Tourism, Hospitality & Event Management

Vitor Braga
António Duarte
Carla Susana Marques *Editors*

Economics and Management of Geotourism

Springer

Tourism, Hospitality & Event Management

This book series covers all topics relevant in the tourism, hospitality and event industries. It includes destination management and related aspects of the travel and mobility industries as well as effects from developments in the information and communication technologies. “Tourism, Hospitality & Event Management” embraces books both for professionals and scholars, and explicitly includes undergraduate and advanced texts for students. In this setting the book series reflects the close connection between research, teaching and practice in tourism research and tourism management and the related fields.

More information about this series at https://link.springer.com/bookseries/15444

Vitor Braga • António Duarte •
Carla Susana Marques
Editors

Economics and Management of Geotourism

Springer

Editors
Vitor Braga
CIICESI, Escola Superior de Tecnologia e Gestão
Politécnico do Porto
Felgueiras, Portugal

António Duarte
School of Management and Technology
Porto Polytechnic
Felgueiras, Portugal

Carla Susana Marques
Centre for Transdisciplinary Development Studies
University of Trás-os-Montes and Alto Douro
Vila Real, Portugal

ISSN 2510-4993 ISSN 2510-5000 (electronic)
Tourism, Hospitality & Event Management
ISBN 978-3-030-89838-0 ISBN 978-3-030-89839-7 (eBook)
https://doi.org/10.1007/978-3-030-89839-7

Preface: The Economics of Geotourism

Over the years, tourism-related activities have rightfully deserved the attention received from academics, policy-makers and practitioners, in particular with regard both to their impact on processes of wealth creation and their contribution to fostering socio-economic development and environmental sustainability. More recently, within the context of the tourism industry, geotourism has been gaining relative importance and, even though the academic literature remains incipient, researchers are already providing major new insights by exploring its local development impact, the entrepreneurial processes involved, and the management and resource allocation challenges that geotourism presents.

Geotourism and other forms of non-conventional tourism can be seen as forms of differentiating from mainstream tourism, leveraging existing endogenous particular conditions of territories and exploiting the consumers' needs to diversify their tourism consumption forms. Although geotourism conditions are not new (usually characterised by their millennial existence), only recently there has been a worldwide concern marketing such potential. Dowling (2011) defines Geotourism as a form of nature tourism centred on the geology and landscape of a territory, inviting visitors—tourists and local residents alike—to geosites aiming to provide educational experiences allied with a pleasurable experience and by deepening understanding and knowledge of geology and other earth sciences, and, simultaneously, raising awareness of the necessity for geodiversity preservation.

Geotourism contributes positively to rural development while expanding the tourism sector as a whole (Dowling and Newsome 2006). Above all, it is a sustainable form of tourism that has the potential to deliver economic and social benefits to the hosting communities. Five key objectives are common to all the activities involved in geotourism: (1) the development of greater awareness and understanding of the significant contributions geotourism can make to the environment, local communities and the economy; (2) the promotion of equity in the geo-development process; (3) sustainable improvements in the quality of life of the host community; (4) delivery of high levels of quality—both experiential and educational—in the visitor experience; and (5) the protection of the quality of the

geological heritage on which the above objectives depend. With its focus on landscape conservation, local economic development and social progress, geotourism operationalises many of the basic principles of sustainability that have already become embedded in broader regional strategies.

All tourism development, including that of geotourism, involves multiple stakeholders, including businesses, government departments and agencies at national and regional levels, as well as community and environmental groups. Due to their direct impact on tourism production and consumption, landscapes indirectly influence opportunities for regional development. Consequently, with regional development and landscape conservation so inextricably intertwined, most accounts of geotourism have foregrounded sustainable rural development as both justification and desired outcome, focusing on the competitive advantages that can be derived from presenting potential visitors with spectacular scenery, geological marvels capable of reconfiguring, exemplifying and projecting territorial identity (Stoffelen and Vanneste 2015). Furthermore, in geotourism development, one of two main approaches tends to predominate: a geological focus on landscape, geological inventories, and conservation and/or a more geographical focus on regional identity, tourism and local entrepreneurship. Thus, from the geological perspective, geotourism is a distinctive subsector in contrast to other tourism niches such as ecotourism and cultural tourism (Dowling and Newsome 2006; Newsome et al. 2012), whereas from the geographical standpoint, it is a global phenomenon in which various types of organisations deploy a series of location-specific products, services and experiences related to the identity of the destination (Bosak et al. 2010).

Geo- or landscape tourism also has the capacity to assist in the regeneration of private rural property, provided they possess significant geological heritage assets (O'Connor 2008). Geopark sites constitute the core of geotourism development because they possess unique geological resources that require protection and conservation so they can be employed for scientific, educational and tourism purposes. As such, geoparks provide the basis for an innovative approach to the conservation of the natural and geological heritage, the expansion of local economic opportunities and rebuilding of local social cohesion and identity.

In line with the emerging nature and status of this theme, and the gaps that still exist in the literature, the aim of the proposed book is to provide insights into the impacts of geotourism in economic and social development processes and to explore to what extent the opportunities and challenges facing geotourism reflect current trends in the tourist industry, as a whole. Our aim is to bring attention to the economics and management of geotourism. This approach is innovative since, to date, the theme has been examined primarily from the natural sciences perspective to the detriment of issues related to local economic and social impact, inter-organizational collaboration, tourist responses and community participation. This book includes contributions from different authors, and seven chapters provide different angles of the economics of geotourism.

The first chapter explores how the literature has explored the topic, mapping the scientific production on the topic over the years. This provides an important context for the empirical chapters that are presented subsequently. This chapter contributes

to understanding how the literature has grouped into different themes and refers to three groups: (1) sustainable geotourism development, (2) geopark network and (3) geosites' tourism value.

The second chapter explores one of the UNESCO geoparks contribution to the development of the territory, providing insights from Portugal. In this chapter, the development of a strategic plan for the territory is explored, emphasising the necessity of organised forms of strategic planning, including the different stakeholders so that the promotion of the territory is achieved. Therefore, this book also advocates the role of geoparks in promoting territorial development.

In addition to promoting territorial development, geoparks also play a central role in territorial branding and attracting public into the region. The third chapter explores how place branding leverages the territories, presenting the case of Geopark Odsherred in Denmark.

However, the attraction of an increased number of visiting brings additional challenges to the territory, namely in terms of its sustainability. In light of such concerns, the management of geoparks needs to be carefully conducted, and structured and systematic forms of management are required. To such extent, Chapter 4 explores the certification procedures of sustainability quality verification taking into account both knowledge management and participatory management. This chapter brings evidence from the Czech Republic's experience in ensuring sustainable management of geoparks through the certification processes as the basis for geoparks quality management. In a different perspective, Chapter 5 also discusses the management of a Portuguese Geopark—Arouca Geopark. However, this chapter brings into discussion the general management of the geopark, describing strategies for the promotion of the territory.

Finally, territorial branding is also explored from the social media perspective. Chapter 6 explores the impact of geotourism on destination brand selection with social media as the moderating variable. In fact, territorial branding, as much as any other industry marketing, has been benefiting from social media, with new forms of approaching existing and potential new customers.

Felgueiras, Portugal Vitor Braga
Felgueiras, Portugal António Duarte
Vila Real, Portugal Carla Susana Marques

References

Bosak K, Boley B, Zaret K (2010) Deconstructing the crown of the continent: power, politics and the process of creating National Geographic's geotourism Mapguides. Tour Geograph 12 (3):460–480

Dowling RK, Newsome D (2006) Geotourism: sustainability, impacts and management. Elsevier, Oxford

Dowling R (2011) Geotourism's Global Growth, Geoheritage 3:1–13

Newsome D, Dowling R, Leung Y-F (2012) The nature and management of geotourism: a case study of two established iconic geotourism destinations. Tour Manage Perspect 2–3:19–27. https://doi.org/10.1016/j.tmp.2011.12.009

O'Connor PJ (2008) The role of geotourism in supporting regeneration in disadvantaged rural communities in Ireland. WIT Trans Ecol Environ 115:267–275

OECD (2013) Innovation driven-growth in regions: the role of smart specialisation. OECD Publishing, Paris

Stoffelen A, Vanneste D (2015) An integrative geotourism approach: bridging conflicts in tourism landscape research. Tour Geograph 17(4):544–560

Contents

Contributors

Patrícia Azevedo Associação Geopark Estrela, Guarda, Portugal

Vitor Braga CIICESI; Porto Polytechnic – School of Technology and Management, Felgueiras, Portugal

João Castel-Branco Associação Geopark Estrela, Guarda, Portugal

Emanuel de Castro Associação Geopark Estrela, Guarda, Portugal

Lucas Cezar Associação Geopark Estrela, Guarda, Portugal

António Duarte AGA – Arouca Geopark Association; CETRAD – Centre for Transdisciplinary Development Studies, University of Trás-os-Montes e Alto Douro, Vila Real, Portugal
ESTG – School of Management and Technology, Institute Polytechnic of Porto, Porto, Portugal

Magda Fernandes Associação Geopark Estrela, Guarda, Portugal

Anderson Galvão CETRAD – Centre for Transdisciplinary Development Studies, University of Trás-os-Montes e Alto Douro, Vila Real, Portugal
ESTG – School of Management and Technology, Institute Polytechnic of Porto, Porto, Portugal

Hugo Gomes Associação Geopark Estrela, Guarda, Portugal

Elahe Hosseini Faculty of Management, Yazd University, Yazd, Iran

Fábio Loureiro Associação Geopark Estrela, Guarda, Portugal

Carla Susana Marques CETRAD – Centre for Transdisciplinary Development Studies, Universidade de Trás-os-Montes e Alto Douro, Vila Real, Portugal

Carla Mascarenha Universidade de Trás-os-Montes e Alto Douro, Vila Real, Portugal

Martina Pásková Department of Recreology and Tourism, University of Hradec Králové, Hradec Králové, Czech Republic

Filipe Patrocínio Associação Geopark Estrela, Guarda, Portugal

Daniela Rocha AGA – Arouca Geopark Association, Arouca, Portugal

Aidin Salamzadeh Faculty of Management, University of Tehran, Tehran, Iran

Yashar Salamzadeh Graduate School of Business, Universiti Sains Malaysia, Penang, Malaysia

Mehdi Tajpour Faculty of Entrepreneurship, University of Tehran, Tehran, Iran

Charlotte Werther Copenhagen Business School, Management, Society and Communication, Frederiksberg, Denmark

Geotourism as Promoter of Sustainability Development: A Systematic Review and Research Agenda

Anderson Galvão, Carla Mascarenhas, Carla Marques, and Vitor Braga

Abstract This study explored the existing literature on geotourism in order to identify current and potential trends in order to encourage new research. The data were collected only from papers published in academic journals included in the Scopus database as it contributed the most journals with the largest number of publications on geotourism. The 192 articles that served as the basis for the study were found by conducting a search with the keywords 'geotourism' AND 'economy' OR 'management'. The results reveal three clusters of papers: (1) sustainable geotourism development, (2) geopark network and (3) geosites' tourism value. The findings contribute to a better understanding and mapping of the existing literature on geotourism, as well as suggesting new lines of research.

Keywords Geotourism · Local/regional development · Geoparks network · Geosite

1 Introduction

Geotourism is defined as tourism that focuses on using areas' geology and landscapes to promote sustainable tourism development, that is, a new approach to tourism based on geological environments (Ólafsdóttir and Dowling 2014).

A. Galvão (✉)
CETRAD – Centre for Transdisciplinary Development Studies, University of Trás-os-Montes e Alto Douro, Vila Real, Portugal

ESTG – School of Management and Technology, Institute Polytechnic of Porto, Porto, Portugal
e-mail: anderson@utad.pt

C. Mascarenhas · C. Marques
CETRAD – Centre for Transdisciplinary Development Studies, University of Trás-os-Montes e Alto Douro, Vila Real, Portugal
e-mail: carlam@utad.pt; smarques@utad.pt

V. Braga
CIICESI; Porto Polytechnic – School of Technology and Management, Porto, Portugal
e-mail: vbraga@estg.ipp.pt

V. Braga et al. (eds.), *Economics and Management of Geotourism*, Tourism, Hospitality & Event Management, https://doi.org/10.1007/978-3-030-89839-7_1

Geotourism sustains and enhances locations' distinctive character, seeks to recognise and protect natural structures and contributes to local and regional development through specificities emerging from geological features (Dowling and Newsome 2006). Thus, geotourism is sustainable tourism that primarily focuses on experiences of geological characteristics that promote tourists' understanding and appreciation of geosites, foster environmental and cultural conservation and benefit local populations. Geotourism is about creating products that protect geographic heritage, help build communities, communicate and enhance geological heritage and involve a wide range of people (Newsome et al. 2012). In the last decade, this tourism niche has become one of the primary and most significant economic activities at a local, national and international level (Dowling and Newsome 2010; Farsani et al. 2014; Lazzari and Aloia 2014).

Geotourism is a relatively new field of research, with studies covering only about a decade. A fuller understanding is needed of this area of knowledge's progress regarding the distribution of innovative ideas across national and international research communities (Ólafsdóttir and Tverijonaite 2018; Ruban 2015), which requires a systematic literature review grounded in bibliometric analysis of publications on this topic. This type of review can identify which lines of investigation have emerged and what gaps still exist. The present study sought, therefore, to provide a clear, systematic review of this field in order to identify current and potential trends and encourage new research formats and perspectives that could fill the gaps detected.

To achieve the proposed objectives, a systematic approach was applied that included a rigorous protocol, a definition of research phases and literature analysis based on published articles listed in Scopus. More specifically, the 192 articles identified as being related to geotourism were submitted to a bibliometric analysis.

This article is structured as follows. After this introduction, the theoretical framework based on the existing literature is briefly discussed. The third section describes the methodology used. The fourth section presents a bibliometric analysis of the articles found in the selected database and discusses the results of a cluster analysis of the articles. The conclusions and future lines of research are presented in the final section.

2 Literature Review

Geotourism is a niche market within tourism that is still in its initial stage of commercial development in most countries. This quite recent approach to tourism is dedicated to exploring nature and landscapes in ecological and sustainable ways. The most comprehensive definition of geotourism available provides clear evidence of these tactics (Newsome and Dowling 2010):

> Geotourism is a form of natural area tourism that specifically focuses on geology and landscape. It promotes tourism to geo-sites and the conservation of geo-diversity and an understanding of earth sciences through appreciation and learning. This is achieved through independent visits to geological features, use of geo-trails and viewpoints, guided tours, geo-activities and patronage of geo-site visitor centres.

Although geotourism is a recent innovation, it has already developed into an activity that is growing rapidly worldwide (Dowling 2011; Dowling and Newsome 2010; Štrba et al. 2016).

One of its main manifestations is the emergence of a global network of geoparks established in 2004 and guided by the United Nations Educational, Scientific and Cultural Organisation (UNESCO) (Farsani et al. 2012, 2014; Lazzari and Aloia 2014; UNESCO 2016). Geoparks are about sustainable development and the stimulation of economic activities through geotourism (Dowling 2013; Han et al. 2018). These parks encourage socio-economic endeavours and sustainability and attract an increasing number of visitors, especially in rural areas where tourism is almost non-existent (Farsani et al. 2011).

Related economic and regional development includes geoproducts connected to geoparks, which are produced by local companies. Sustainable local economies are based on the creation of infrastructure to support tourism, such as accommodations, restaurants, cultural entertainment, museums and interpretive centres, outdoor activities and geoproduct stores (Beretić et al. 2019; Ruban 2016).

3 Methodology

This study sought to analyse trends in geotourism research by using a bibliometric revision of the data in order to propose future lines of investigation. This review also sought to assess the impact of specific publications on this topic, identifying the main journals and authors who have contributed the most to the field's development.

The basic principles on which bibliometric reviews are based include transparency and replicability (Armitage and Keeble-Allen 2008). This quantitative methodology facilitates the measurement of knowledge production and dissemination rates while monitoring the evolution of the relevant academic areas, publication patterns and application of research results. Bibliometric studies have mainly been used to evaluate authors' productivity and carry out citation studies (Araújo 2006).

The present research chose to focus on the Scopus database because of its wide coverage of internationally indexed scientific journals recognised by the academic community for their quality. Notably, some of the articles analysed are also available in the Web of Science database. The study was conducted in February 2020. The keywords selected were 'geotourism' AND 'economy' OR 'management', which were used to search titles, keywords and abstracts. The final set of 192 articles included only academic articles with peer-validated knowledge (Podsakoff et al. 2005). Conference papers, books and book chapters were excluded (see Table 1).

To process the data obtained, the present study used the analysis options offered by the Scopus platform and Interface de R pour les Analyses Multidimensionnelles de Textes et de Questionnaires (Iramuteq) software. These analysis functions generated bibliometric maps, following procedures that favour strong visual components (e.g. Perianes-Rodriguez et al. 2016; van Eck and Waltman 2009; Waltman et al. 2010).

Table 1 Phases of the methodological process

Phase	Description	Results
Phase 1	Choice of Scopus database	–
Phase 2	Search of database with keywords 'geotourism' AND 'economy' OR 'management'	250 documents
Phase 3	Selection of academic publications only, excluding conference papers, books and book chapters	197 papers
Phase 4	Analysis of 192 publications from 1997 to 2019	192 papers*

Note: Five papers published in 2020 were removed

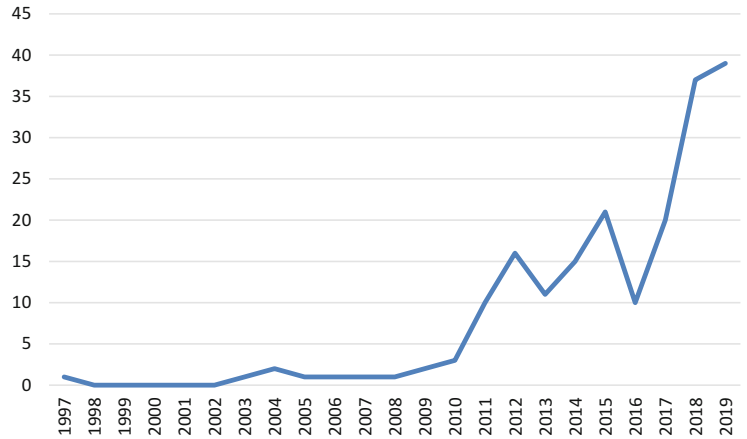

Fig. 1 Total publications by year

4 Results

4.1 Characterisation of Papers Under Study (1997–2019)

As can be seen from the results presented in Fig. 1, research on geotourism has grown quite significantly over the last few years. The graph confirms that the number of published articles started to increase noticeably from 2010 onward, reaching a peak in 2019 with 39 published articles. The results reveal that interest in geotourism is relatively recent and that, over the past decade, an increasing volume of contributions have been made to this field's development. In 10 years (2010–2019), 182 articles were published, which is approximately 95% of all publications on this topic.

With regard to citations per publication (see Fig. 2), citations have increased significantly since 2010. This trend may be related to the large number of publications that appeared starting with that year.

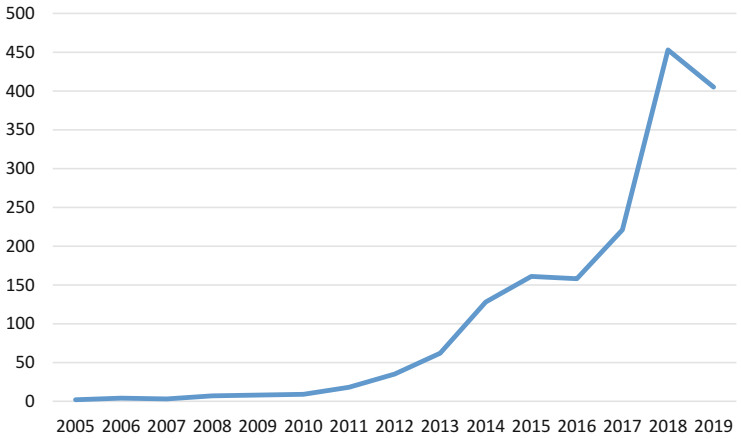

Fig. 2 Total citations by year

The *h*-index of the data under analysis is 23, which means that 23 papers have had more than 23 citations. This index can be used to identify the most important publications (Gundolf and Filser 2013). The citations mirror correspondences between authors' work and conjunctions of different scientific ideas (Kraus et al. 2014). Articles are frequently cited because they convey useful scientific knowledge, and they can be used as the basis for further research (Acedo and Casillas 2005). Table 2 shows the five most cited articles in this field, each with more than 59 citations.

To clarify why these are the most cited articles, each article is summarised in more detail below. Hose's (2012) paper, "3G's for Modern Geotourism', examines an instance of geotourism in the United Kingdom while providing an outline of the historical and theoretical foundations of geotourism and its approaches to sustainable management. The cited author defines three interrelated aspects of contemporary geotourism—geoconservation, geohistory and geo-interpretation—and provides a chronological description of geotourism's development.

Farsani et al. (2011), in turn, compare 25 different geoparks as tourism destinations in Europe, Asia, Australia and South America. These authors assess various tourism development strategies in geoparks and discuss the role geoparks play in improving local economies and populations' business opportunities.

Newsome et al. (2012) describe geotourism's characteristics and challenges based on an examination of two geosites in Taiwan and Australia. The cited authors show that the sustainable management of visitors in iconic geosites can be challenging despite the presence of infrastructure, protection and interpretation services. Newsome et al.'s (2012) results underline the importance of managing tourists in geoparks and the resulting implications for geotourism.

Fassoulas et al. (2012) used a new quantitative methodology to evaluate how geotopes can be used to promote the sustainable management and conservation of geological heritage. Sustainable development, education and conservation are

Table 2 Top five articles with the most citations

Number	Title	Author	Journal	Publication year	Number of citations
1	'3G's for Modern Geotourism	Hose, T. A.	*Geoheritage*	2012	116
2	'Geotourism and Geoparks as Novel Strategies for Socio-economic Development in Rural Areas'	Farsani, N. T., Coelho, C. and Costa, C.	*International Journal of Tourism Research*	2011	114
3	'The Nature and Management of Geotourism: A Case Study of Two Established Iconic Geotourism Destinations'	Newsome, D., Dowling, R. and Leung, Y. F.	*Tourism Management Perspectives*	2012	78
4	'Quantitative Assessment of Geotopes as an Effective Tool for Geoheritage Management'	Fassoulas, C., Mouriki, D., Dimitriou-Likolakis, P., Iliopoulos, G.	*Geoheritage*	2012	60
5	'Preliminary Geosite Assessment Model and Its Application on Fruška Gora Mountain, Potential Geotourism Destination of Serbia'	Vujicic, M. D., Vasiljevic, D. A., Markovic, S. B., Hose, T. A., Lukic, T. and Hadzic, O.	*Acta Geographivs Slovenica*	2011	60

central issues for any protected areas' successful management, so the cited study focused on developing specific indices to determine the relative value of geotopes' tourism, educational and protection requirements.

Vujicic et al.'s (2011) paper presents a preliminary model of physical assessments of geosites, which can be used to facilitate natural heritage sites' sustainable planning and management and their transformation into tourism destinations. The cited proposed model could provide vital assistance to those seeking to protect natural heritage and to tourism agents so that they can more easily assess geosites' current state and determine the best path to follow in the future.

4.2 Characterisation of Journals and/or Sources Under Study

Table 3 lists the five journals that have contributed the most to the literature on geotourism. *Geoheritage* is responsible for most publications (58 articles), starting in

Table 3 Top five geotourism journals

Journal	Number of publications	Number of citations	Year	SJR 2018
Geoheritage	58	761	2010–2019	0.563
Geojournal of Tourism and Geosites	13	24	2016–2019	0.24
Geosciences Switzerland	11	94	2018–2019	0.392
Przeglad Geologiczny	7	13	2011–2015	0.281
Quaestiones Geographicae	6	68	2012–2018	0.236

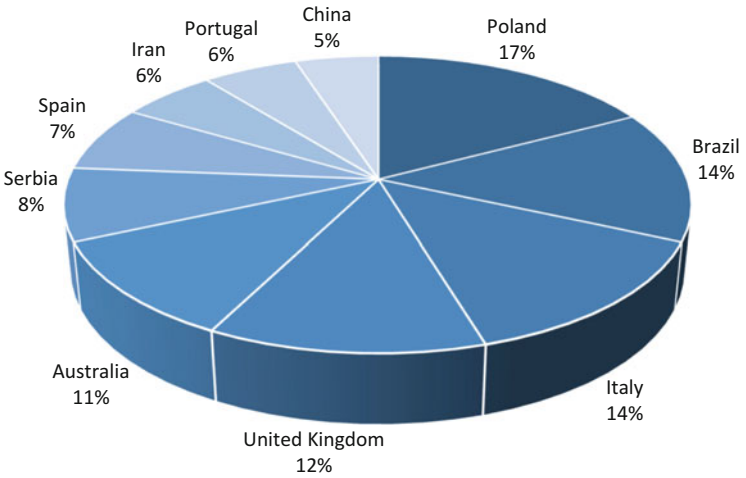

Fig. 3 Top ten countries with the most publications

2010. In addition, this magazine has the largest number of citations (761 citations) and the highest SCImago Journal Rank (SJR) value (0.563). This indicator measures journals' scientific prestige.

Figure 3 shows the ten countries that have contributed the most to the existing literature under study. Poland leads with 24 publications, followed by Brazil (20), Italy (19) and the UK (17). Together these ten countries represent 72% of the total number of countries contributing published articles in this field.

Regarding the authors of the 192 articles on which this study was based, the results in Table 4 show which authors have published the most in recent years and the articles' respective number of citations. The five authors with the most publications on this topic represent approximately 16% of the articles analysed. Hose has the largest number of publications (eight papers), followed by Markovic and Vasikjevic with six publications each. Hose also has the largest number of citations (339) and the highest citation average per article (42.4).

Table 4 Top five authors

Authors	Number of publications	Number of citations	Average citations per article
Hose	8	339	42.4
Markovic	6	115	19.2
Vasikjevic	6	165	27.5
Ruban	5	20	4
Tomic	5	53	10.6

4.3 Cluster Analysis

Iramuteq software was used to conduct the corpus analysis. Each article corresponds to an initial context unit (ICU), while each term in that article constitutes an elementary context unit (ECU). Thus, the corpus comprised 188 ICUs that gave rise to 1041 ECUs, which contained 5116 different words with an average frequency of occurrence of 35.77% per segment. The proportion of ECUs retained for analysis was 80.40%. The words were reduced to their roots, from which 4108 stem cells were obtained, resulting in 837 ECUs, 3651 analysable words or active forms and 457 supplementary forms.

Descending hierarchical classification isolated three classes composed of different text segments. The words considered were those with the highest quantitative degree of significance based on a chi-square test (<0.001). The distribution of words by clusters can be seen in Fig. 4.

Based on the above results, three distinct clusters were found, each of which reflects the associations between the terms most often referred to in the set of articles under analysis. The three clusters were given the following names:

- Cluster 1: Sustainable geotourism development (32.9%).
- Cluster 2: Geopark network (25.9%).
- Cluster 3: Geosites' tourism value (41.2%).

4.3.1 Cluster 1: Sustainable Geotourism Development

Geotourism attracts the public's attention to their shared geological heritage, increasing their knowledge of geology and contributing to local economies (Buckley 2003; Chakrabarty and Mandal 2018; Christian 2018; Gürer et al. 2019; Hose 2007; Ólafsdóttir and Tverijonaite 2018; Slomka and Mayer 2011; Štrba et al. 2018). An assessment of geodiversity is one of the earliest and most crucial stages in geoconservation initiatives' development. Parameters must be established that quantify abiotic elements and places in order to highlight features that are more valuable than others. In this way, areas can be managed so that their notable geographical heritage is protected and sustainable activities such as geotourism are developed

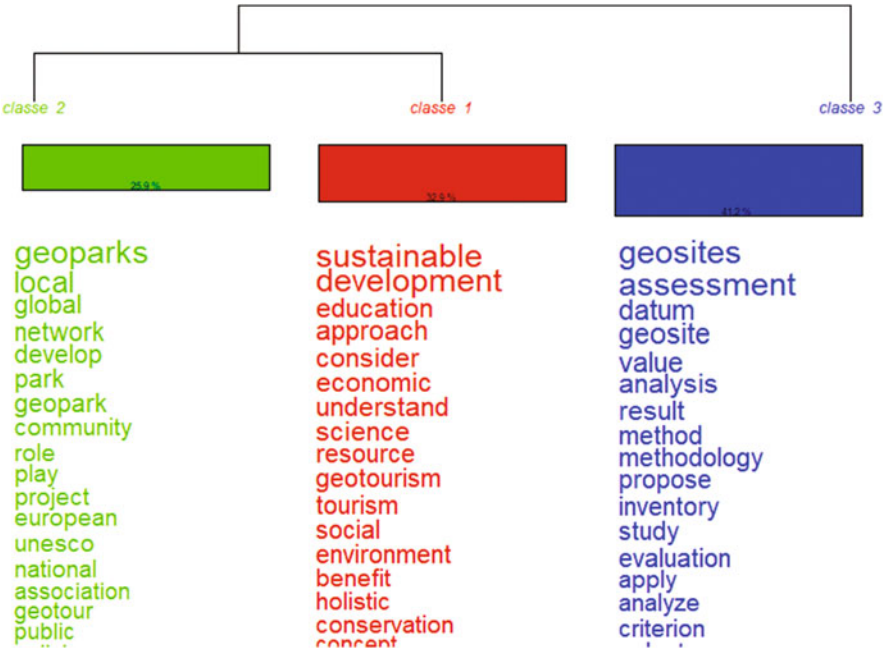

Fig. 4 Dendrogram of descending hierarchical classification: clusters identified

(da Silva et al. 2019; Escorihuela and Dowling 2015; Fassoulas et al. 2012; Ozis et al. 2014; Ruiz-Real et al. 2019; Rutherford et al. 2015).

The recognition, selection and quantitative assessment of geological and geomorphological sites of interest are fundamental steps in environmental management focused on geoconservation and geotourism promotion (Gladfelter and Mason 2012; Martín-Duque et al. 2012; Ortega-Becerril et al. 2019; Planagumà and Martí 2018; Tokarczyk-Dorociak et al. 2015). Mapping these sites can provide a preliminary tool with which to protect natural areas and manage land use, as maps use an easily transmitted international language that cannot be misinterpreted (Kiernan 2013). The mapping process offers excellent opportunities to transfer geoscience information to the public in general and to policymakers. Recently, geotourism maps have become a standard strategy for protecting and promoting relevant places and a means of activating and mediating geotourism's regional image (Bouzekraoui et al. 2018; Clivaz and Reynard 2018; Ernawati et al. 2018; Pellitero et al. 2015; Pereira and Ruchkys 2016; Von Ahn and Simon 2017).

The sustainable management of natural resources driven by geodiversity transforms long-forgotten sites and allows them to become important tourist attractions (Brocx and Semeniuk 2019; Crane and Fletcher 2016; Kaźmierczak et al. 2019; Piedrabuena et al. 2019; Tefogoum et al. 2014; Woźniak et al. 2015). Thus, national geological parks are now natural legacies visited by millions of tourists whose length of stay varies significantly (Górska-Zabielska and Zabielski 2017). Geosites

and geoparks open new doors for tourism destinations, especially for rural tourism, and create job opportunities and revenues. Geosites constitute an invaluable national and international heritage for current and future generations, facilitating a better understanding of the past and present (Badang et al. 2017; Lima et al. 2015; Modrej et al. 2018; Shafiei et al. 2017).

Geology is a science based on fieldwork, so it cannot survive without direct observations and teaching and researching geology would be extremely difficult without field studies. Geological records are formed over millions of years and require special care, and once these sites are destroyed, they are lost forever. Based on these resources, geoparks and the associated geotourism reduce migration and unemployment rates in rural areas and provide a platform for isolated populations to find sustainable forms of economic development (Antić et al. 2019; Burlando et al. 2011; Farsani et al. 2011; Plyusnina et al. 2016; Mokhtari et al. 2019).

However, for geotourism development to be successful, this niche market's specific needs must be recognised (Arjana et al. 2019; Bouzekraoui et al. 2018; Vasiljević et al. 2018). Geoparks have to be created in order to foster educational opportunities focused on geodiversity, geotourism and scientific debate. Geo-singularities such as geoparks' features stand out the most for tourists because of their processes, shapes, composition or imposing physical presence. Geo-singularities are, therefore, of prime geotourism value.

Tourism worldwide is currently characterised by a significant increase in tourists, which in many cases translates into a massification of tourism in places unprepared to receive so many visitors (Avelar et al. 2015; Han et al. 2018; Wang et al. 2019). In this context, a greater emphasis has recently been placed on geoconservation's broader, unscientific value (Lugeri and Farabollini 2018; Meini et al. 2018; Tičar et al. 2018) through features such as ecosystems, biodiversity, cultural heritage and geotourism—in association with a better understanding of landscapes, climate change and natural risks. Planning and managing protected areas can help to protect geoheritage based on the public's involvement—beyond that of the scientific community—and efforts to promote a fuller integration of geoheritage into nature conservation agendas, including terrestrial ecosystems (Gordon et al. 2019; Lokier 2013; Necheş and Erdeli 2015; Singtuen and Won-In 2018; Soliman and Abou-Shouk 2017).

4.3.2 Cluster 2: Geopark Network

Despite the efforts made at the central state or municipal level, a clear discrepancy still exists between the national and international protection of biotic and abiotic elements. Over the past 20 years, geological heritage management has undergone profound theoretical and practical changes that have resulted in the creation of geoparks (Fung and Jim 2015; Poiraud and Dandurand 2017). These parks are areas with a specific geological heritage (Newsome et al. 2012). Officials have worked with residents to develop strategies for sustainable regional development,

including geotourism offers, thereby creating added value for all those involved (Moufti et al. 2013; Wang et al. 2015).

Geoparks can be recognised at the national, European and UNESCO levels, but these parks are not included under nature protection laws (Megerle and Pietsch 2017). Geoparks often totally or partially overlap with large-scale protected areas, such as national parks and nature or biosphere reserves (Mulec and Wise 2013). This territorial overlap generates opportunities and risks for geoparks. The main benefits arise from geotopes' automatic integration into the general protected status of more extensive reserves. The risks are mainly potential competition or less visibility due to the greater popularity of the large-scale protected areas in question. Whether overlapping areas have positive or negative side effects can largely be traced back to key decision-makers, who usually include executive directors. The degree of territorial overlap appears to be less crucial than the existence of joint activities and, ideally, joint headquarters with common personnel (Megerle and Pietsch 2017).

Geoparks have evolved from a small subfield of geosciences and conservation into an internationally recognised issue (i.e. UNESCO) (Hose and Vasiljević 2012). New kinds of participants have gotten involved (e.g. professionals and social scientists), which has led to changes in behaviours and innovative practices. This paradigm shift and the intensification of geotourism practices have tended to generate growing tensions between the imperatives of geographic heritage conservation, on the one hand, and the challenges of regional development, on the other (Poiraud and Dandurand 2017). Originally, the threat to geological heritage was the geopark movement's starting point in the late 1990s, and, ever since it has developed rapidly (Hose 2012; Megerle and Pietsch 2017).

Natural resource conservation overall is a social process that has adapted and changed over the years. Geoparks, as part of this process, have sought comprehensive, compulsory and participatory management of their resources (Farsani et al. 2014; Khoshkam and Jaafar 2016; Cortez and Tasiguano 2018). In the past 20 years, considerable effort has been made to develop geotourism as a form of sustainable tourism (Farsani et al. 2011). These decades have also been a period of significant growth in UNESCO's Global Geoparks (144 in total) initiative with the creation of the International Geoscience and Geoparks Programme and in the number and diversity of geoparks recognised worldwide. These geoparks have particular characteristics, such as spatial involvement and commitment to sustainable geotourism (Warowna et al. 2014). Geoparks also have an economic and educational and/or information function (Ólafsdóttir and Dowling 2014; Ruban 2019; Warowna et al. 2016; Yuliawati et al. 2016).

4.3.3 Cluster 3: Geosites' Tourism Value

Geosites are a precious, non-renewable resource in the geosphere, offering educational, scientific, natural and cultural riches that have a high economic potential (Anifowose and Kolawole 2014; Antić et al. 2019; Planagumà and Martí 2018).

Geotourists who visit geosites are distinct from other forms of tourism in natural areas as geotourism focuses on the economic uses of geological resources within the tourism industry (Chakrabarty and Mandal 2018; Norrish et al. 2014; Singtuen and Won-In 2018; Štrba et al. 2016).

Geomorphological mapping plays a fundamental role in the representation of landscapes, serving as the starting point for many applications and the creation of thematic maps of, among others features, hazards and risks, geographic heritage and geotourism attractions. Traditional geomorphological maps are useful for scientific purposes but need to be simplified to serve different purposes such as management and education. Tourism is enhanced by the mapping of geomorphological resources and geomorphic evidence of past dangerous geomorphological events. These maps are an important way to increase knowledge about landscapes' evolution and active processes, potentially involving geomorphosites and hiking trails (Bruno and Perrotta 2012).

Over the past two decades, numerous geosite inventories have been carried out. These surveys aim to document the state of geological heritage, based on which management strategies can be implemented (Annad et al. 2017; Hose 2012; Tomić and Božić 2014). Regions with large population agglomerations have extensively modified the original geomorphology to accommodate infrastructure, agriculture, urban growth and various modifications of natural features. Thus, inventories must include not only visible landforms but also ancient natural features destroyed or hidden by human activities (Bouzekraoui et al. 2018).

The growing interest in geotourism has increased the need for quantitative assessments of geosites as a fundamental step towards applying geoconservation strategies that guarantee the organisation, management and sustainable use of natural resources (Cappadonia et al. 2018). The recognition, selection and quantitative evaluation of geological and geomorphological sites of interest are important stages in environmental management seeking to foster geoconservation and geotourism (Cortez and Tasiguano 2018; Suzuki and Takagi 2018), especially in rural areas (Forleo et al. 2017).

However, newly identified geosites' potential educational value lies mainly in the way that the sites are presented. These places' attractiveness to geotourism and other types of tourism depends on new exhibitions, accessibility and local populations' initiative. Geotourism routes need to be included on tourist maps, which are an essential tool for promoting geotourism and an efficient way to popularise geosciences (Annad et al. 2017; Bouzekraoui et al. 2018). Because of natural processes' dynamics, the legally mandatory protection of existing natural features is only partially applicable to the conservation and management of emerging geosites.

Therefore, each location requires a tailor-made approach to identify good sustainable management practices (Migoń and Pijet-Migoń 2017). The protection and use of new geosites as places of touristic interest depend heavily on the local communities' stance (Mikhailenko et al. 2019). These places thus need to be safeguarded, even though many of them are already in protected areas (Ferreira

et al. 2019). Geosites can also offer unique opportunities to create independent geoparks, which generate regional geo-education and geotourism programmes (Farsani et al. 2014; Fijałkowska-Mader and Malec 2013; Górska-Zabielska and Kamieńska 2017; Kocan and Yucesoy 2016; Moufti et al. 2013; Németh and Moufti 2017; Newsome et al. 2012).

5 Conclusion

Geotourism, despite being a global phenomenon, is a relatively recent concept, as can be seen from this bibliometric literature review. Publications began to appear systematically only after 2008, and, since 2010, the number of publications has risen sharply. Geotourism can help finance the conservation of geological areas of interest, many of them previously degraded and nearly lost. With the 2008 crisis, this niche market gained new strength, once again attracting funding to areas governments were unwilling to support (Hose 2012). The present review's results show that a large proportion of the articles under study have focused on geotourism in association with geoconservation.

The preservation of these significant geological places favours the creation of tourist attractions that are increasingly in demand, thereby favouring local economies. The conservation and dissemination of information about these sites overall favours local tourism development, often in isolated rural regions with no other means of subsistence. The three clusters presented above highlight that aquatic or terrestrial geological formations have a high potential for tourism, either in isolation as geosites or as geoparks.

While this research's design has limitations resulting from the choice of keywords and use of only one database, the findings contribute useful insights, including that most studies have focused on the possibility of regional development based on geotourism. Only a few have concentrated on geotourism from the tourists' perspective. In addition, interesting results could be obtained from investigating whether these places of geological interest have the necessary infrastructure to meet visitors' demands.

Studies focused on all geotourism stakeholders would be equally relevant, as well as research on how effectively these sites' managers have developed the areas in which they operate. Finally, further studies are needed to confirm the extent to which geotourism has economically boosted the regions surrounding this type of tourist attraction, with reference to data on financial aspects and job creation.

Acknowledgement This work is supported by national funds, through the FCT—Portuguese Foundation for Science and Technology under the project UIDB/04011/2020 and UIDB/04728/2020.

References

Acedo FJ, Casillas JC (2005) Current paradigms in the international management field: an author co-citation analysis. Int Bus Rev 14(5):619–639

Anifowose AYB, Kolawole F (2014) Appraisal of the geotourism potentials of the Idanre Hills, Nigeria. Geoheritage 6(3):193–203

Annad O, Bendaoud A, Goria S (2017) Web information monitoring and crowdsourcing for promoting and enhancing the Algerian geoheritage. Arab J Geosci 10(13):276

Antić A, Tomić N, Marković S (2019) Karst geoheritage and geotourism potential in the Pek River lower basin (eastern Serbia). Geogr Pannonica 23(1):32–46

Araújo CA (2006) Bibliometria: evolução histórica e questões atuais. Em questão 12(1):11–32

Arjana IWB, Ernawati NM, Astawa IK (2019) Tourist attractions of Batur Geotourism, Bali. J Environ Manage Tour 10(6):1399–1404

Armitage A, Keeble-Allen D (2008) Undertaking a structured literature review or structuring a literature review: tales from the field. Electron J Bus Res Methods 6(2):103–114

Avelar S, Mansur KL, Anjos SC, Vasconcelos GF (2015) Community perceptions for geoconservation of a coastal area in Rio de Janeiro, Brazil. Geoheritage 7(3):275–283

Badang D, Ali CA, Komoo I, Leman MS (2017) Sustainable geological heritage development approach in Sarawak Delta, Sarawak, Malaysia. Geoheritage 9(4):443–462

Beretić N, Đukanović Z, Cecchini A (2019) Geotourism as a development tool of the geo-mining Park in Sardinia. Geoheritage 11(4):1689–1704

Bouzekraoui H, Barakat A, El Youssi M, Touhami F, Mouaddine A, Hafid A, Zwoliński Z (2018) Mapping geosites as gateways to the geotourism management in central high-Atlas (Morocco). Quaestiones geogr 37(1):87–102

Brocx M, Semeniuk V (2019) Building stones can be of geoheritage significance. Geoheritage 11(1):133–149

Bruno DE, Perrotta P (2012) A geotouristic proposal for Amendolara territory (northern ionic sector of Calabria, Italy). Geoheritage 4(3):139–151

Buckley R (2003) Environmental inputs and outputs in ecotourism: geotourism with a positive triple bottom line? J Ecotour 2(1):76–82

Burlando M, Firpo M, Queirolo C, Rovere A, Vacchi M (2011) From geoheritage to sustainable development: strategies and perspectives in the Beigua Geopark (Italy). Geoheritage 3(2):63–72

Cappadonia C, Coratza P, Agnesi V, Soldati M (2018) Malta and Sicily joined by geoheritage enhancement and geotourism within the framework of land management and development. Geosciences 8(7):253

Chakrabarty P, Mandal R (2018) Geotourism mapping for sustainability: a basin oriented approach. GeoJ Tour Geosites 21(1):174–185

Christian D (2018) A history of Russia, Central Asia and Mongolia, volume II: inner Eurasia from the Mongol empire to today, 1260–2000. Wiley

Clivaz M, Reynard E (2018) How to integrate invisible geomorphosites in an inventory: a case study in the Rhone River valley (Switzerland). Geoheritage 10(4):527–541

Cortez JLS, Tasiguano MS (2018) Los geoparques y su implantación en América Latina. Estudios geográficos 79(285):445–467

Crane R, Fletcher L (2016) The speleotourist experience: approaches to show cave operations in Australia and China. Helictite 42:1–11

da Silva MLN, do Nascimento MAL, Mansur KL (2019) Quantitative assessments of geodiversity in the area of the Seridó Geopark project, Northeast Brazil: grid and centroid analysis. Geoheritage 11(3):1177–1186

Dowling RK (2011) Geotourism's global growth. Geoheritage 3(1):1–13

Dowling RK (2013) Global geotourism–an emerging form of sustainable tourism. Czech J Tour 2(2):59–79

Dowling RK, Newsome D (eds) (2006) Geotourism. Routledge, Oxford

Dowling RK, Newsome D (2010) Geotourism a global activity. Goodfellow, Oxford

Ernawati NM, Sitawati AAR, Muliati NK (2018) Batur toward sustainable tourism development-a community-based geotourism case from Bali in Indonesia. J Environ Manage Tour 9 (2 (26)):291–297
Escorihuela J, Dowling RK (2015) Analysis of the geotouristic activity in the geologic park of Aliaga, Spain: progress, threats and challenges for the future. Geoheritage 7(3):299–306
Farsani NT, Coelho C, Costa C (2011) Geotourism and geoparks as novel strategies for socio-economic development in rural areas. Int J Tour Res 13(1):68–81
Farsani NT, Coelho C, Costa C (2012) Geotourism and geoparks as gateways to socio-cultural sustainability in Qeshm rural areas, Iran. Asia Pac J Tour Res 17(1):30–48
Farsani NT, Coelho CO, Costa CM (2014) Analysis of network activities in geoparks as geotourism destinations. Int J Tour Res 16(1):1–10
Fassoulas C, Mouriki D, Dimitriou-Nikolakis P, Iliopoulos G (2012) Quantitative assessment of geotopes as an effective tool for geoheritage management. Geoheritage 4(3):177–193
Ferreira ARR, Lobo HAS, de Jesus Perinotto JA (2019) Inventory and quantification of geosites in the state Tourist Park of Alto Ribeira (PETAR, São Paulo state, Brazil). Geoheritage 11(3):783–792
Fijałkowska-Mader A, Malec J (2013) ARTYKUŁY GEOTURYSTYCZNE Waloryzacja geostanowisk na obszarze projektowanego Geoparku Łysogórskiego w Górach Świętokrzyskich. Prz Geol 61(3):165–171
Forleo MB, Giannelli A, Giaccio V, Palmieri N, Mastronardi L (2017) Geosites and parks for the sustainable development of inner areas: the matese mountain (Italy). GeoJ Tour Geosites 20(2):231–242
Fung CK, Jim CY (2015) Unraveling Hong Kong Geopark experience with visitor-employed photography method. Appl Geogr 62:301–313
Gladfelter S, Mason RJ (2012) Beyond boundaries: an assessment of the Yosemite National Park geotourism initiative. Tour Plan Dev 9(4):355–368
Gordon JE, Brazier V, Hansom JD, Werritty A (2019) Advances in quaternary studies and geomorphology in Scotland: implications for geoconservation. Earth Environ Sci Trans R Soc Edinb 110(1–2):257–278
Górska-Zabielska M, Kamieńska K (2017) Geotourism potential of the Drawskie Lake district as a support for the planned geopark named Postglacial land of the Drawa and Dębnica Rivers. Quaestiones Geogr 36(1):15–31
Górska-Zabielska M, Zabielski R (2017) Potential values of urban geotourism development in a small polish town (Pruszków, Central Mazovia, Poland). Quaestiones Geogr 36(3):75–86
Gundolf K, Filser M (2013) Management research and religion: a citation analysis. J Bus Ethics 112(1):177–185
Gürer A, Gürer ÖF, Sangu E (2019) Compound geotourism and mine tourism potentiality of Soma region, Turkey. Arab J Geosci 12(23):734
Han J, Wu F, Tian M, Li W (2018) From geopark to sustainable development: heritage conservation and geotourism promotion in the Huangshan UNESCO global Geopark (China). Geoheritage 10(1):79–91
Hose TA (2007) Geotourism in Almeria province, Southeast Spain. Turizam: međunarodni znanstveno-stručni časopis 55(3):259–276
Hose TA (2012) 3G's for modern geotourism. Geoheritage 4(1–2):7–24
Hose TA, Vasiljević DA (2012) Defining the nature and purpose of modern geotourism with particular reference to the United Kingdom and south-East Europe. Geoheritage 4(1–2):25–43
Kaźmierczak U, Strzałkowski P, Lorenc MW, Szumska E, Sánchez AAP, Baker KA (2019) Post-mining remnants and revitalization. Geoheritage 11(4):2025–2044
Khoshkam M, Jaafar M (2016) A community-based geotourism entrepreneurship: a case of Kilim Geopark, Malaysia. Int J Soc Ecol Sustain Dev 7(4):47–58
Kiernan K (2013) The nature conservation, geotourism and poverty reduction nexus in developing countries: a case study from the Lao PDR. Geoheritage 5(3):207–225

Kocan N, Yucesoy N (2016) Kizilcahamam-Camlidere Geopark (Ankara/Turkey) with its geological heritage values and geotourism planning. J Geol Soc India 87(1):112–118
Kraus S, Filser M, O'Dwyer M, Shaw E (2014) Social entrepreneurship: an exploratory citation analysis. Rev Manag Sci 8(2):275–292
Lazzari M, Aloia A (2014) Geoparks, geoheritage and geotourism: opportunities and tools in sustainable development of the territory. Geoj Tour Geosites 13(1):8–9
Lima EA, Machado M, Guerreiro M, Nunes JC, Costa MP (2015) Gestão do património geológico em ilhas pequenas: o exemplo dos Açores-Geoparque Mundial da UNESCO. Comunicaçõe Geológicas 102(1):76–81
Lokier SW (2013) Coastal sabkha preservation in the Arabian Gulf. Geoheritage 5(1):11–22
Lugeri FR, Farabollini P (2018) Discovering the landscape by cycling: a geo-touristic experience through Italian Badlands. Geosciences 8(8):291
Martín-Duque JF, García JC, Urquí LC (2012) Geoheritage information for geoconservation and geotourism through the categorization of landforms in a Karstic landscape. A case study from Covalagua and Las Tuerces (Palencia, Spain). Geoheritage 4(1–2):93–108
Megerle HE, Pietsch D (2017) Consequences of overlapping territories between large scale protection areas and Geoparks in Germany: opportunities and risks for geoheritage and geotourism. In: Annales de géographie. Armand Colin, No 5, pp 598–624
Meini M, Di Felice G, Petrella M (2018) Geotourism perspectives for transhumance routes. Analysis, requalification and virtual tools for the geoconservation management of the drove roads in Southern Italy. Geosciences 8(10):368
Migoń P, Pijet-Migoń E (2017) Interpreting geoheritage at New Zealand's geothermal tourist sites—systematic explanation versus storytelling. Geoheritage 9(1):83–95
Mikhailenko AV, Ruban DA, Yashalova NN, Rebezov MB (2019) The unique granite gorge in mountainous Adygeya, Russia: evidence of big and complex geosite disproportions. Geosciences 9(9):372
Modrej D, Fajmut Štrucl S, Hartmann G (2018) Results of the geointerpretation research in the frame of the Danube GeoTour project. Geologija 61(1):101–110
Mokhtari D, Roostaei S, Khodadadi M, Ahmadi M, Ebrahimi O, Shahabi H (2019) Evaluation of the role of environmental education in Manesht and Ghelarang Geotourism destination, Iran. J Qual Assur Hosp Tour 20(6):681–708
Moufti M, Németh K, Murcia H, Lindsay J, El-Masry N (2013) Geosite of a steep lava spatter cone of the 1256 AD, Al Madinah eruption, Kingdom of Saudi Arabia. Open Geosci 5(2):189–195
Mulec I, Wise N (2013) Indicating the competitiveness of Serbia's Vojvodina region as an emerging tourism destination. Tour Manag Perspect 8:68–79
Necheş IM, Erdeli G (2015) Geolandscapes and geotourism: integrating nature and culture in the Bucegi Mountains of Romania. Landsc Res 40(4):486–509
Németh K, Moufti MR (2017) Geoheritage values of a mature monogenetic volcanic field in intracontinental settings: Harrat Khaybar, Kingdom of Saudi Arabia. Geoheritage 9(3):311–328
Newsome D, Dowling R (2010) Setting an agenda for geotourism, vol 4. Good Fellow, Oxford
Newsome D, Dowling R, Leung YF (2012) The nature and management of geotourism: a case study of two established iconic geotourism destinations. Tour Manag Perspect 2-3:19–27
Norrish L, Sanders D, Dowling R (2014) Geotourism product development and stakeholder perceptions: a case study of a proposed geotrail in Perth, Western Australia. J Ecotour 13(1):52–63
Ólafsdóttir R, Dowling R (2014) Geotourism and geoparks—a tool for geoconservation and rural development in vulnerable environments: a case study from Iceland. Geoheritage 6(1):71–87
Ólafsdóttir R, Tverijonaite E (2018) Geotourism: a systematic literature review. Geosciences 8(7):234
Ortega-Becerril JA, Polo I, Belmonte A (2019) Waterfalls as geological value for geotourism: the case of Ordesa and Monte Perdido National Park. Geoheritage 11(3):1199–1219
Ozis L, Trpin J, Šmuc A (2014) Rock shelters in Slovenian Istria as a potential for the development of geotourism in the region. Geologija 57(2):203–216

Pellitero R, Manosso FC, Serrano E (2015) Mid-and large-scale geodiversity calculation in Fuentes carrionas (nw Spain) and serra do cadeado (paraná, Brazil): methodology and application for land management. Geogr Ann Ser B 97(2):219–235
Pereira EO, Ruchkys Ú (2016) Quantificação e análise da geodiversidade aplicada ao geoturismo na Área de Proteção Ambiental Sul da Região Metropolitana de Belo Horizonte, Minas Gerais. Raega-O Espaço Geográfico em Análise 37:207–226
Perianes-Rodriguez A, Waltman L, van Eck NJ (2016) Constructing bibliometric networks: a comparison between full and fractional counting. J Informet 10(4):1178–1195
Piedrabuena MÁP, Molist JM, Bergua SB, Alfonso JLM (2019) The deterioration of Geoheritage in the central Spanish volcanic region by open-pit mining. Geoheritage 11(4):1903–1917
Planagumà L, Martí J (2018) Geotourism at the Natural Park of La Garrotxa volcanic zone (Catalonia, Spain): impact, viability, and sustainability. Geosciences 8(8):295
Plyusnina EE, Sallam ES, Ruban DA (2016) Geological heritage of the Bahariya and Farafra oases, the Central Western Desert, Egypt. J Afr Earth Sci 116:151–159
Podsakoff PM, MacKenzie SB, Bachrach DG, Podsakoff NP (2005) The influence of management journals in the 1980s and 1990s. Strateg Manag J 26(5):473–488
Poiraud A, Dandurand G (2017) De la géoconservation au géotourisme: un glissement de paradigme. In: Annales de géographie. Armand Colin, No. 5, pp 625–653
Ruban DA (2015) Geotourism—a geographical review of the literature. Tour Manag Perspect 15:1–15
Ruban DA (2016) Representation of geologic time in the global geopark network: a web-page study. Tour Manag Perspect 20:204–208
Ruban DA (2019) Water in descriptions of global geoparks: not less important than geology? Water 11(9):1866
Ruiz-Real JL, Uribe-Toril J, De Pablo Valenciano J, Pires Manso JR (2019) Ibero-American research on local development. An analysis of its evolution and new trends. Resources 8(3):124
Rutherford J, Kobryn H, Newsome D (2015) A case study in the evaluation of geotourism potential through geographic information systems: application in a geology-rich island tourism hotspot. Curr Issue Tour 18(3):267–285
Shafiei Z, Farsani NT, Abdollahpour M (2017) The benefit of geo-branding in a rural geotourism destination: Isfahan, Iran. GeoJ Tour Geosites 19(1):96–103
Singtuen V, Won-In K (2018) Geodiversity and geoconservation of the Chaiyaphum region in Thailand for sustainable geotourism planning. GeoJ Tour Geosites 22(2)
Slomka T, Mayer W (2011) Geoturystyka–interdyscyplinarna specjalnoœć kształcenia. Prz Geol 59(4):329–329
Soliman MS, Abou-Shouk MA (2017) Predicting behavioural intention of international tourists towards geotours. Geoheritage 9(4):505–517
Štrba Ľ, Kršák B, Molokáč M, Adamkovič J (2016) Geotourism and geoparks—a sustainable form of environmental protection. Prod Manage Eng Sci 279(284):279–284
Štrba Ľ, Kršák B, Sidor C (2018) Some comments to geosite assessment, visitors, and geotourism sustainability. Sustainability 10(8):2589
Suzuki DA, Takagi H (2018) Evaluation of geosite for sustainable planning and management in geotourism. Geoheritage 10(1):123–135
Tefogoum GZ, Dongmo AK, Nkouathio DG, Wandji P, Dedzo MG (2014) Geomorphological features of the Manengouba volcano (Cameroon line): assets for potential geopark development. Geoheritage 6(3):225–239
Tičar J, Tomić N, Valjavec MB, Zorn M, Marković SB, Gavrilov MB (2018) Speleotourism in Slovenia: balancing between mass tourism and geoheritage protection. Open Geosci 10(1):344–357
Tokarczyk-Dorociak K, Lorenc MW, Jawecki B, Zych-Głuszyñska K (2015) Post-industrial landscape transformation and its application for geotourism, education and recreation–an example of the Wide Mt. near Strzegom, Lower Silesia/Poland. Z Dtsch Ges Geowiss 166(2):195–203

Tomić N, Božić S (2014) A modified geosite assessment model (M-GAM) and its application on the Lazar Canyon area (Serbia). Int J Environ Res 8(4):1041–1052

UNESCO (2016). UNESCO global geoparks: celebrating earth heritage, sustaining local communities. Online: https://unesdoc.unesco.org/ark:/48223/pf0000243650 (10.02.2020)

van Eck N, Waltman L (2009) Software survey: VOSviewer, a computer program for bibliometric mapping. Scientometrics 84(2):523–538

Vasiljević ĐA, Vujičić MD, Božić S, Jovanović T, Marković SB, Basarin B, Lukić T, Čarkadžić J (2018) Trying to underline geotourist profile of National park visitors: case study of NP Fruška Gora, Serbia (typology of potential geotourists at NP Fruška Gora). Open Geosci 10(1):222–233

Von Ahn MM, Simon ALH (2017) Geomorphological mapping and geodiversity: study at the Minas do Camaquã geosite protection area (Brazil). Rev Bras Geomorfol 18(2):427–442

Vujičić MD, Vasiljević DA, Marković SB, Hose TA, Lukić T, Hadžić O, Janićević S (2011) Preliminary geosite assessment model (GAM) and its application on Fruška Gora Mountain, potential geotourism destination of Serbia. Acta Geogr Slov 51(2):361–376

Waltman L, van Eck NJ, Noyons EC (2010) A unified approach to mapping and clustering of bibliometric networks. J Informet 4(4):629–635

Wang L, Tian M, Wang L (2015) Geodiversity, geoconservation and geotourism in Hong Kong global geopark of China. Proc Geol Assoc 126(3):426–437

Wang Y, Wu F, Li X, Chen L (2019) Geotourism, geoconservation, and geodiversity along the belt and road: a case study of Dunhuang UNESCO Global Geopark in China. Proc Geol Assoc 130(2):232–241

Warowna J, Zgłobicki W, Gajek G, Telecka M, Kołodyńska-Gawrysiak R, Zieliński P (2014) Geomorphosite assessment in the proposed geopark vistula river gap (E Poland). Quaestiones Geogr 33(3):173–180

Warowna J, Zgłobicki W, Kołodyńska-Gawrysiak R, Gajek G, Gawrysiak L, Telecka M (2016) Geotourist values of loess geoheritage within the planned Geopark Małopolska Vistula River Gap, E Poland. Quat Int 399:46–57

Woźniak PP, Tylmann K, Kobiela A (2015) Głazy narzutowe Trójmiejskiego Parku Krajobrazowego–potencjał badawczy i geoturystyczny. Prz Geol 63(4):256–262

Yuliawati AK, Hadian MSD, Rahayu A, Hurriyati R (2016) Developing geotourism as part of sustainable development at Ciletuh Sukabumi, West Java, Indonesia. J Adv Res Manage 7(1):57–62

The Estrela UNESCO Global Geopark Territorial Development Strategy: A Holistic Vision for the Twenty-First Century

Emanuel de Castro, Fábio Loureiro, Filipe Patrocínio, Hugo Gomes, João Castel-Branco, Lucas Cezar, Magda Fernandes, and Patrícia Azevedo

Abstract UNESCO Global Geoparks, created by UNESCO's latest programme, are territories where science, education, tourism and communication support a territorial development strategy that aims to be holistic and sustainable. In this context, the Estrela Geopark is one of the biggest development strategies for the Estrela Mountain in the twenty-first century, integrating nine municipalities and involving different networks of local agents who can benefit from the UNESCO Global Geopark classification. As such, a strategic plan for this Territory was developed, based on the main areas of action of a UNESCO Global Geopark, constituting a development strategy based on its exceptional Geological Heritage, involving the populations and their resources, in a structured and integrated approach, through a Bottom-up approach. The Strategic Plan for the Estrela Geopark assumes itself as a guiding document, where the priorities for the sustainable development of Estrela are defined, anchored in the various objectives of this classification and in the UNESCO brand, assuming that in these elements, geological heritage, territorial-based development strategy and UNESCO brand, the conditions are met for what will be the major paradigm shift for the highest mountain in mainland Portugal.

Keywords Geotourism · Sustainable strategy · Estrela Geopark · Rural development

E. de Castro (✉) · F. Loureiro · F. Patrocínio · H. Gomes · J. Castel-Branco · L. Cezar · M. Fernandes · P. Azevedo
Associação Geopark Estrela, Guarda, Portugal
e-mail: emanuelcastro@geoparkestrela.pt; fabioloureiro@geoparkestrela.pt; filipepatrocinio@geoparkestrela.pt; hugogomes@geoparkestrela.pt; joaobranco@geoparkestrela.pt; lucascezar@geoparkestrela.pt; magdafernandes@geoparkestrela.pt; patriciaazevedo@geoparkestrela.pt

V. Braga et al. (eds.), *Economics and Management of Geotourism*, Tourism, Hospitality & Event Management, https://doi.org/10.1007/978-3-030-89839-7_2

1 Introduction

The UNESCO Global Geoparks Programme is today a new paradigm for the valorisation, promotion and development of territories, anchored in the importance of geological heritage. In this sense, a Geopark is a well-defined territory with a remarkable geological history which, due to its relevance, uniqueness and significance, constitutes a common legacy that must be safeguarded and valued for future generations (UNESCO 2015). As a corollary to these concerns, UNESCO's Global Geoparks advocate a holistic vision of the territory, concerted action between the different development agents, a strategy for the conservation and valorisation of their sites of geological interest, and a territory-based development policy that is effectively integrated and participatory, placing populations at the centre of the strategy.

In compliance with these premises, the Estrela Geopark Association (EGA)—submitted the application of Estrela to the UNESCO Global Geopark in November of 2017, in which a strategy for the promotion, development and refunctionalisation of a 2216-km^2 territory with nine municipalities and approximately 150,000 inhabitants, is included. Through the inventory and classification of 124 sites of geological interest (geosites), this application aimed to demonstrate the importance of this heritage for the development of the territory, as well as its relationship with cultural, biological and landscape values of the most important Mountain in mainland Portugal.

The Estrela UNESCO Global Geopark must affirm itself as a territory of science, education and culture, capable of establishing strategies of valorisation and development that encompass geoconservation, the preservation of the geological and non-geological heritage, education, science, tourism and communication, essential premises of this UNESCO classification, constituting the foundations of the transversal action of this Geopark.

In this context, this chapter aims to present the Strategic Guidelines for all the work carried out in the Estrela Geopark, before and after its classification on 10th July, 2020, as well as its implementation over time. From the beginning, the objective was to make a feasible plan that could be adapted to the needs of the territory and to its time dynamics, reinforcing the role of EGA as an important agent for the development of the territory, with an international dimension, a fundamental condition for the sustainable development of Estrela.

2 The UGGp: From Geology to Territorial Development

UNESCO Global Geoparks (UGGp), as holistic territorial strategies for the promotion, valorisation and protection of the natural heritage, with particular emphasis on the geological, play an important role in the sustainable development of territories, especially regarding their endogenous character and valorisation strategies. At the same time, the establishment and classification of territories as UNESCO Geoparks

generates new employment opportunitiés, new economic activities and additional sources of income, especially in rural and low-density regions. These strategies encourage the production of new local products and enhance regional crafts, involving geotourism activities and "geoproducts", with a focus on improving the economy of local communities, working on them as strategies and not only as ultimate goals to be achieved.

As mentioned, Geoparks are well-defined territories with geological heritage of international relevance, with scientific, educational and landscape importance, and UNESCO has therefore decided to classify them as World heritage (UNESCO 2015). Each Geopark is unique and tells part of the long history of planet Earth, using its geology as a tool for the development of its communities, through the implementation of strategies based on Science, Geoconservation, Education for Sustainable Development and Tourism (Zouros 2004). Education has a fundamental role not only because it contributes to the awareness of children, young people and adults about the importance of geological heritage, promoting its valorisation and raising awareness about the need to preserve it, since these are unique places to understand the history and evolution of the Earth, life and its people. Through education, ordinary citizens, who normally have a low knowledge of geosciences and their importance to society, can more easily understand how geodiversity conditions all natural and human development and acquires knowledge to better understand the dynamics of the Earth. This contributes to the development of a society that is more aware, trained and active in relation to environmental issues, focusing on the need to adopt attitudes that promote sustainable development (UNESCO 2017). In parallel, UNESCO Global Geoparks are territories where the study of climate change, natural hazards and the management of the Earth's resources play an important role in territorial management and development policies.

3 The Estrela Geopark and Its Management Strategy

The Estrela UNESCO Global Geopark has the mission to contribute to the protection, valorisation and promotion of the natural and cultural heritage, with special emphasis on geological heritage deepening and spreading the scientific knowledge, promoting tourism and sustainable development in a territory with a total area of 2216 km^2 where approximately 150,000 inhabitants from the municipalities of Belmonte, Celorico da Beira, Covilhã, Fornos de Algodres, Gouveia, Guarda, Manteigas and Oliveira do Hospital and Seia, live. This Geopark aims at investing in the improvement of the quality of life of populations, giving ample importance to education, sports, arts, culture and tourism, promoting the territorial competitiveness of Serra da Estrela, positioning it in a more competitive and favourable way in the regional, national and international contexts (Castro et al. 2021).

In this sense, the Estrela Geopark Association (EGA), the entity responsible for managing the Estrela UNESCO Global Geopark brand, has been a relevant role in the territory since 2016, when it was set up, fostering its promotion and integrated

Table 1 SWOT analysis of the Estrela UNESCO Global Geopark

Strengths	Weaknesses
• The UNESCO brand as a lever for sustainable development • High value of geodiversity, biodiversity and cultural heritage • Territory constituted by nine municipalities • Encompass a Natural Park • Increasing the Geoparks network (national and international) • Existence of Higher Education Institutions • Existence of Research Organisations • Stakeholders committed to establish partnerships with EGA to develop activities • The Estrela brand and its geographical configuration • Endogenous products of excellence • Good rail, road and tourism infrastructure network • Proven quality water resources and fluvial beaches • Educational network, museums and interpretation centres	• Low population density • Ageing of the population • Rural Exodus • Absence of a networking culture at regional level • Low level of education, lack of scientific culture and low entrepreneurship of the population • Scarce diversity of tourist products • Degradation of the traditional economic structure • Spatial and temporal concentration of visitors • Low supply of public transport
Opportunities	**Threats**
• Growth potential for research and public awareness of geoconservation • Development of new local products • Job creation • Public policies for the development of inland and mountain regions • Potential for growth in nature tourism and mountain sports	• Pressure from increasing visitor numbers • Pressure from mass visitation to identitary elements of the territory • Lack of coordination in regional policy • Impact of climate change • Low attractiveness of the primary sector • Relocation of units from the secondary sector • Forest fires

development, through the valorisation of heritage and its dissemination, the qualification of associated resources and services, the stimulation of sustainable tourism, the development of new products, the creation of jobs and the promotion of entrepreneurship, the articulation between R&D centres and the territory and its communities and the development of educational projects and programmes. The strategy of this Geopark is also based on the strategic establishment of partnerships that promote the strengthening of the territory in terms of its quality of life, based namely on economic activities supported by the region's endogenous products and identities and on services with high levels of knowledge and income, with emphasis on the circular and territorially based economy (Table 1).

In pursuit of its mission objectives, the EGA develops feasible and heterogeneous annual activity plans. In order to achieve these plans, eight strategic vectors have been defined that underpin the Strategic Plan and the Action Plan (Fig. 1).

For each strategic vector, general objectives have been defined in order to be able to apply a metric and to measure them, these objectives are valid in Table 2.

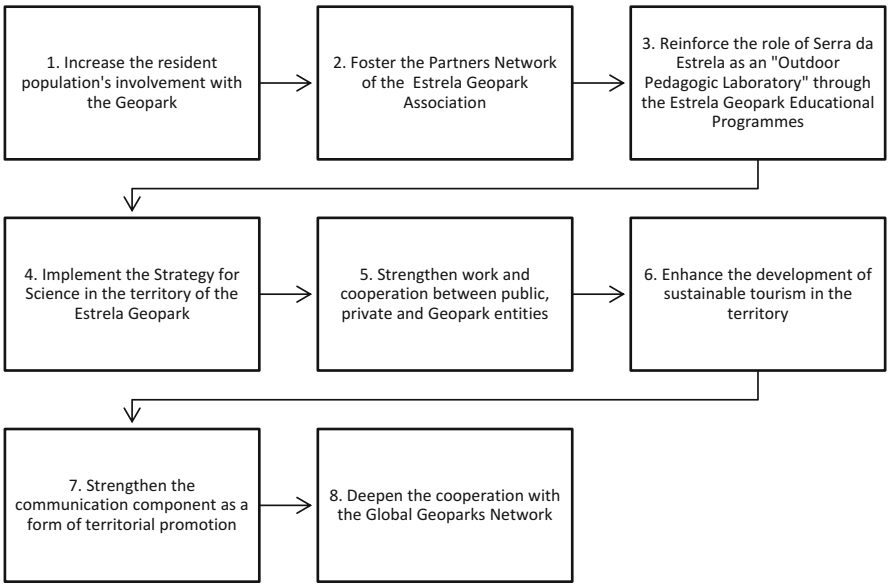

Fig. 1 Strategic vectors of the Estrela Geopark Association

The Estrela UNESCO Global Geopark is a new concept of territorial development, where the exceptional Geological Heritage is the basis for a strategy that promotes the well-being of populations while maintaining maximum respect for the environment. Its objectives are: preserving geological heritage for present and future generations; educating and teaching the general public about Earth sciences and their relations with environmental issues; ensuring sustainable development at the socio-economic and cultural level; promoting multicultural bridges in heritage, conservation and maintenance of geological and cultural diversity through partnerships; stimulating scientific research in the territory; actively contributing to the existence of networking through joint initiatives (publications, conferences and joint projects), in which each of the initiatives promoted must start from a holistic vision of the territory.

Thus, the concrete objectives defined in the short, medium and long term will be presented, showing how to achieve them (how, when and where) and what can be done to overcome possible threats or obstacles. As such, the Strategic Plan of the Geopark Estrela Association is organised by strategic areas (Fig. 2): Geoconservation and Geological Heritage; Environment and Sustainability; Science and Research; Education and Training; Tourism and Sustainable Development; Communication, Promotion and Dissemination.

Table 2 Estrela UGGp strategic vectors and main objectives

Strategic vector	Objectives
1. Increase the resident population's involvement with the Geopark	Strengthen internal communication in the territory Promote community participation in the activities promoted by Estrela Geopark Foster people's sense of belonging to the Estrela Geopark
2. Foster the partners network of the Estrela Geopark Association	Extend the network of educational partners to the entire school network in the territory Consolidate the network of institutional partners Progressively increase the number of business partners Foster the local producers network
3. Reinforce the role of Serra da Estrela as an "outdoor pedagogic laboratory" through the Estrela Geopark Educational Programmes	Extend the educational routes to different levels of education Develop the "the Estrela goes to school" programme Promote greater didactic and pedagogical cooperation with the different schools and school groups
4. Implement the strategy for science in the territory of the Estrela Geopark	Enhance endogenous resources, existing infrastructure and regional actors Generate knowledge through qualified human resources, bringing science closer to economic, social and creative activities Promote innovation dynamics, mobilising individual and collective potential, generating employment, economic, social and territorial value
5. Strengthen work and cooperation between public, private and Geopark entities	Refunction vacant places in the territory Promote joint initiatives/activities Increase the exchange of synergies between Geopark and ICNF (PNSE)
6. Enhance the development of sustainable tourism in the territory	Promote and develop activities of Geotourism and health and well-being tourism Implement the "Geoalbergues network" Promote new tourism products, based on endogenous potential and on the diversity of landscapes and heritage
7. Strengthen the communication component as a form of territorial promotion	Establish a territorial marketing plan Implement the strategic communication plan Participate in congresses, fairs and dissemination events Strengthen media communication Foster strategic partnerships in the area of communication
8. Deepen the cooperation with the Global Geoparks Network	Cooperate in national and international projects Participate in joint promotional events Establish bilateral partnerships with Geoparks with similar characteristics

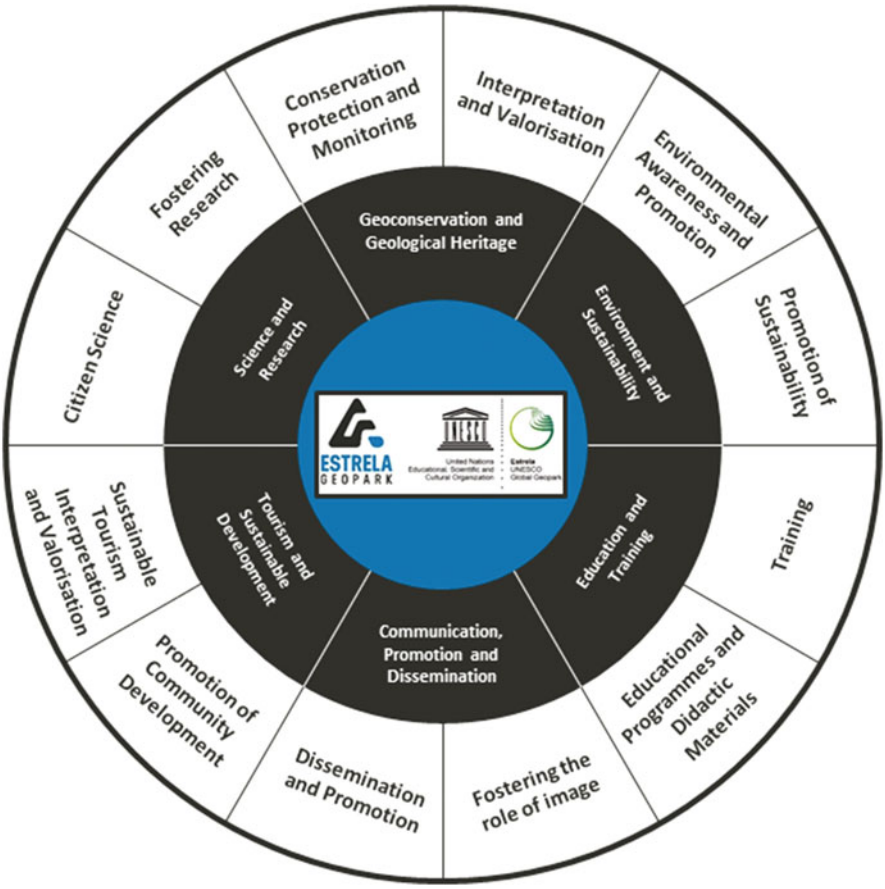

Fig. 2 Strategic areas of the Estrela Geopark Association

3.1 Geoconservation and Geological Heritage

Geoconservation is one of the key areas of a Geopark, since the preservation of the geological heritage constitutes the basis for the creation of sustainable development strategies applied in these UNESCO territories. It is therefore essential that partnership work is developed so that the actions taken for the conservation and valorisation of this heritage are more efficient. It should be noted, however, that the topic of geoconservation cannot be approached in a restrictive way as far as its implementation is concerned, and it is necessary to apply various strategies, spanning across different areas such as science, education, tourism, communication or sustainable development. In fact, one can say that for the success of a UNESCO Global Geopark strategy, the various areas need the geological heritage to be preserved, each in turn having a duty to contribute to this preservation. Geoconservation should therefore

present a holistic strategy, from abiotic to biotic, ensuring that management procedures take into account the vulnerability of this natural heritage. The Estrela UGGp currently has an inventory of 124 sites of geological interest (geosites), which poses significant challenges in their management and conservation. However, the territory of the Estrela UGGp includes several classified areas (Natural Park, Biogenetic Reserve and RAMSAR), which make up around 50% of the territory, as well as a large number of regional stakeholders involved in implementing effective management measures. As such, the Estrela Geopark Association is clearly committed to the integral management of the existing heritage (natural and cultural), integrating existing services and infrastructures and supporting territorial promotion activities. From this point of view, and based on the inventory of all the existing heritage (natural and cultural) in the territory, detailed management, geoconservation and monitoring plans have been established in collaboration with the nine municipalities, parishes and the Institute for Nature Conservation and Forests—Serra da Estrela Natural Park (ICNF—PNSE). In addition to this commitment, attention was also given, in an articulated manner, to the creation of partnership networks and effective dissemination channels that stimulate and bring together cultural, artistic and sports agents, contributing to the recognition and sustainable development of the Serra da Estrela territory.

The objective of Geoconservation in the Estrela Geopark is to define a holistic approach that clearly allows the protection, preservation, interpretation and valorisation of the unique geological heritage of this territory (Fig. 3).

In this context, we present some of the most relevant actions promoted in partnership with the various agents:

- With the aim of promoting knowledge about the territory and also raising awareness of its value and the need to preserve sites of geological interest, the Estrela Geopark has been implementing a network of interpretative structures (Fig. 4), spread throughout the various municipalities. These allow the reader to understand not only geological and geomorphological issues, but also the biodiversity and culture of these sites, showing the clear link between the abiotic and biotic elements, improving also the visitation experience.
- With regard to monitoring and plans for the valorisation and conservation of geosites, since 2014 some actions have been implemented in order to achieve this objective. In addition to field work, for evaluation and monitoring of each geosite, high-resolution aerial photography surveys and spatial modelling have been carried out, allowing an increase in the capacity to assess the vulnerability of geosites and the impacts that anthropic activity causes on those sites. Some of the most relevant geosites, such as Covão do Boi, Salgadeiras and Lagoa Seca, already have several series of surveys that have allowed the study of their evolution along this timeline, namely in the erosion and trampling processes.
- With the aim to ensure the legal protection of geosites, the inclusion of geosites in the Municipal Master Plan (PDM) of each municipality is being implemented, with the main objective of classifying them as natural heritage, thus increasing

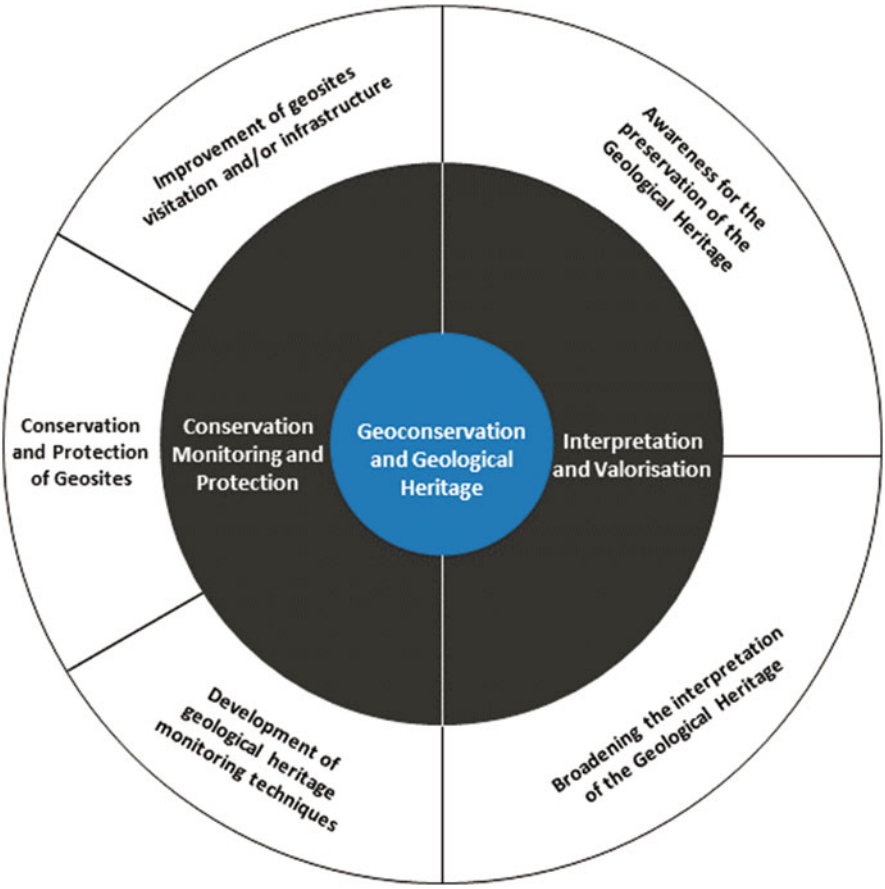

Fig. 3 Geoconservation and geological heritage strategy

their level of protection and enabling clearer strategies to valorise the various sites.

– The valorisation and conservation of the natural heritage can be achieved through some interventions such as, cleaning and improving access to sites or installing structures that allow better interpretation and visitation.

In addition to the above, it is also important to highlight the promotion of the existing Interpretation Centres and the implementation of pedagogical and interpretative routes.

Thus, the initiatives in the area of Geoconservation and Geological Heritage seek the promotion and valorisation of this heritage, either through the interpretative structures and environmental education equipment already mentioned, or in the organization of more popular events such as ObservaEstrela, Nature and Landscape

Fig. 4 Painéis Interpretativos do Estrela Geopark

Festival of the Estrela Geopark, or in more formal actions such as training and workshops.

3.2 Environment and Sustainability

Sustainability is such a broad concept that in order to create actions in favour of it, the United Nations defined in 2015 the 17 Sustainable Development Goals (SDG) to be worked on by 2030 (therefore also jointly called "Agenda 2030"). These 17 SDG span the three dimensions of sustainability (economic, social and environmental) and include more than 150 targets, which together help us direct public and private initiatives in the search for a more sustainable society. Sustainable Development is, in its general definition, the seek to meet the needs of the present generation without compromising the ability of future generations to meet their own needs. It is, therefore, a model that must consider, inseparably, social justice, economic viability and the preservation of the environment.

Mountain territories, such as Estrela, have an intrinsic scientific value as "observatories" of climate and climate change (Vieira 2004). Mountain areas in general, due to their unusual geological and climatic history, are home to a unique wealth of ecosystems and habitats. Many species of restricted occurrence, adapted (and

sometimes exclusive) to their geographical, soil and meteorological conditions, are distributed throughout these areas. As such, any aggression to or alteration of the environment can jeopardise these fragile ecosystems.

In the case of the Estrela Geopark, the climate has very particular characteristics, so the orographic context of Serra da Estrela makes it a privileged place for the study of climate and climate change. Both by the characteristics of the mountain environment and by the marks left by the last glaciation, it is possible to study both the past and the present climate and a better understanding of the changes that have occurred over time. In this way, it is possible to predict the changes that may occur in the future and thus to promote the application of methodologies aimed at mitigating the natural risks associated with climate change, as well as reducing the human contribution to this phenomenon (Gomes et al. 2019).

Another relevant attribute to note concerns natural risks associated with climate change. As exposed in the SWOT analysis, one of the main threats to the preservation of the region's natural heritage is forest fires, accelerating the degradation of geosites and habitats. It is predicted that with climate change, they tend to be even more frequent and severe.

The reconversion of pine forests and invasive species to native deciduous forests can be effective in adapting the territory to climate change, by inserting a mosaic of more diverse and less flammable species, favouring the infiltration of water into the soil (a resource which is expected to be scarce); on the other hand, the preservation of all the native fauna and flora can be promoted by diversifying the habitats. This initiative, when supported by socio-economic return and carried out in an educated and gradual manner, taking into account ecosystem services, tends to present greater acceptance by the local population and, consequently, greater success (Fig. 5).

In addition to the relevant geological heritage classified by UNESCO, the Estrela Geopark holds a remarkable biodiversity. Its geographical position, great altitudinal variation, the influence of different bioclimates and soil conditions have favoured the proliferation of several species, both native and introduced. The flora is composed of about 900 taxa of vascular plants. There are also about 40 species of mammals, 100 species of birds, 30 species of amphibians and reptiles, 8 species of fish and a variety of invertebrate fauna. It should be noted that 75% of the species of bat that exist in Portugal can be observed in Serra da Estrela, as well as about 70% of amphibians.

As Global Geoparks are a UNESCO classification, their mission is to promote the sustainable regional development of a territory, therefore, guiding themselves by these same objectives and goals. Established in territories with an important geological heritage that is intended to be preserved, they are translated into an important strategy of territorial promotion and valorisation. The strategy (Fig. 5), however, aims to preserve without prohibiting access to this heritage, focusing on education, valorisation and awareness.

The strategy of the Estrela UGGp, seeks to take advantage of the natural heritage as a resource to favour its communities. By valuing the heritage and promoting the territory at home and abroad, it aims to increase tourism demand in order to create more jobs and local economic growth. However, this development must take place in a conscious and planned way, with the least possible impact on heritage, so that its

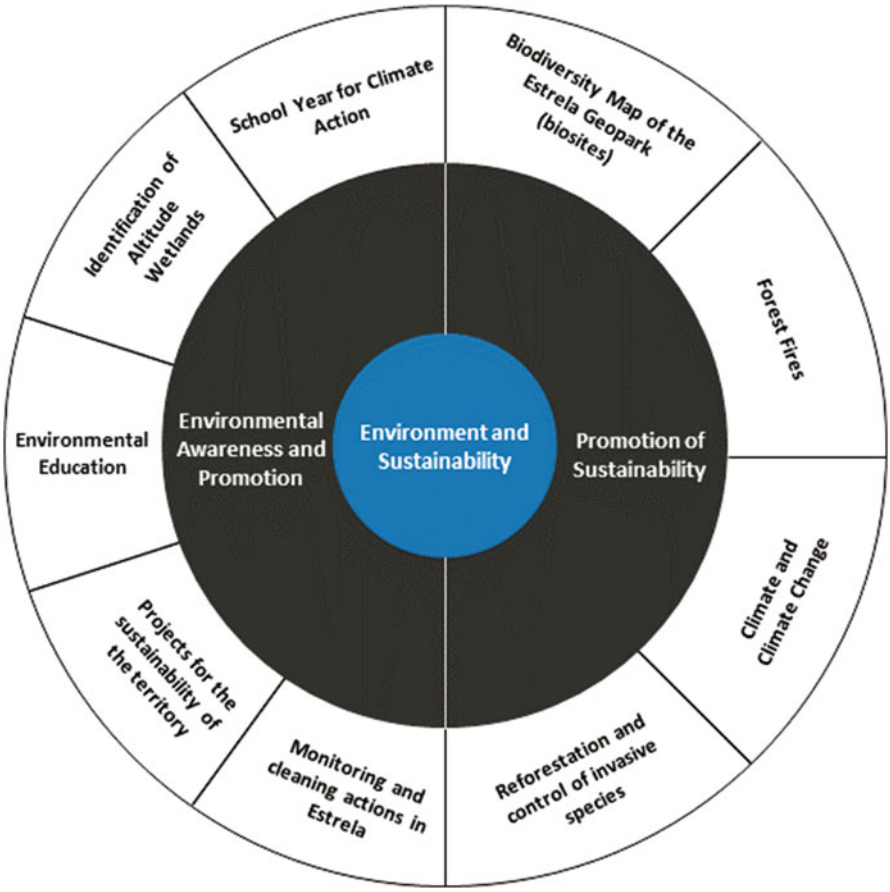

Fig. 5 Environment and sustainability strategy

value is not exhausted. Thus, we see the opportunity to contribute to the goals of SDG 4—Quality Education; we work on SDG 8—Decent Work and Economic Growth and indirectly on SDG 10—Reducing Inequalities within and between countries. However, no strategy can be implemented without exploring SDG 17—Partnerships for the Implementation of Objectives, working with local communities, businesses, institutions and public authorities, joining forces for the development of populations and a greater resource, which is Estrela itself!

3.3 Science and Research

One of the objectives of the Estrela Geopark Association is to put Science at the service of the populations in an effective way, meeting the premises of UNESCO and the Global Geoparks Programme.

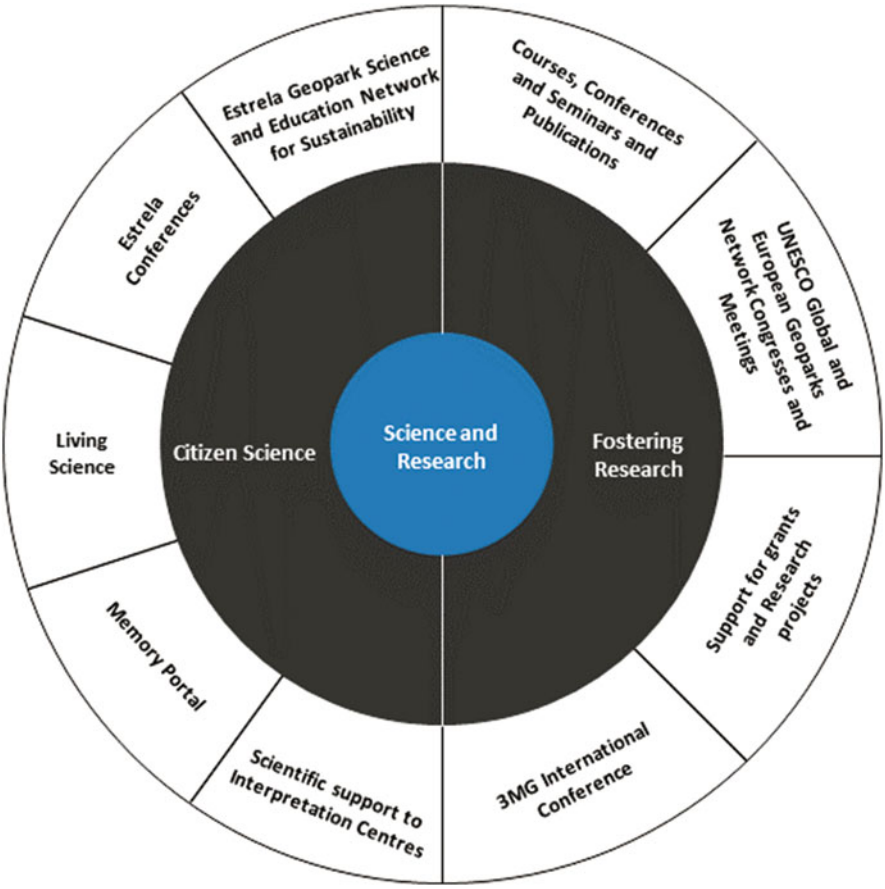

Fig. 6 Science and research strategy

In this regard, the EGA has prepared a concerted, cohesive and coherent strategy with a medium/long-term vision towards sustainability, in compliance with the SGD (Sustainable Development Goals of the UN Agenda 2030), including the most ambitious commitments to economically stimulate the region, in the short term, and with the commitment to assist the agents of the territory in defining a medium/long-term path (Fig. 6).

The strategy for Science aims at supporting and promoting research and existing infrastructures, generating knowledge through qualified human resources, bringing the scientific system closer to economic, social and creative activities; promoting dynamics of innovation, mobilising individual and collective potential, generating employment, economic, social and territorial value. In this context, it is important to consider the complementarity of the actions carried out, such as the awareness of individual practices, like promoting sustainability in the daily life and the training of all those who make decisions for the development of the Estrela territory.

This strategy is focused on research in specific, sometimes transversal, disciplinary areas that can promote structural transformation, namely in the area of training and capacity building, contributing so that decision makers and the public administration itself, teachers and students, professionals in the area of tourism, restaurants and hotels, among many others, obtain the appropriate training to act and work in a world in transition (Gomes et al. 2020).

In this sense, long before its classification, the Estrela Geopark has clearly focused on science and scientific knowledge, relating it to education and turning it into a real laboratory (Gomes et al. 2020). In fact, the Estrela Mountain presents unique characteristics for the studies of various scientific areas. However, the science produced must be done with the participation of the population (citizen science), placing it at the service of their problems and making the results available in an open and accessible way. Proof of this is the work carried out on forest fires, climate change, geological heritage, geoconservation, among many other studies.

The strategic plan developed is based on applied science, but with an overall and interdisciplinary approach, where access to resources can be facilitated, thus enhancing quality education and lifelong training, stimulating job creation at regional level, taking advantage of the opportunities arising from its unique heritage (geological, biological, cultural). It can, for example, promote the territory as a health destination by enhancing fluvial beaches and thermal waters; find innovations that contribute to a more circular economy, improving the living conditions of communities; or work on adapting to and mitigating climate change in the territory. In fact, the aim of the Estrela Geopark Science strategy is to transform the territory into a "living laboratory" for the implementation of sustainability and the promotion of this perspective among communities, the country and the world. In this context, the objectives recommended in the field of science and research are briefly presented:

- Stimulate applied research to the reality of the territory, as a catalyst for territorial development, meeting the effective needs of the populations, promoting research projects with a high impact on regional development, through integrated, holistic and innovative approaches.
- Provide greater proximity between science and citizens, through the voluntary involvement of ordinary citizens in scientific research activities, seeking to answer key questions and contributing to the development of science, but also through the involvement of the different structures related to the natural and cultural heritage existing in the territory (museums, interpretation centres, associations, and among others).
- Attract different partners to the Estrela Geopark, institutions and researchers, national and international, as a strategy to promote science and knowledge, namely through technical and scientific events (conferences, seminars, workshops, scientific residences, training actions and environmental awareness campaigns), in the different themes of the Estrela Geopark.
- Stimulate different lines of action by raising financial resources from public or private entities (patronage), potentially financing projects, scholarships and

research internship programmes, at different levels of education that have Estrela as their object.

Taking into account these objectives, the Science and Education Network for Sustainability of the Estrela Geopark (SNES) was implemented in 2019. This Network aims to carry out science-based studies and formulate proposals for planning scientific research in various disciplines, support research projects, seek funding for research or training programmes, promote and subsidise editions and publications, particularly of a scientific, technical or didactic nature, as well as editing texts considered relevant for the territory, and sponsor national and international scientific relations, particularly through the organisation of events where researchers, teachers and technicians can participate.

The Science and Education Network for Sustainability of the Estrela UGGp aims to support and promote applied research in the territory of Geopark Estrela, based on an articulated set of interdisciplinary working groups, spread throughout the territory, with close links to Higher Education Institutions and the national scientific and technological system, with emphasis on entities that carry out research in mountain regions. It will also serve as a catalyst for the new generation of scientists that will benefit from the more than 2200 km^2 of the Estrela Geopark as a natural laboratory. In this context, the SENS will support all areas of scientific research, including the natural, exact, social, humanities and sports sciences. Its priority activities, defined in the framework of EGA's Strategic Plan for Science, are focused on the following areas: Geology and Geomorphology, Landscape, Culture and Heritage, Climate and Climate Change, Biodiversity and Ecology, Environment and Natural Resources, Spatial Planning and Risk, Tourism, Leisure and Sustainable Development. This dynamic structure, where each working group is coordinated by a Researcher in charge (IR), integrates a team appointed by him. The working group aims at constituting and fostering structures to promote science, education and scientific knowledge, in a collaborative way, based on the establishment of medium and long-term strategic partnerships, between different actors of the territory and institutions that develop research in the different areas, having as main objectives the cooperation in the identification of challenges, joint planning of activities, project definition, development of studies on Estrela's territory, sharing of resources and infrastructures and mobility and/or exchange of qualified human resources between them and the Research & Development organisms, with the objective of transferring, sharing and disseminating knowledge. This network has been implemented in the territory and promotes five science and education working groups: Climate and Climate Change; Water Resources; Biodiversity and Mountain Ecology; Tourism and Sustainability; Geodiversity and Geoconservation.

As objective of the Estrela UGGp the knowledge produced by the various SENS working groups must be disseminated to the general population, since scientific dissemination is fundamental for the development of societies, as science is responsible for the circulation of ideas. Also, the dissemination of the results obtained, in the context of scientific research, promotes the development of an enlightened, attentive and more participatory society (Open Science). Thus, the EGA considers

that the knowledge produced by science should be universal and, therefore, its mission must be to bring it to all audiences, providing clarification to the media and to the general public, encouraging their involvement and participation; carrying out actions in schools and public spaces, exhibitions, among other activities, in order to bring the communities closer to science.

UNESCO territories are places of science, education and culture par excellence. As such, initiatives in the field of science, the promotion of culture and territorial development, are part of the daily life of these territories and must have a holistic and promoting approach towards sustainable development. In this context, every year in the 2030 decade will be dedicated to one of the SDG, through an action plan in the areas of citizen science and education, in order to raise awareness, promote and define strategies to achieve the recommended development goals, adapted to the reality of this territory. Thus, the Estrela UGGp aims to present an action plan, scheduled for the next 10 years. Through multiple actions aimed at community participation (Citizen Science), it is intended to solve or alert to concrete problems in this geography.

3.4 Education and Training

Education, in the context of UNESCO Geoparks, is a fundamental tool for raising awareness among children, young people and adults towards the importance of geological heritage and the need to preserve it, since only what is truly known can be valued and therefore preserved. In this sense, education is essential to stimulate the feeling of belonging, in relation to their territory and to the natural and cultural heritage it contains, thus contributing to its conservation. In this sense, given the importance of Education for the Estrela Geopark (Fernandes et al. 2018), the following guidelines were established to achieve its mission and objectives: diversification of the Educational Programmes offer; development of the Network of Educational Partners; fostering of the Tower Interpretation Centre; development of teaching resources and materials; realisation of Training Actions; realisation of different workshops related to Geoparks and mountains; and promotion of local heritage through Education (Fig. 7).

In the context of the Estrela Geopark Educational Programmes, these constitute an important educational resource in the teaching of Geosciences, since they stimulate direct contact with the geological and geomorphological heritage of the territories, seeking to educate and raise awareness among students at different levels of education of the importance of their conservation. Bearing in mind that the Estrela UGGp territory possesses a great diversity of landscapes that allow us to understand the history and evolution of the Earth, life and its people, the diversification of its educational programmes is of the utmost importance, both within the disciplinary areas and in terms of the levels of education covered. As such, outdoor educational programmes have been created, which are structured in pedagogical routes, directed at all levels of education, from primary school to higher education, which

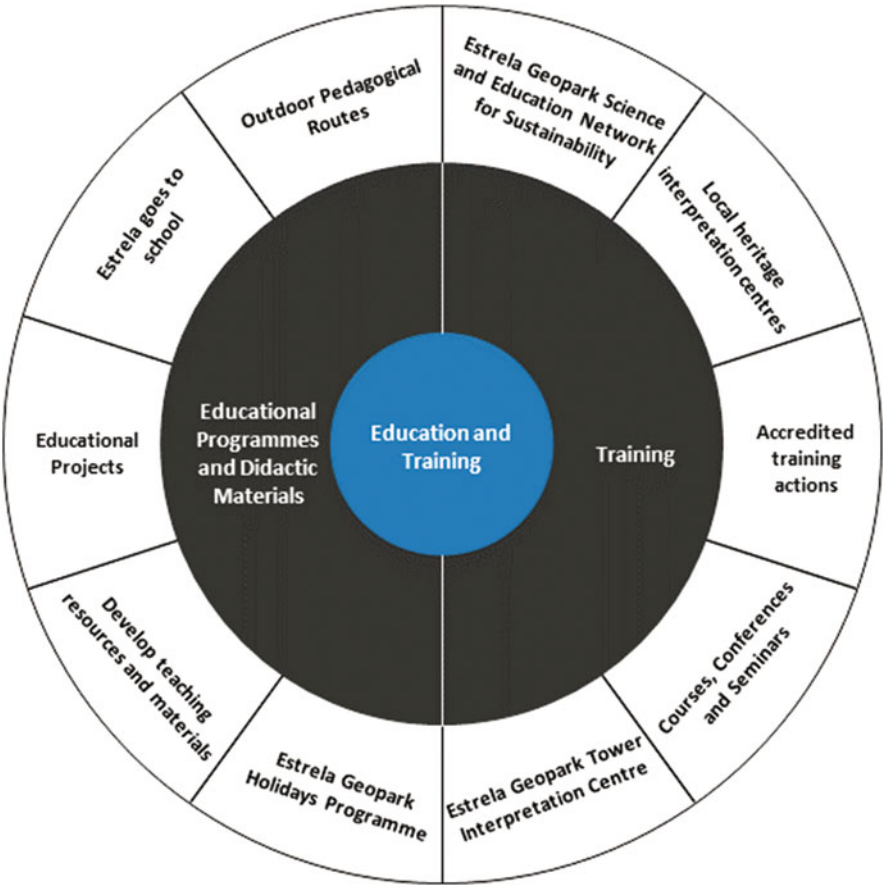

Fig. 7 Education and training strategy

encourages teachers to go out into the field with their students, transforming Estrela into a living outdoor learning laboratory for non-formal education, making known the extraordinary natural heritage of this territory, using methodologies that motivate and facilitate the teaching-learning process and that promote the conservation and valorisation of this heritage through Education. Aware that it is not always easy to leave school with students, since the curricular programmes are very extensive and that leaving schools involves financial costs, the Geopark Estrela Association has created an indoor educational programme called "Estrela goes to school", in which the Estrela Geopark staff goes to schools to carry out various activities, working with students on various cross-cutting themes related both to the geo and biodiversity of Estrela and to its cultural heritage, as well as to develop projects, particularly those related to the Sustainable Development Goals.

Given the importance of the UNESCO Global Geopark classification for territories, since we are talking about a sustainable development strategy based on

Fig. 8 Estrela UGGp educational programmes

geological heritage, its relationship with other natural and cultural heritage, networking and communities, it is essential that students, teachers and the whole educational community understand that they live in a UNESCO territory, that they know the concept of Geopark and that they learn to value its very rich heritage, unfortunately often unknown to those living in Serra da Estrela. And that is exactly why it is so important for the Estrela Geopark to be close to the Schools, establishing educational partnerships, with the purpose of working with students and teachers on important issues for the development of a more sustainable territory. It was exactly in this scope that the Estrela Geopark's Educational Partners Network was developed, including already 16 School Groupings, which corresponds to 62% of the total number of existing schools in the Estrela Geopark territory. However, given that the Schools play a fundamental role in transmitting scientific knowledge and fostering Education, and that they are important vectors for the dissemination of the Estrela Geopark's objectives and actions to local communities, the extension of this network of EGA's educational partners to include all the Schools Groupings/Schools not grouped in the territory is of the utmost importance.

As educational tourism represents a practice that provides coexistence between people from different cultures, presenting favourable situations for the practice of learning to know, to do, to live together and to be, and provides a participative pedagogy, in which students and other participants are stimulated to get actively involved, the Estrela Geopark has tried to develop several activities in this field, namely through educational programmes (Fig. 8), but also with the promotion of the Estrela Geopark Tower Interpretation Centre. This space is a privileged resource for the interpretation of the natural, landscape and cultural heritage of Estrela, thus constituting an important strategy for the dissemination and valorisation of this territory and the heritage it encloses.

We can see that educational tourism (Cascais and Terán 2011) and the implementation of joint projects with Schools contribute to the promotion of Education for Sustainable Development, meeting the objectives of UNESCO by encouraging changes in the way knowledge is obtained, in the importance of strengthening values and attitudes, enabling a more sustainable and fair society for all. And, trying to

demonstrate the importance of the educational strategy that has been implemented in the Estrela Geopark territory, aiming at the conservation and enhancement of its natural and cultural heritage through Education, we highlight that, from 2016 to December 2019, more than 1800 students and 340 teachers have already visited this territory and more than 2600 km have been travelled in the territory, in the scope of educational tourism, with the implementation of 54 outdoor educational routes. The Estrela Geopark Tower Interpretation Centre has already received more than 3600 visitors since its opening in September 2018. And because schools are the centre of knowledge dissemination in a transversal way, allowing the message, mission and values of the Estrela Geopark to spread quickly throughout the territory, since these students will be the vehicle to spread the word among their peers, more than 40 lectures/workshops were held as part of the indoor Educational Programme "Estrela goes to School", where around 3265 participants attended. In fact, only in the year 2019, between January and December, 2080 students and teachers from all over the country made indoor and outdoor activities with this Geopark, which clearly reflects our bet in the development of a well-structured educational strategy, anchored in a diversified and comprehensive educational offer, directed to different target audiences, with different age groups, seeking to put the dissemination of knowledge and sustainability values at the service of the development of their communities and the conservation and valorisation of the heritage of this Geopark through Education. We can even state that Education should be the basic premise of any UNESCO Global Geopark, around which the territorial development strategy is built.

The development of teaching resources and materials is also imperative and essential, since these materials are facilitators in the teaching–learning process, helping students to understand the contents. These resources can be used during educational, outdoor and indoor programmes, and will also act as important tools for the dissemination of the natural heritage to children and young people, promoting territorial identity.

Teachers have an important role in the dissemination and promotion of the natural and cultural heritage, as through educational programmes with their students and the use of Estrela's heritage as a practical example to explain the programme contents dealt with in a classroom, contributing to a greater knowledge by the students on geodiversity, biodiversity and Estrela's culture. In this context, it is extremely important to develop accredited training actions aimed at teachers in order to make the natural and cultural heritage of the Estrela Geopark known and to encourage educational programmes.

The promotion of other, broader and more focused training for the non-school community are also important moments of dissemination of the Geopark concept, as well as its fundamental pillars—Education, Science, Tourism and Sustainable Development. Thus, courses such as those already held in 2017 and 2018, namely "Sustainable Tourism in UNESCO Global Geoparks" and "Geographic Information Systems and Tourism", whose target audience were the technicians of municipalities, tourism partners and other community members, should be continued and expanded.

One of the objectives of a UNESCO Geopark is the development of craftsmanship and the creation of new local products, based on the territory's endogenous resources. In this context, education can play an important role, namely through the creation of centres for the interpretation of local heritage, as well as through the development of training, in partnership with the Institute for Employment and Vocational Training (IEVT), to transmit the traditions and techniques used in the production of the typical handicraft of this region, thus promoting its preservation and, at the same time, encouraging entrepreneurship. Like the workshops organised by the EGA, which aim to make Estrela's natural heritage known and contribute to a greater involvement of the population in this project, it is important to continue to carry out activities that promote discussion and increase knowledge among the local population and other participants on various themes related to this territory and the mountains in general.

3.5 Tourism and Community Development

The EGA has as its mission to "*contribute to the protection, valorisation and revitalisation of the natural and cultural heritage, with special emphasis on geological heritage, with a view of deepening and disseminating scientific knowledge, promoting tourism and the sustainable development of the Estrela UNESCO Global Geopark territory*" (Castro et al. 2021). For this reason, it has developed a set of actions for Tourism, which fit in the strategic lines defined by this association (Fig. 9).

Taking into account that Tourism is one of the pillars of a UNESCO Global Geopark, as it is able to generate wealth for the territories and contribute to their dissemination, enhancing a better quality of life for the local communities, actions were selected which aim, among others: to boost tourism in the Serra da Estrela territory; strengthen partnerships; contribute to the continuity of Estrela's identity; contribute to the creation of a strong tourism brand, based on heritage and culture; encourage an increase in the number of visitors and the average expense/day per visitor; as well as contribute to the mitigate tourism seasonality.

Thus, in the framework of the tourism strategy, the Estrela Geopark has created a network of interpretative routes (Fig. 10), through the nine municipalities that make up the territory, addressing different themes (castles, panoramas, religious, among others). The Interpretative Routes of the Estrela UNESCO Global Geopark aim to make the territory of the Estrela Mountain known and encourage the visitor to start discovering the specificity of its landscape and a unique heritage. As such, it is intended that this network of routes can be increasingly extended, consolidating what are the objectives of promotion and knowledge of the territory.

The promotion of the Estrela UNESCO Global Geopark concept and the Estrela brand is only possible through synergies with local agents, who are in contact with the people of this territory every day. To this end, this association has defined a network of partners with the aim of broadening this dissemination, as well as

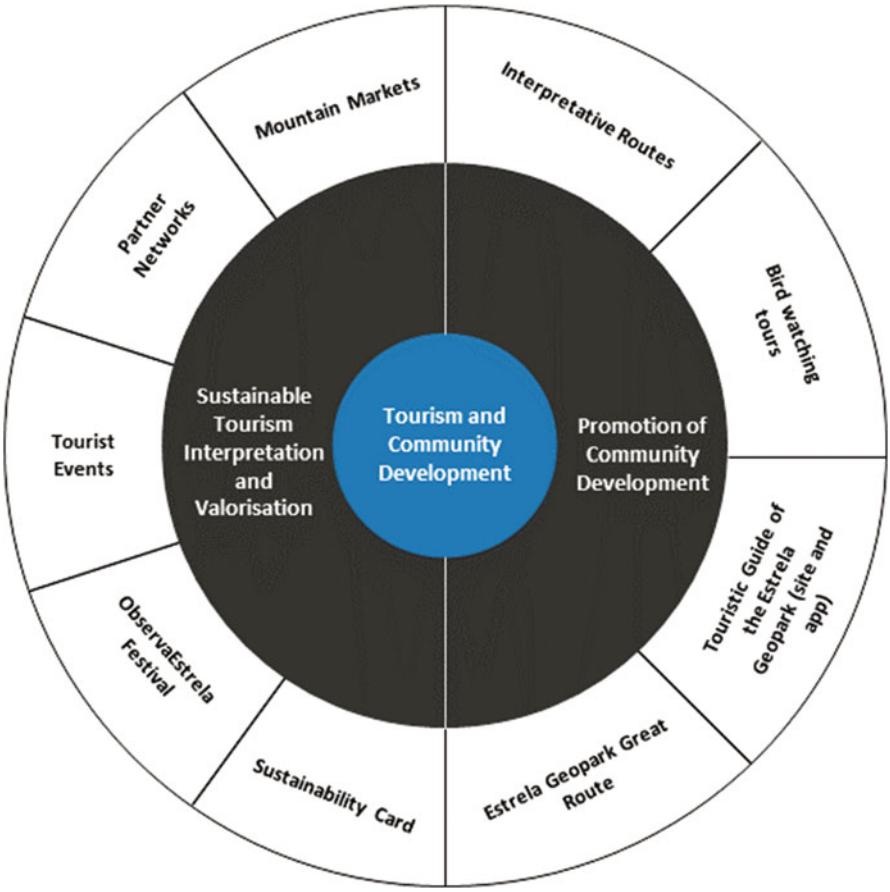

Fig. 9 Tourism and community development strategy

Fig. 10 Estrela UNESCO Global Geopark Interpretative routes

strengthening links and promoting the territory. This network has been divided into four segments: Institutional, Educational, Business and Local Producers Partners. The objective is to find joint strategies for the development of the territory, and it is intended to expand this network more and more so that all of it can be covered by the UNESCO Global Geopark brand.

In 2020, taking advantage of the consolidated state of this Network of Partners, the Estrela Geopark Association bet on a sustainable and advantageous strategy for all involved. The Estrela Geopark Sustainability Card was conceived, a loyalty programme that gives its holders a number of discounts in the most diverse partners of this Geopark. By acquiring the card, the visitor is contributing to the preservation of Estrela's heritage, helping finance projects focused on sustainability in the territory.

As mentioned, Tourism is one of the key areas for the development of territories classified by UNESCO. Therefore, it is important to make a strong bet in the consolidation and expansion of what is the tourist activity of this territory. It is known that the great tourist attraction of Serra da Estrela, thanks to its climatic and orographic characteristics, for long decades has been snow. The dependence for this resource caused a marked seasonality in Estrela and its economy. However, the restricted occurrence of snow ends up threatening the natural heritage and devaluing the tourist product itself. Besides this risk, due to climate change, this resource has been more scarce every year. It is, therefore, necessary to invest in the remaining resources of the territory in order to offer all visitors a complete experience. This strategy will also improve the territorial economy, since it will be distributed more evenly throughout the year. It is necessary to counteract seasonality and offer a variety of resources, based on what tourist activities are per se, but also on all the elements that can be used for tourism development. It is imperative that in a developed and conscious society, a sustainable tourism that allows for the preservation of resources is practiced assiduously. In this way, it will be possible to increase the tourist influx in a sustainable way, so that all visitors can enjoy these resources equally. The investment in the dissemination and interpretation of all heritage, as well as the encouragement of tourism training are also central, thus allowing a more enriching experience for visitors, which can translate into an increase in the length of their stay.

The support for investment and development of local products, with strong investment in endogenous resources, is an important milestone in the tourism development strategy of the territory, so it is necessary to create conditions so that new investments can be made in a firm and secure way, thus allowing the economy to be fostered and jobs to be created.

3.6 Communication, Promotion and Dissemination

UNESCO territories are territories of Education, Science and Culture, but also of Communication. Today, communication is imperative for territories, both as

strategies for dissemination and as a means of positioning themselves in different areas of their development. In any case, knowing how to communicate their resources, the differentiating elements or the strategies defined, constitutes a competitive advantage that cannot be neglected today. From another perspective, communication translates a strategy defined by territories, visible by the way they communicate and what they communicate.

UNESCO Global Geoparks, as well-defined territories where from a particular geology a community development strategy is built, are also territories of science. As such, communicating scientific knowledge, heritage resources, tangible and intangible values and culture itself are part of this strategic plan (Fig. 11). Assuming the old maxim that we can only value what we know, it becomes fundamental to develop instruments, strategies and processes that allow the interpretation and dissemination of the geological heritage of these places, but also what we want to achieve by valuing them, promoting not only a greater attractiveness, but also a greater involvement of their communities, leading them to participate in the very development of the territory.

At Estrela UNESCO Global Geopark, communication assumes a prominent role in its transversal development strategy (Fig. 11). In each of its vital axes, tourism, science, education and sustainability, the communication seeks to achieve three essential objectives: firstly, greater awareness of the UNESCO Geopark brand and its own concept, secondly, greater promotion and dissemination of the territory, and thirdly, a greater capacity for attracting tourists, residents and investors. However, it is not always easy to communicate science and scientific research. How to transmit knowledge in a way that is accessible, interesting and appealing to the general public, whether visitors or residents? Aware of this difficulty, the EGA soon focused on interpretation as the core strategy of the entire communicative process. Interpreting is the *sine quo non* condition to spread knowledge, promote geoconservation, achieve new forms of education and foster our sense of belonging and pride. During the last 4 years several communication measures have been adopted, among which we highlight the "Estrela Geopark Gates", which are points of information, heritage dissemination and "entry" to this territory. These "Gates" are the materialization of a dissemination strategy for the nine municipalities that make up this territory, with more than 2000 km^2. Thus, nine doors were created, and a tenth at the highest point in mainland Portugal, Torre, a place that receives approximately two million visitors per year.

In fact, communicating is much more than just a way of transmitting knowledge, it is a methodology that leverages the entire strategy of this territory, so that Estrela truly becomes a territory of Science, Education, Culture and Communication.

In a global way, the strategic lines for communication go through several initiatives, such as the reinforcement of the role of social networks in the promotion and dissemination of the Estrela Geopark, since they assume a fundamental role today. As such, it becomes relevant to bet on the different platforms as a strategy to internationalise and consolidate the image of the Estrela Geopark and the territory itself.

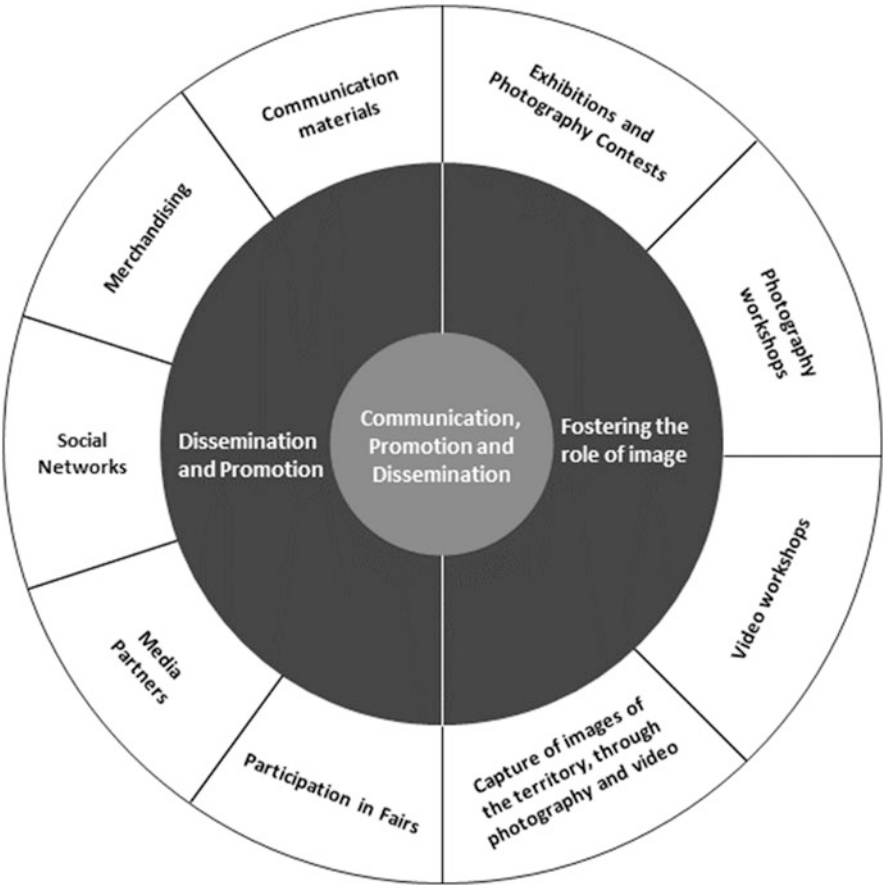

Fig. 11 Communication, promotion and dissemination strategy

Within this strategy, it is intended to promote a local network of structures to disseminate the activities developed, in order to reach as many people as possible, which in the coming years will be consolidated with the presence of Estrela UGGp in different media, either through news or chronicles, or through paid advertising. This greater involvement is also promoted, in this transversal approach, from several initiatives aimed at local communities, some of which have already been mentioned, such as the programme "Science in Unlikely Places", the ObservaEstrela festival and the participation in popular culture festivals and pilgrimages in the territory.

The Partner Network is also an important driver of development for AGE, not only in communication but also in other dimensions. In this way, it is intended that each of the partners functions as an ambassador, disseminating it and contributing to the pursuit of its objectives.

In parallel, the merchandising of Estrela Geopark, which started in 2018, will be expanded and promoted, effectively contributing to its dissemination. Through the

use of the Mascot and more, it is intended to create different products that carry the Estrela UGGp brand and the images of the Territory itself. The images, both through photography and video, are fundamental tools in the dissemination of the territories. In this sense, the EGA intends to deepen the work already started in 2016, using the image as an inducer of dissemination, applicable in different media and formats. In the next 4 years, the EGA intends to develop a Territorial Marketing Plan to support all the communication strategies, internal and external, of this Geopark.

4 Estrela UNESCO Global Geopark and Territorial Cohesion

Territorial cohesion is fundamental to the pursuit of the objectives of this UNESCO Global Geopark, because only by working together will it be possible to preserve and enhance the natural and cultural heritage of this territory, promoting the economic and social development of its communities, based on the endogenous resources that this mountain has to offer. The Estrela Geopark, in its conception, achieved something unprecedented in Serra da Estrela. It has united nine municipalities, which have worked their geographical area individually for years, and two higher education institutions around a common project to promote and enhance Serra da Estrela as a whole, based on their communities and the extraordinary natural and cultural heritage that this territory encloses. The success of the Estrela UGGp, and the development strategy it aims to implement, will only be possible if these nine municipalities and the various agents in the territory continue to work and draw up joint strategies, promoting Estrela as a unique and cohesive territory.

For all these reasons, this Geopark aims to strengthen this cohesion in the territory. Besides keeping the work present with municipalities and higher education institutions, and investing in initiatives that promote community involvement, it is also intended to increasingly expand the Network of Partners presented in order to promote initiatives, in a coordinated manner with other stakeholders, that allow channelling investments and projects that fit into the action of the Estrela Geopark, providing financial capacity for the actions to be undertaken, contributing in a very significant way to improve the quality of life of the populations and to the sustainable development of this region.

Thus, through the concomitant work in each of the areas of action, it is intended that this Geopark encourages concrete actions that promote the development of the territory, in a cohesive and transversal way, by supporting local producers, the heritage, new tourist approaches, effective and efficient communication, inevitably through work in the areas of education and science, all this anchored in the geological heritage and the recognition of its intrinsic value.

5 Final Remarks

In order to create the strategic plan, it was necessary to identify the various stakeholders (people or organisations), list the opportunities and list the threats. From the SWOT analysis carried out, we highlight the high value of geodiversity and biodiversity and cultural heritage; the Estrela brand and its geographical configuration and the high quality of endogenous products, as well as the potential for growing public awareness of geoconservation; public policies for the development of inland and mountain regions and the UNESCO brand as a lever for sustainable development. In this context, the strategic lines defined in the plan aim at preserving and valuing existing natural and cultural resources and enhancing the opportunities identified in the SWOT analysis, as well as combating the various weaknesses and threats identified (low population density and aging, rural exodus, low level of education and lack of scientific culture, low entrepreneurship of the population, degradation of the traditional economic structure due to the low attractiveness of the primary sector, relocation of secondary sector units and forest fires).

With the objective of reaching the ideas and proposals presented throughout the various areas of action-Structure and Management, Geoconservation and Environment, Science, Education and Training, Tourism and Community Development and Communication, a series of actions were defined with the purpose of achieving the goals set by this strategic plan. Some of these actions are transversal to several areas of action, presenting an interdisciplinary approach, thus constituting a set of well defined, concrete and measurable activities. These actions, however, are only feasible due to a large number of public and private partners, namely: local authorities; local development associations and other private associations with and without profit goals; the political power, namely the Ministry of Science, Technology and Higher Education, CCDRC, CIMBSE and CIMRC; interpretation centres; police and army forces; higher education institutions; foundations; the educational system; not forgetting the Tourism of Portugal and the Centre ERT, among others. This clearly demonstrates the importance of networking and establishing partnerships, therefore constituting one of the primary objectives of the strategy implemented by the Estrela UNESCO Global Geopark, contributing to its viability and to the achievement of its objectives, namely the preservation and enhancement of the Estrela's natural and cultural heritage, placing its geology at the service of the development of the territory and its communities through tourism, science and education for sustainability.

This Sustainable Development strategy seeks to meet the needs of the current generation without compromising the ability of future generations to meet their own needs. It is, therefore, a model that must consider, inseparably, social justice, economic viability and the preservation of the environment.

Sustainability is such a broad concept that in order to guide action in favour of it, the United Nations defined in 2015 the 17 Sustainable Development Goals (SDG) to be worked on by 2030 (are also jointly called "Agenda 2030"). These 17 SDG spans the three dimensions of sustainability, economic, social and environmental, and

include more than 150 targets, which together help us direct public and private initiatives in the search for a more sustainable society.

As an UNESCO classification, Global Geoparks have the mission to promote the sustainable regional development of a territory and therefore they are also guided by these objectives and goals. They are established in territories with an important geological heritage that is intended to be preserved, translating into an important strategy of territorial promotion and valorisation. The strategy, however, provides for the preservation without prohibition of access to this heritage, but from education, enhancement and awareness.

Thus, the strategy of the Estrela UGGp, seeks to take advantage of the natural heritage as a resource to favour the community that lives here. By valuing the heritage and promoting the territory at home and abroad, it aims to increase tourism demand in order to create more jobs and local economic growth. But this development takes place in a conscious and planned way, with the least possible impact on the heritage, so that its value is not exhausted. Thus, SDG 8—Decent Work and Economic Growth is worked on and indirectly for SDG 10—Reducing Inequalities within and between countries. However, no strategy can be implemented without exploring SDG 17—Partnerships for the Implementation of Objectives, working with local communities, businesses, institutions and public authorities, joining forces for the development of populations and a greater resource, which is Estrela itself!

References

Cascais M, Terán A (2011) Educação formal, informal e não formal em ciências: contribuições dos diversos espaços educativos. XX Encontro de Pesquisa Educacional Norte Nordeste, Universidade Federal do Amazonas – UFAM, 23 a 26 de agosto de 2011, Manaus-AM

Castro E, Loureiro F, Gomes H, Vieira G (2021) O Património Geológico do Geopark Estrela e a sua valorização. Capitulo de Livro "Geopatrimónio em Portugal e na América Latina"

Fernandes M, Castro E, Loureiro F, Patrocínio F, Firmino G, Vieira G, Gomes H (2018) Geodiversity and geo-education in the construction of tourist and leisure territories: the case of aspiring Geopark Estrela. In: Abstract book 14th European Geoparks conference – "Geoparks: pathways of sustainable tourism for development" (Açores)

Gomes H, Loureiro F, Cezar L, Castro E, Vieira G (2019) Interpreting Late Pleistocene paleoenvironments through the geosites of the Estrela Geopark (Central Portugal). In: Pena dos Reis R, Henriques MH, Oosterbeek L, Rosina P, Alves EI, Garcia GG, João P (eds) International meeting on paleoclimate: change and adaptation – book of abstracts. série Area Domeniu, vol 8, Instituto Terra e Memória – Centro de Geociências da Universidade de Coimbra, 57–58 p

Gomes H, Castro E, Fernandes M, Loureiro F (2020) The science and education network for sustainability in Estrela UNESCO Global Geopark. In: Let's become geologists! Challenges and opportunities in geoscience education in Europe. Eur Feder Geol J 50:45–49 p

UNESCO (2015) Statutes of the international geoscience and geoparks programme and operational guidelines for UNESCO Global Geoparks. UNESCO, 16 p
UNESCO (2017) Education for sustainable development goals: learning objectives. Organização das Nações Unidas para a Educação, a Ciência e a Cultura (UNESCO). ISBN: 978-85-7652-218-8. http://unesco.org/open-access/terms-use-ccbysa-en
Vieira G (2004) Geomorfologia dos planaltos e altos vales da Serra da Estrela. Ambientes frios do Plistocénico Superior e dinâmica actual. PhD in Geography. University of Lisbon, 724 p
Zouros N (2004) The European Geoparks network. Episodes 27(3):165–171

Leveraging Landscape: The First Four Years of UNESCO Global Geopark Odsherred

Charlotte Werther

Abstract Based on a study of the first four years of UNESCO Global Geopark Odsherred in Denmark, this chapter reflects on four questions raised in Kavaratzis et al. (Rethinking place branding, 2015): Why is place branding important? What builds place brands? Who builds place brands? And how should place management be understood and undertaken? It discusses whether, for relatively peripheral places that experience socio-economic problems, designation as global geopark may constitute a platform for addressing such issues by working with place-bound resources to achieve viable place-based development. In addition, it suggests that geopark status may allow for a more inclusive and participatory place branding process that relies on co-creating the place brand with multiple local stakeholders rather than on imposition of a place brand top-down. Given that the Global Geoparks Network (GGN) offers 'a landscape approach for geological heritage conservation, research and sustainable development' and relies on bottom-up local involvement, allocation of geopark status arguably creates opportunities to develop an overarching narrative and place stories that can be levered to foster pride of place and promote geotourism.

Keywords UNESCO Global Geopark Odsherred · Inclusive place branding · Place-based development · Place narrative · Geotourism

1 Introduction

In December 2013, the Danish municipality of Odsherred in north-western Zealand applied for membership of the UNESCO European Geoparks Network (EGN) and Global Geoparks Network (GGN) (Geopark Odsherred 2013). Following a review and field evaluation process, the application was accepted, and Odsherred was granted Geopark status for a four-year period in September 2014. Odsherred is

C. Werther (✉)
Copenhagen Business School, Management, Society and Communication, Frederiksberg, Denmark
e-mail: cw.msc@cbs.dk

V. Braga et al. (eds.), *Economics and Management of Geotourism*, Tourism, Hospitality & Event Management, https://doi.org/10.1007/978-3-030-89839-7_3

Denmark's first and, until 2021, only geopark. The designation was up for renewal through a 'revalidation process' in 2018 based on a self-evaluation report and a field visit, and UNESCO Global Geopark Odsherred was successful in achieving a 'green card' in early 2019 for a further 4-year period (UNESCO 2017, see also Ramsay 2017).

The central requirement to qualify for UNESCO Global Geopark status is for the area to demonstrate 'geological heritage of international significance', but equally 'to explore, develop and celebrate the links between that geological heritage and all other aspects of the area's natural, cultural and intangible heritages' (UNESCO 2017) or—as UNESCO's Global Geopark site describes it:

> It is about reconnecting human society at all levels to the planet we all call home and to celebrate how our planet and its 4600 million year long history has shaped every aspect of our lives and our societies.

UNESCO began its work with geoparks in 2001, and in 2004 17 European geoparks, organized in the European Geoparks Network (EGN) (www.europeangeoparks.org), and eight Chinese geoparks came together to form the Global Geoparks Network (GGN), relabelled the UNESCO Global Geoparks in 2015. As of August 2020 there are 161 designated Global Geoparks in 44 countries and many new applicants.[1]

According to the Guidelines and Criteria for National Geoparks seeking membership of the GGN, the primary goal of geoparks is 'Promoting Earth Heritage, Sustaining local Communities', just as the network presents 'a landscape approach for geological heritage conservation, research and sustainable development' (UNESCO 2014). Central aims are to protect and conserve the area and landscape and to educate the public and visitors in the geological heritage of the area as well as the local cultural heritage. A unique landscape and exceptional geology are sine qua non, but 'non-geological themes must be highlighted as an integral part' of any geopark (UNESCO 2014).

Therefore, in addition to the above goals, the aspiration is to address 'problems generated by stagnant economic development, high unemployment and associated

[1] The new applicants include two Danish geoparks, *Geopark Vestjylland* [Western Jutland] (www.geoparkvestjylland.dk), which achieved designation in 2021, and *Geopark Det Sydfynske Øhav* [South Funen Archipelago](www.naturturisme.dk). The UNESCO Global Geoparks is one of three UNESCO site designations, the other two being the Biospheres Reserves (granted to the Danish island of *Møn* in June 2017) and the—probably best known—World Heritage Sites.

demographic issues arising from a combination of ageing residents and rural depopulation' (Ramsay 2017, 501), and the prospective geopark must stimulate economic activity within the framework of sustainable development. This is linked to the requirement of local involvement, strong community support and, generally, a bottom-up approach to economic and cultural development. This, it is argued, may stimulate 'pride of place' of local residents and strengthen their identification with the area, which in turn may aid the protection of the geological heritage.

2 Place Branding: Critical Perspectives

While the above goals and requirements do not directly rely on place branding concepts and ideas, geoparks are evidently also focused on furthering socially, environmentally and economically sustainable development of local businesses, including tourism. The geopark agenda is about making full use of place-based resources, primarily the landscape and geology, but also local history and culture, to create a narrative or storyline that will engage local residents and attract tourists (Miller and Buhay 2014) and form the basis of innovative business and other developments in the area, all of which are recognizable ambitions from a place branding perspective.

The literature on and discussions of place branding are booming and raise critical questions about the viability of many place branding practices, not least in relation to the involvement of residents and other stakeholders in co-creating place brands (Braun et al. 2013; Kaneva 2017; Casais and Monteiro 2019). In their edited volume Rethinking Place Branding, Kavaratzis et al. (2015) called for the rethinking of the theory and practice of the field, arguing that 'a more grounded, theoretical framework to what began and initially developed as a wholly practical activity' (Warnaby et al. 2015, 242) is needed. In addition, they vented a 'growing doubt that much official place branding is actually effective in attaining its often only vaguely delineated outcomes' and 'that the objective of much place branding is more to be seen to be doing it, rather than to achieve specific desired outcomes and impact on the place' (242).

Similar concerns are raised in Kavaratzis and Dennis' editorial 'Place branding gathering momentum' (2018) in Place branding and public diplomacy, where they introduce a number of pressing issues in the field. They call for recognition of the complexity of places and the 'exploration of approaches alternative to a purely managerial focus', which brings to the fore issues of identity and place brands as 'cultural phenomena carrying and re-producing cultural meanings and values' (Kavaratzis and Dennis 2018, 75). This also involves a stronger focus on 'stakeholders, their significance, their role and their further engagement in place branding' and 'the multiplicity of stakeholder groups and their conflicting interest' (Kavaratzis and Dennis 2018, 75).

This was also the focus in Kavaratzis (2012), who introduces the notion of participatory branding and stresses the importance and necessity of stakeholder

involvement and consultation in the (co-)creation of the place brand. In particular, the key role of residents and local communities is emphasized in that they form an integrated part and act as ambassadors of place brands (Kavaratzis 2012, 12). In addition to this, residents are also voters whose support is needed to render the place brand politically legitimate and viable (Braun et al. 2013).

The stakeholder perspective is further developed in Kavaratzis et al. (2017), who introduce the term inclusive place branding, stressing that places are very special and complex forms of products to be handled with great care and that place branding has a 'potential to go beyond economic interests and goals, to focus on residents, to engage diverse stakeholders, and to embrace contradictions and marginalized groups' (Giovanardi et al. 2017, 172).

This potential is summed up in three interrelated dimensions of place branding: strategic, cultural and socio-economic. The strategic dimension asks whether place branding can provide a vision and a plan of action for a place that may 'successfully unify diverse stakeholders' voices, agendas and desires to serve the interests of the many not the few' (Giovanardi et al. 2017, 173), while the cultural perspective queries whether, when the various cultural meanings of a place are appropriated for branding purposes, the multitude of existing identities can be respected (see also Kaneva 2017) and grounded in a bottom-up process rather than being imposed top-down. Finally, the socio-economic dimension revisits Kavaratzis' (2012) argument about the role of residents and local communities and acknowledges that place branding is inherently highly political and that democratic legitimacy is of the essence (Giovanardi et al. 2017).

The call for rethinking the field of place branding in Kavaratzis et al. (2015) is encapsulated in four questions. **Why** is place branding important? **What** builds place brands? **Who** builds place brands? And **how** should place management be understood and undertaken? (Ashworth et al. 2015, emphasis added).

These questions will be used as a framework to discuss the case of Geopark Odsherred and to suggest that geopark designation can be viewed as place branding and may offer a platform for a relatively more inclusive and bottom-up process of place(-based) development, as argued by Ramsay 2017 (501). In addition, geopark status may constitute a vehicle for creating a diverse and multifaceted place brand with at least a potential for including more stakeholders in co-creating the brand. Or, to put it differently, it will be discussed to what extent the designation as UNESCO Global Geopark can be seen as a viable strategy for a bottom-up and inclusive local development process by 'leveraging landscape'.

This chapter draws on extensive notes from participatory observation and a review of relevant documents, and while it makes no claim to having rethought the field of place branding or to provide (definitive) answers as to how to achieve inclusive place branding, it is hoped that reflecting on the first four years of Geopark Odsherred will contribute to illustrating some of the critical issues raised by Kavaratzis (2012), Kavaratzis et al. (2015, 2017), and Kavaratzis and Dennis (2018).

3 Introducing Odsherred

The municipality of Odsherred, in its present form, was created in 2007 by the most recent restructuring of the local authority landscape in Denmark, which reduced the number of local authorities from 270 to 98. Three local authorities in north-western Zealand, Dragsholm, Trundholm and Nykøbing-Rørvig, were merged to re-establish the long-gone 'herred'—Odsherred—an ancient administrative unit. In a sense, the new authority (re-)created a 'space' in need of becoming a 'place' and of carving out a new role and identity for itself (Vejre et al. 2015, 108).

Odsherred is only one hour's drive from the Danish capital, Copenhagen, and functions as a gateway to the ferry link between Zealand and Jutland. Its relatively substantial agricultural sector is combined with tourism based to a large degree on holiday or second homes along the extensive coastline (157 km). With around 24,000 second homes, it is the Danish municipality with the largest number by far, and over the years, the Odsherred landscape has been a major driver to attract 'landliggere' (seasonal residents).

Nevertheless, Odsherred counts among the peripheral areas of Denmark, facing problems such as a declining and ageing population, livelihoods below average and a low educational level among the population (Geopark Odsherred 2013).[2] Odsherred's local production sector is limited, and the economy is characterized by many small businesses and very reliant on tourism, the municipality itself being the biggest employer. The tax base is low, and increasing transfer payments in the wake of the 2008 financial crisis drained the municipal coffers, which brought municipal finances under the control of the Ministry of Internal Affairs until 2011.

With the establishment of the newly merged municipality also came the responsibility for local spatial planning and administration, and from that new responsibility sprang the idea to use the spectacular ice-age landscapes of Odsherred to define the identity of this new local authority and to use it for driving its development (Vejre et al. 2015). The idea to aim for geopark status first emerged in 2005 and became part of the municipal planning strategy in 2007, but the project only took off in 2008 where more stakeholders became convinced of the narrative potential of the glacial landscape of Odsherred and of its ability to act as a unifying identity and a driver of socio-economic development (Vejre et al. 2015). The geopark strategy became a core element in the local council's Municipal Plan for 2009–2012 (continued in the Plan for 2013–2025) and was gradually incorporated in the policies, practices and communication of all municipal departments (Vejre et al. 2015).

In 2011, the municipality allocated the first budget to develop the project, and during the summer, the geopark was officially 'opened', and, in 2012, responsibility for driving the process towards applying was transferred to a Geopark Secretariat, a collaborative project organization consisting of Odsherred Municipality, the tourist organization and other significant local players (Geopark Odsherred 2013). These

[2] See Gyimothy and Meged (2018, 3) on another 'disadvantaged corner of rural Denmark', the island of *Møn*.

developments mark the beginning of the focused preparatory phase, where a prospective geopark attempts to prove that designation is merited. In essence, that is done by actually setting up and running a geopark.

This period also saw increased dissemination of information about the geopark to local stakeholders, including full and part-time or seasonal residents, via meetings, folders and an info-point at Dragsholm Castle. Barriers in the process were a good measure of critical opposition to the whole idea on the part of the local press (Nordvestnyt) (Vejre et al. 2015, 122) and local community scepticism, including the challenge of unfolding the new concept of geopark and of making it 'physical and material' in response to questions such as 'where is the entrance to the geopark?'

Following the filing of the application in 2013 and the field visit of two GGN evaluators during the summer of 2014, Geopark Odsherred reached its goal in September 2014. With the achievement of geopark status, the running of the geopark was taken out of municipal hands, and an independent Geopark Odsherred Foundation with a Board was set up on 1 January 2015.

4 Why Geopark Odsherred?

Why are places important, and why do places attempt place branding in the first place? The reason given most often in the place branding literature is that it helps places in the increasingly fierce inter-place competition, for e.g. residents, tourists or investments brought along by an alleged heightened interrelatedness and sameness of places that result from globalization processes. This thinking relies on a discourse of 'competition' and 'winning' at the expense of other places in that '[p]laces, and their range of goods and services, have become increasingly interchangeable' (Horlings and Marsden 2014, 5). In other words, place branding is seen as a zero-sum game (Warnaby et al. 2015, 244), and from this perspective, especially rural areas are disadvantaged and perceived to face 'ecological, social and economic vulnerabilities' (Donner et al. 2016, 274).

This place-less discourse of competitiveness is countered by many (Dale et al. 2008, 268; Horlings and Marsden 2014, 5; Donner et al. 2016, 274), and it is argued that 'place branding may have social objectives as well as economic ones' and contribute to '[c]ommunity building, local awareness' and 'the shaping of local identities'. (Warnaby et al. 2015, 244), and that globalization forces are 'not best faced by applying outdated and defunct spatial planning zones or through development by opportunistic bids for short-term European funding' (Thomas Lane et al. 2016, 203).

Instead of relying on a logic that stresses the sameness of places and the competition between them, place-based development, bound in the local context and based on endogenous or place-bound resources, should be given priority to enable especially rural areas and regions to 'valorise their local assets and exploit hitherto unused resources' (Donner et al. 2016, 274). It is argued that a one-size-fits-all approach to development is unlikely to be a success (Dale et al. 2008, 267) and

that 'sustainable development initiatives (. . .) must foster a sense of place that is possible within the given space' (269).

Therefore, one answer to the question of why place brands are important and why places attempt branding is that it can be used for place development. In the case of Odsherred, establishing the geopark was indeed intended to foster 'rural district development in connection with commerce and tourism', and 'securing tourism as a possible economic livelihood' (Geopark Odsherred 2013, 44). As argued in the motivation for joining EGN and GGN (Geopark Odsherred 2013, 44, emphasis added):

> Odsherred's Municipal Council, the Tourist Agency and Business Council all believe that the best way to ***achieve sustainable development in Odsherred*** is to become a member of the European Geoparks Network, with all the advantages that go with it.

There are other possible answers as to why gathering around a common place brand is a good idea. It may provide *'strategic guidance'* for place development and allow for a process of imagining the future of the locality and also form the *'basis for stakeholder cooperation'* (Ashworth et al. 2015, 4). In addition, place brands may help *'maximise positive place experience'* among residents, visitors and possible investors (Ashworth et al. 2015, 4). All these goals can be found in Geopark Odsherred's application (2013, 44, emphasis added):

> **Geopark Odsherred as a brand**
>
> Endorsed by the internationally recognized geopark stamp of approval, which emphasizes high quality, Odsherred's many small businesses will have the opportunity to market their products under ***a single brand***. Joint marketing of products from Geopark Odsherred also helps to give the area ***a special identity***, distinguishing it from other parts of Denmark.
>
> **Geopark Odsherred as an umbrella.**
>
> Both public and private partners in Odsherred have been working separately for many years on the same things. Recognition as an international geopark will function like ***an umbrella*** in future collaboration, in which existing and new initiatives can ***share direction***. Geopark Odsherred will make it possible in the future for the area to speak with ***one common voice*** on themes such as sustainable development and protection of landscape assets.
>
> **Geopark Odsherred as a local gathering point.**
>
> Recognition by the European Geoparks Network will engender ***pride and identity*** among the inhabitants of Odsherred and help to increase ***knowledge and understanding*** of the local cultural heritage.

In addition to the above, yet another reason why place brands are considered important and why places attempt branding is that they may offer *'solutions to practical/functional place-related problems'* (Ashworth et al. 2015, 4). As suggested, the municipality of Odsherred did and does suffer from a number of the problems associated with being a (relatively) peripheral area in Denmark. The application for membership of the geopark network reflects ambition and hope that such place-related problems may be countered by using the place-bound resources of geology and landscape to create one brand with an overarching narrative or

connective storyline (Dominguez Garcia et al. 2013) to promote 'Odsherred as a locality with a valuable geology' and make it 'interesting as a niche in relation to geotourism' (Geopark Odsherred 2013, 44) (see also Farsani et al. 2011; Miller and Buhay 2014; Han et al. 2018).

There is, of course, a degree of competitive differentiation (Mayes 2008, 130) in aiming for 'distinguishing Odsherred from other parts of Denmark' (Geopark Odsherred 2013, 44) and in promoting geotourism or sense-of-place tourism to boost the already important tourism industry further. Overall, however, the application for GGN membership seems to reflect that the 'exploitation and control over local resources is considered as more important than competition between areas', as Donner et al. (2016, 288) describe it based on their study of four rural regions in Europe. Equally, the aspirations of the application seem to be 'directed towards the capacities and deeds of local people and development "from within"' (Donner et al. 2016, 288). This is also in line with a shift in the development strategies of rural areas identified by Horlings and Marsden (2014, 17) that make them less focused on agricultural-based development and more directed towards a more integrative and place-based approach that involves a wider spectrum of local stakeholders and capacities.

5 What Constitutes Geopark Odsherred?

What are the components of place brands, and what resources are used for their construction? Ashworth et al. 2015 (5) reflect on the fact that the most common answer is '*promotional tactics and identity claims*' undertaken by tourism and branding agencies. In practice, this approach to place branding, which is intended to promote places as clearly distinguishable from others, is often seen to do the exact opposite (Warnaby et al. 2015, 245).

A less managerial and wider and more nuanced perspective is that place brands consist of the multitude of '*associations with place-making elements*' that together shape a sense of place, a view that 'assumes a much stronger link between the place and the brand' (Ashworth et al. 2015, 5) and offers a more complex and dynamic perspective on what constitutes a place brand. A related approach sees place brands as a collection of '*narratives or "place stories"*' that reflect the meaning(s) of places and are formed collectively and interactively, or co-created (Ashworth et al. 2015, 5).

Geopark Odsherred takes its point of departure in embedded or place-bound resources that cannot be (re)moved: the geology. The landscape was formed during the latest (Weichsel) ice-age 17,000 years ago when the ice advanced from the east, creating depressions (such as Siddinge Fjord and Lammefjord) and three ridges, collectively known as the Odsherred arches (now captured in the logo of Geopark Odsherred, see Sect. 1). This type of glacial landscape formation is illustrated in an exemplary way in Odsherred and therefore found its way into twentieth century school wall charts across Denmark.

Odsherred used to be a peninsula joined to the rest of Zealand by a small strip of land, which was the strategic position of Dragsholm Castle. At the initiative of baron Zytphen-Adeler from Dragsholm, the mid-nineteenth century saw the beginning of land reclamation for agricultural purposes by the draining of glacial depressions such as Lammefjord, which eventually produced some of the best farmland in Odsherred.

Geopark Odsherred's 355 square kilometres present a varied landscape of 60% ice-age geology and 40% later landscape formations, the reclaimed land constituting 20% of the total area. Geology and landscape provide a source of as well as a setting for staging narratives and place stories about past and present life in Odsherred, centred around **cultural history**, **local produce** and **art**. Pre-historic monuments, the Bronze-age Sun Chariot, Dragsholm Castle and the medieval Næsholm castle ruin, all form part of the cultural history of Odsherred, as do stories about life in the many holiday homes and about the early pioneers who, following the reclamation of Lammefjord, settled 'on the fjord' to begin the process of converting it into the farmland that today produces carrots, potatoes and other root crops.

Carrots and potatoes from Lammefjord and other reclaimed areas have achieved Protected Geographical Indication (PGI) status, which adds to the story about Odsherred as a favourable 'terroir' (Dale et al. 2008, 267) for producing quality crops and especially vegetables that are showcased during an annual Grand Cru food festival featuring a carrot 'tasting' and choice of Grand Cru carrot and potato of the year. In recent years, this story has been sustained by developments such as a budding local wine production and Dragsholm Castle's status as a high-end hotel and gourmet restaurant that relies on local produce and which obtained a Michelin star in 2017. Potatoes also form the basis of a local production of vodka (Nordic Soil), just as the numerous varieties of seaweed that can be harvested along the coastline are now delivered to restaurants and made into various products by Dansk Tang [Danish Seaweed]. It can all be summed up as 'food with identity' or 'sense-of-place food', traceable to the locality.[3]

The third theme that interacts with the landscape to generate stories about Odsherred is art. The landscape has attracted artists since the mid-nineteenth century, including its own 'colony' or group of Odsherred painters who came to live and work there in the 1930s and 1940s and were associated with and defined by the landscape, just like the other (earlier) Danish groups of painters from Skagen, Funen and Bornholm. Present-day Odsherred also boasts a large number of local artists, who open their workshops during Whitsun weekend for an 'Art Trail' which takes visitors through the landscape.

Together with the geology, the themes of cultural history, local produce and art can be said to make Odsherred as a place and conjure up associations with place-making elements to create a sense of (a special) place. As was realized early on, the landscape of Odsherred has narrative potential (Vejre et al. 2015, 110) to tell a more nuanced and multifaceted story than brands that make claims to (re)presenting the

[3] See Therkelsen (2017) for a discussion of the potential of creating locally situated as opposed to generic food place brands in four Danish coastal destinations, including Odsherred.

essence of a place (Hansen 2010; Ren and Blichfeldt 2011). As a place brand, it does not lend itself easily to traditional promotional tactics and identity claims but relies on being enacted and performed in the landscape.

This reliance on local enactment has led to the establishment of the first 7 km of a Ridge (hiking) Trail, described as the 'backbone' of Geopark Odsherred.[4] The findspot in Trundholm Mose [bog] of the Bronze-age Sun Chariot, exhibited at the National Museum of Denmark and featured both on Danish 1000-kroner notes and Odsherred's municipal coat of arms (see Sect. 1), has been developed into a special site and a stop on a 250-km ice-age biking trail. Yet another initiative is a visitors' field and theme route centred round the reclamation of Lammefjord and the local vegetable production, where retired and still active farmers share their personal and professional stories during the summer season.

While these places and stories all enact and communicate aspects of Geopark Odsherred and what it is about, it is less easy to sum up the geopark discursively in a few words. One way of doing that, which is used in folders by the geopark, is:

Geopark Odsherred = all the things we are proud of

This evidently suggests an inclusive pride of place and identification with the locality, but it also begs the question: who are 'we'?

6 Who Constructs Geopark Odsherred?

Who are the agents of place brand formation, and who actually constructs place brands or influences their construction? The traditional answer to these questions is that place brands are constructed top-down by the organizations and '*institutions that undertake place branding projects*' (Ashworth et al. 2015, 5), be they public, private or voluntary. This has been challenged by a bottom-up argument that 'place brands are formed by individual *place consumers who make place-related decisions*' or by groups of individuals (Ashworth et al. 2015, 5) such as residents, tourists or investors. This perspective emphasizes that the institutions and agencies who believe that they are creating and communicating a place brand do no such thing. Instead, stakeholders contribute to (co)-creating the place brand(s), while place users base their perceptions on personal experience and input from family and friends rather than relying on pre-packaged messages (Therkelsen 2015). In the words of Aitken and Campelo (2011, 916): 'Understanding that brand meanings are socially constructed, culturally dependent, and communally "owned" promotes a radical shift in understanding brands and brand ownership'.

[4] See *Stedet Tæller: Perspektiver og Erfaringer* [Place Matters: Perspectives and Insights] (2017), which accounts for 36 projects across Denmark funded by the philanthropic foundation Realdania, and aimed at levering *place-bound* resources to develop peripheral regions.

Designation as UNESCO Global Geopark rests on ambitions to generate local involvement and community support, to promote pride of place and local empowerment, and to rely on a bottom-up process to achieve economic and cultural development. Fulfilling these ambitions is no mean task and did indeed prove a challenge for the aspiring geopark. In her industrial PhD thesis, Paya Hauch Fenger (2018) argues that, in working towards designation as geopark, the Odsherred municipality

> tried to establish a geopark primarily through the establishment of dissemination signs, designation of geopark sites, and through a strictly coordinated visual and oral narrative—without active involvement of citizens as co-designers,

but also that staging 'a festival can be used as a platform for the involvement of citizens in the construction of a geopark' (Fenger 2018, 6, translations by author).

The initial thinking was that local citizens were to be informed of, rather than involved in, the geopark development to enable them to communicate the geopark concept and narrative, which essentially made them 'passive recipients of a didactic project' (Fenger 2018, 170), where the strengths and qualities of the area would be defined and constructed top-down. While locals did notice the new signs in the landscape and read about the establishment of the geopark in the paper, the attempt by the municipality and what might be seen as elite stakeholders to stage and orchestrate **their** local area and community as a geopark met with a good measure of scepticism and opposition (Fenger 2018; see also Stubbs and Warnaby 2015, 102).

The first geopark festival in Odsherred was an attempt to counter that scepticism and to use local curiosity about the project to engage citizens in the creation of the geopark. With Paya Hauch Fenger as project coordinator, it was planned and organized in private homes and local communities during the first half of 2014 and took place in July. The festival programme stresses the inclusion and involvement of local stakeholders (Geopark Odsherred 2014, translations by author and emphasis added):

> [The] Geopark Festival has been organized by citizens, second home owners and visitors who are all attached to Odsherred, who believe that it is a very special place, who are proud to live and visit here and willing to spend time and effort on sharing it with others.

The programme also underlines that it has been a voluntary, civil society process reflecting ownership and willingness to engage, despite the fact that 'there is no money':

> Over and over it has turned out that a lot of people in Odsherred are willing to get involved without any, or very little, remuneration because ***we*** think it is fun. Because ***we*** can. And because it is ***our*** festival, which is fantastic and very touching.

The festival was not devoid of tensions between various groups of stakeholders, such as culture professionals and ordinary citizens, as to the right to define the geopark and as to who was entitled to act as gatekeepers of what events went into the official programme. Nevertheless, the first geopark festival served the purpose of engaging local people and involving local stakeholders in constructing Geopark

Odsherred, shifting the role of some local citizens and communities from that of consumers to producers of culture (see also Therkelsen 2015).

Since 2014, the Geopark festival has become a recurring event, but whether quite the same degree of enthusiasm and co-creation has been achieved in ensuing festivals is perhaps doubtful. Some events, such as the organization of an amateur biking ride in the Odsherred hills (Geopark Bjerg Grand Prix), have of necessity been professionalized and run by external partners, but every year the Geopark Secretariat invites ideas and proposals from local producers of events. This is seen by the secretariat as facilitating rather than controlling the planning process, but it does not mean that even now, all local citizens have heard about the geopark, or are necessarily engaged or interested. As Paya Hauch Fenger put it during the defence of her PhD thesis in November 2018: 'My hairdresser may read about the geopark in the paper, but it is nothing to do with her'.

According to Jakob Walløe Hansen (personal communication), geologist at the Geopark Secretariat, the ambition to broaden the engagement may only be achievable in the long term when today's schoolchildren in Odsherred grow up. From 2014 to 2018, the children in Odsherred's schools have been through a Geokids programme, devised and supervised by two local artists, which has introduced them to the geological development and cultural history of the area and engaged them in activities such as preparing a dish from local produce and creating their own artwork in the form of a mask made from ice-age clay. The approximately 3500 masks created by the children have been fitted on iron poles and placed in the hills near the village of Veddinge, where they form an impressive sight in the landscape and add a new setting for stories of Odsherred and the geopark. Educational activities for the public of all ages, but especially children, are a central prerequisite for a UNESCO Global Geopark, and it is hoped that Geokids and similar projects may foster 'pride of place' and identity-building in the future generations.

Another way of stimulating identification and engaging local communities is a competition to become Village of the Year through a local community makeover project. The competition, which started in 2013, has itself undergone a makeover to anchor it more firmly in the geopark context. Three local communities, which may include holiday home communities, compete for funding to work with their very local place and its resources to e.g. improve accessibility to the surrounding landscape by establishing a path or to showcase in some other way the link between the community and one or more of the other central themes of the geopark: cultural history, local produce and art. In contrast to the early designation of geopark sites top-down, the competition invites local communities to define and create their own geo-sites bottom-up.

The winner of the competition becomes Geopark Village or Community of the year and joins Geopark Odsherred's network of partners that includes local businesses and organizations to ensure a broad base of stakeholders who work jointly in developing and branding the geopark.

Finally, the Folkemøde (democratic festival) in Odsherred, first organized in September 2017 and modelled on the (Danish) people's democratic festival held in the island of Bornholm in June, provides opportunities for showcasing and discussing the geopark and its future amongst a number of other debates about life and democracy in Odsherred. Again, many locals may not attend, nor feel that they have a stake in it or that it is anything to do with them, but in response to the question of who constructs Geopark Odsherred, it seems fair to argue that openings are there to contribute to its construction.

7 How Is Geopark Odsherred Managed?

How should place brand management be understood and undertaken, and what influences it? This fourth and final question relates to the practice of place management and essentially sums up aspects of the three other questions. Ashworth et al. 2015 (6–7) suggest that place brand management is often seen as merely promotional activities to attract place users or, in a slightly wider perspective, as image or reputation management to re-image a place in order 'to "correct" a negative image or to increase awareness of the place' (6). This suggests a top-down approach and is related to a critical view of place management as a power exercise serving elite interests. As Lichrou et al. 2017 (1) warn, '[p]lace branding produces, reproduces, circulates and, perhaps, imposes place imaginaries that affect the lives of real people, reconstructing and reinforcing narratives of power'.

A contrasting view is that place brand management has at least the potential to be a bottom-up exercise in community-building, focused on internal audiences and aimed at identifying directions for the future and at increasing place attachment. It rests on the argument that, in contrast to consumer brands, place brands cannot be 'owned', and that 'asking who owns the place brand is the wrong question', the right question possibly being 'who has a stake in the place brand' (Stubbs and Warnaby 2015, 103), which means that those responsible for place brand development and management 'should be open to the widest possible stakeholder participation in terms of brand development' (115).

Evidently, the Geopark Odsherred place brand is managed and used for image and promotional purposes by the Geopark Foundation, Odsherred Municipality, Visit Odsherred and a number of other stakeholders and partners, and the fact that the geopark and the municipality are coterminous may be seen as a strength, as suggested by Pasquinelli (2010, 570) in that 'any branding initiative should be undertaken and managed at a geographical level which is politically in charge of and accountable for the developmental policy that is the backbone of the brand'.

The initiative and drive to establish the geopark originated with the Odsherred municipality when geopark designation came to be seen as a strategy and platform for addressing socio-economic development and regeneration issues. Today, the geopark is managed by the Foundation and Secretariat in close cooperation with the municipality, and it is used for image management, such as promoting Odsherred as an attractive place to live, visit, set up business and work, with the present (2017–2020) municipal settlement strategy focusing on attracting active empty nesters, young families with children and entrepreneurs.

Given that tourism makes such a major contribution to Odsherred's economy, providing one third of private jobs and adding 100,000 residents and visitors to a population of 33,000 during the summer season, the geopark also features prominently in promotional activities for potential visitors and tourists (www.visitodsherred.dk), and it is the explicit goal of the Geopark Board to enhance further awareness of the geopark among full and part-time residents and visitors in the future (Geopark Odsherred 2018).

There is no doubt a substantial element of a top-down, tightly orchestrated approach to the management of Geopark Odsherred but, at the same time, the first four years of the geopark reflect that it has been combined with a more consultative and bottom-up process to enhance community-building and involve and engage various internal audiences or stakeholder groups that include school children, local organizations and businesses, and the owners of the approximately 24,000 second homes, many of whom have a high degree of attachment to the area.

So far, the geopark seems to have delivered on the elements discussed by Dominguez Garcia et al. (2013) to query 'how place branding—as a means to create place distinctiveness and attractiveness—can be combined with an endogenous approach' (137). The nurturing of an internal brand and connective storyline or narrative based on the landscape, cultural history, local produce and art has increased the visibility of Odsherred both internally and externally, led to the development of new products and services, and given rise to a reorganization and coordination of activities (Dominguez Garcia et al. 2013).

8 Conclusion: Four More Years

The successful application for another four-year period as UNESCO Global Geopark suggests that Geopark Odsherred has delivered on the promises made in the original application, which was confirmed by a self-evaluation report and a field visit by two (new) evaluators. The two evaluators (from Canada and China), who visited in August 2018, recommended that Geopark Odsherred be given a 'green card' to continue and even found that the strengths and achievements of the geopark were understated in the self-evaluation report.

While the Geopark Foundation's strategy for 2019 to 2024 lists many achievements and projects that have been realized during the first four years, it also acknowledges that there is still some way to go to realize 'the potential the UNESCO designation entails' (Geopark Odsherred 2018, 9, translations by author). Communicating the concept of geoparks continues to be a challenge, as is knowledge and ownership of the geopark, especially among local residents (Geopark Odsherred 2018, 6–7).

Even if the Foundation has managed to attract external funding for specific projects, it is still very dependent on municipal co-financing, and therefore needs to facilitate and provide platforms for sustainable development in and of Odsherred—**and** to be seen locally to be making that contribution. As stated in the strategy,'[t]he Geopark contributes to the "re-invention" of Odsherred, providing us with a clear profile as a municipality and place. This may result in an increase of the number of new residents and visitors to provide the basis for boosting incomes and job creation', and, in close cooperation with the municipality and other local partners, 'to facilitate sustainable business development and jobs that are not threatened by relocation and social dumping' (Geopark Odsherred 2018, 9).

The strategy for the next 4 years is based on the vision—and challenge—of working with the UN sustainable development goals relevant to Odsherred, the challenge being to translate the global UN goals into local action and ownership. A first attempt was made in the Geopark Festival 2019, where three of the 17 goals were in focus: sustainable communities, growth and consumption.

Finally, it is the Board's vision and ambition that, by 2024, Geopark Odsherred is recognized as one of the leading geoparks in Europe, cooperating and sharing its insights with emerging Danish and international geoparks.

Based on the experience of Geopark Odsherred, this chapter argues that geoparks should be considered complex and multifaceted place brands and that working to obtain geopark designation constitutes a place branding platform that allows for stakeholder inclusion and engagement by offering an overarching place narrative. The 2019–2024 geopark strategy (2018, 1) sums it up as follows:

> Taking their point of departure in a special landscape with a unique geological heritage, geoparks work with partnerships, identity, dissemination and research to create sustainable development.

Arguably, this might be rephrased as working inclusively with place-bound resources to achieve sustainable place-based development and a viable place brand—or 'leveraging landscape'.

References

Aitken R, Campelo A (2011) The four Rs of place branding. J Mark Manag 27(9–10):913–933

Ashworth GJ, Kavaratzis M, Warnaby G (2015) The need to rethink place branding. In: Kavaratzis et al (eds), pp 1–11

Braun E, Kavaratzis M, Zenker S (2013) My city – my brand: the different roles of residents in place branding. J Place Manag Dev 6(1):18–28

Casais B, Monteiro P (2019) Residents' involvement in city brand co-creation and their perceptions of city brand identity: a case study in Porto. Place Brand Public Dipl. https://doi.org/10.1057/s41254-019-00132-8

Dale A, Ling C, Newman L (2008) Does place matter? Sustainable community development in three Canadian communities. Ethics Place Environ 11(3):267–281

Dominguez Garcia MD, Horlings L, Swagenmakers P, Simón Fernández X (2013) Place branding and endogenous rural development. Departure points for developing an inner brand of the river Minho estuary. Place Brand Public Dipl 9(2):124–140

Donner M, Horlings L, Fort F, Vellema S (2016) Place branding, embeddedness and endogenous rural development: four European cases. Place Brand Public Dipl 13(4):273–292

Farsani NT, Coelho C, Costa C (2011) Geotourism and Geoparks as novel strategies for socio-economic development in rural areas. Int J Tour Res 13:68–91

Fenger PH (2018) Festivalen som prototype: codesign af en geopark [Festivals as prototype: Codesigning a geopark]. PhD thesis. ISBN 978-87-7830-978-5. https://adk.elsevierpure.com/ws/portalfiles/portal/62192307/phd_afhandling_Paya_Hauch_Fenger.pdf

Geopark Odsherred (2013) Application for membership in the European Geoparks Network

Geopark Odsherred (2014) Geopark festival: Landskabet Lyset Livet. Program 2014, 26–29 Juli. [Geopark Festival: Landscape Light Life. Programme 2014, 26–29 July]

Geopark Odsherred (2018) Strategi 2019–2024: UNESCO Global Geopark Odsherred. [Strategy 2019–2024]. https://www.geoparkodsherred.dk/sites/default/files/asp/geoparkodsherred/Nyheder/strategi_geopark_2018_ok_final.pdf
Giovanardi M, Lichrou M, Kavaratzis M (2017) Inclusive place branding – towards an integrative research agenda. In: Kavaratzis et al (eds), pp 172–181
Gyimóthy S, Meged JW (2018) The Camøno: a communitarian walking trail in the sharing economy. Tour Plan Dev 15(5):1–20
Han J, Wu F, Tian M, Li W (2018) From Geopark to sustainable development: heritage conservation and geotourism promotion in the Huangshan UNESCO Global Geopark (China). Geoheritage 10:79–91
Hansen RH (2010) The narrative nature of place branding. Place Brand Public Dipl 6(4):268–279
Horlings LG, Marsden TK (2014) Exploring the 'new rural paradigm' in Europe: eco-economic strategies as a counterforce to the global competitiveness agenda. Eur Urban Reg Stud 21(1):4–20
Kaneva N (2017) Closing commentary. Between brand utopias and lived experience. In: Kavaratzis et al (eds), pp 182–190
Kavaratzis M (2012) From "necessary evil" to necessity: stakeholders' involvement in place branding. J Place Manag Dev 5(1):7–19
Kavaratzis M, Warnaby G, Ashworth GJ (eds) (2015) Rethinking place branding: comprehensive brand development for cities and regions. Springer, Cham
Kavaratzis M, Giovanardi M, Lichrou M (eds) (2017) Inclusive place branding: critical perspectives on theory and practice. Routledge, London
Kavaratzis M, Dennis C (2018) Place branding gathering momentum. Place Branding Public Dipl 14(2):75–77
Lichrou M, Kavaratzis M, Giovanardi M (2017) Introduction. In: Kavaratzis et al (eds), pp 1–10
Mayes R (2008) A place in the sun: the politics of place, identity and branding. Place Brand Public Dipl 4:124–135
Miller RF, Buhay DN (2014) Turning a forgotten geological heritage into a Geological Park: developing Stonehammer Geopark. Geoheritage 6:29–39
Pasquinelli C (2010) The limits of place branding for local development: the case of Tuscany and the Arnovalley brand. Local Econ 25(7):558–572
Ramsay T (2017) Fforest Fawr Geopark – a UNESCO global Geopark distinguished by its geological, industrial and cultural heritage. Proc Geol Assoc 128:500–509
Ren C, Blichfeldt BS (2011) One clear image? Challenging simplicity in place branding. Scand J Hosp Tour 11(4):416–434
Stubbs J, Warnaby G (2015) Rethinking place branding from a practice perspective: working with stakeholders. In: Kavaratzis et al (eds), pp 101–118
Therkelsen A (2015) Rethinking place brand communication: from product-oriented monologue to consumer-engaging dialogue. In: Kavaratzis et al (eds), pp 159–173
Therkelsen A (2017) Brand conformity in a food place context. In: Kavaratzis et al (eds), pp 112–125
Thomas Lane E, Pierce S, Jones A, Harris I (2016) Re-creating and celebrating place(s) in designated space(s): the case of Wales. In: Dessein J, Battaglini E, Horlings L (eds) Cultural sustainability and regional development: theories and practices of territorialisation. Routledge, London, pp 189–205
UNESCO (2014) Global Geoparks network: guidelines and Criteria for National Geoparks seeking UNESCO's assistance to join the Global Geoparks Network (GGN). http://www.europeangeoparks.org/wp-content/uploads/2012/03/Geoparks_Guidelines_Jan2014.pdf

UNESCO (2017) Unesco Global Geoparks. http://www.unesco.org/new/en/natural-sciences/environment/earth-sciences/unesco-global-geoparks/

Vejre H, Kristensen LS, Lemkow N (2015) Geopark Odsherred – landskabet som løftestang for det åbne lands planlægning. In: Kristensen LS, Primdahl J, Vejre H (eds) Dialogbaseret planlægning i det åbne land – om strategier for kulturlandskabets fremtid [Dialogue-based open-landscape planning – on strategies for human landscapes]. Frederiksberg, Bogværket, pp 108–125

Warnaby G, Ashworth GJ, Kavaratzis M (2015) Sketching futures for place branding. In: Kavaratzis et al (eds) pp 241–248

Kavaratzis M, Dennis C (2018) Place branding gathering momentum. Place Branding Public Dipl 14(2):75-77

Geopark Certification as an Efficient Form of Sustainable Management of a Geotourism Destination

Martina Pásková

Abstract Sustainable management of tourism can vary depending on individual types of tourism destinations and the forms of tourism realized in it. This chapter is dedicated to the description of a systematic approach to sustainability management in geoparks, which is based on certification procedures of sustainability quality verification. It is underlined that this approach includes key components closely connected to the verified procedures of tourism sustainability management. Knowledge management and participatory management are among the most significant.

Keywords Geotourism · Management · Sustainability · UNESCO global geoparks · Certification · Earth heritage

1 Introduction

Increasing interest of ordinary people in nature as well as growing responsibility of local communities for their natural heritage have led to the rise of bottom-up environmental initiatives and their support by national, transnational and international institutions (Pásková and Zelenka 2018a). The paradigmatic shift to a participative approach to nature conservation has also led to the emergence and dynamic development of geoparks initiative. This holistic concept of protection (Erikstad 2013), as well as responsible approach of local stakeholders to the Earth heritage research and promotion, draws the attention of increasing number of states and institutions. Gradually it was developed into a quality label, which is currently under the UNESCO supervision.

Geotourism (Dowling and Newsome 2006; Farsani et al. 2012a; Dowling 2013) as an environmentally innovative form of tourism reflects the basic rules of sustainable tourism (Pásková and Dolejský 2011; Farsani et al. 2012b; Pásková 2012;

M. Pásková (✉)
Department of Recreology and Tourism, University of Hradec Králové, Hradec Králové, Czech Republic
e-mail: martina.paskova@uhk.cz

V. Braga et al. (eds.), *Economics and Management of Geotourism*, Tourism, Hospitality & Event Management, https://doi.org/10.1007/978-3-030-89839-7_4

Dowling 2013; Pásková and Zelenka 2018b). The interdisciplinary approach to the synergy between conservation and interpretation of Earth heritage is applied (Barrow 2013 cit. in Pásková and Zelenka 2018b), as illustrated by the ABC which interconnects abiotic, biotic and cultural Earth heritage components (Dowling 2013). According to Pásková (2018), the basic principle of geoparks is the implementation of a participative approach to their management. A major impetus for the holistic sustainability of geopark development is the emphasis on integrated quality management. It has become progressively enriched into the form of sustainability management. This is a key feature of the development of UNESCO global geoparks (UGGps), which is reflected in their certification and revalidation schemes as well as in UGGp statutes (GGN 2016; Islam et al. 2018) and guidelines.

Geotourism represents a specific form of sustainable tourism (Novelli 2005; Farsani et al. 2012a; Pásková 2011, 2012, 2014a, b; Dowling 2013), and geoparks' management can be well considered as a specific form of destination management. Geoparks, however, implement a wider scope of activities; geotourism is just one of them and serves primarily as a tool of environmental education and support of cultural identity of the people living in geopark. Destination management, on the other hand, is professionally specialized in tourism management so that the geopark usually cooperates with the destination management organization competent in its territory.

In the context of recent trends in sustainability management, geopark management and the development of their certification process, this chapter analyses the application of selected concepts of sustainability management within UGGp' certification and networking processes.

2 Sustainability Management

According to Pásková and Zelenka (2018a), the development of sustainability management has started in the last two decades of the last century, firstly as a tool for companies to manage their environmental footprint, then for organizations in general. Among concrete methods, they mention cleaner production, EMAS and ISO 14001 as examples of formal approaches and Total Environmental Quality Management (TEQM) as an example of informal approach.

Gradually, the sustainability management has improved. It became more complex, according to Starik and Kanashiro (2013), approached as a system with its processes applicable for all types of subjects (individuals, organizations, societies etc.). It became also more participative when the interest group theory has been coined and developed by Hörisch et al. (2014). In this approach, the sustainability concept represents a value, shared by key interest groups. This requires a synergic mix of long-term education, regulative measures and values building (Hörisch et al. 2014). Current concepts of sustainability management in tourism destinations (specifically in protected areas), include approaches as environmental quality management, participative management, strategic management and knowledge management. The last-mentioned approach is closely connected with the adaptive co-management (Islam et al. 2018).

To sum up, sustainability management can be perceived as a complex set of mutually interconnected concepts: participative management (Rolková and Farkašová 2015), environmental quality management (Pásková and Zelenka 2018a; Shen 1999), knowledge management (Swan et al. 1999) and strategic management (Pricop 2012).

Among the most important approaches to tourism sustainability are integrated management (e.g. Inskeep 1991), systematic and system management of the destination (e.g. Jakulin 2016, 2017) and participative management for involving both destination actors and other key tourism stakeholders (Hörisch et al. 2014). The specifics of the application of participative management in tourism were described at the beginning of the third millennium in Australia (NT Parks and Wildlife Commission 2002) and they further developed (e.g. for tourism in protected areas, Eagles et al. 2002). To control tourism sustainably, it is important to optimize its impacts, which is to reach an equilibrium in which its positive effects are maximized while minimizing the negative ones (Pásková 2001, 2012). For that reason, in addition to the aforementioned participative management and strategic management, monitoring of tourism impacts is implemented, which is a helpful instrument for determining the carrying capacity of the destination and its life cycle (Pásková 2012). This represents one of the many forms of the knowledge management concept and knowledge gained represents an essential support for tourism impact management (optimization). Among other approaches applied with aim to manage tourism impact are visitor management (Zelenka et al. 2013; Leung et al. 2014), specifically for geotourism (Newsome et al. 2012), advanced information and communication technologies in management (e.g. Cayla et al. 2014 in geoheritage management) and the heritage conservation.

3 Knowledge Management as a Specific Part of Geopark Management

Interpretation of geopark territorial values has expanded from the rather passive interpretation of geological heritage to the most active interpretation of interconnection of all three components of the Earth's heritage (abiotic, biotic and cultural). This ABC concept (Dowling 2013; Pásková 2012, 2014a, b; Pásková et al. 2021) highlights the interdependence of geodiversity and biodiversity (e.g. Santucci 2005) with cultural diversity and identity of the local community (e.g. Pásková 2017, 2018; Palacio-Prieto et al. 2016). Geological values of individual geosites are assessed qualitatively by the description of its geodiversity (Erikstad 2013) and quantitatively, by pointing the value of geoheritage through the identification of the values of individual geosites (e.g. Fassoulas et al. 2007, 2012; Forte et al. 2012; Kubalíková 2013, 2017; Brilha 2016).

Geopark management also includes other knowledge management approaches, whether it is the sharing of experience and knowledge in the frame of networking

(e.g. Farsani et al. 2012b; Shen 1999), or geopark collaboration with the local community (e.g. Farsani et al. 2014), the education of local residents and visitors (Azman et al. 2010; Fassoulas and Zouros 2010; Pásková and Řídkošil 2011) and the way of interpretation of geological, biological and cultural heritage. The sharing of experience and knowledge takes place mainly within the framework of coordination and advisory committee meetings, thematic working groups, workshops, conferences and in the form of competition concerning examples of good practice held at two-yearly intervals. All these activities are realized in the frame of the coordinating regional networks (European, Asian-Pacific, Latin-American & Caribbean and African) and Global Geoparks Network (GGN).

Knowledge management is mainly used in the assessment process of aspiring and revalidated geoparks, when the UNESCO global geoparks' evaluators hand over to geopark representatives their experience and knowledge concerning geopark management, the conservation, presentation and interpretation of geoheritage, geotourism development and the involvement of the local community in geopark activities. Evaluators have to attend regular workshops and testing organized by aforementioned regional geopark networks and co-organized by UNESCO. In addition to new information and deeper explanation from UNESCO and feedback from the evaluated geoparks, there is a mutual exchange of information and experience among evaluators and their feedback to UNESCO. Quality of knowledge management behind the evaluation/revalidation system is guaranteed by distinguishing and knowledge sharing between senior and junior evaluators. After the evaluation, their performance is not only assessed by UNESCO and evaluated geopark, but they also assess each other.

4 Participatory Management

Participatory management is understood by Pásková and Zelenka (2018b) as a concept profiting from the positive benefits generated by cooperation which can be characterized by "higher potential of know-how, shared values, motivation to promote common goals" (e.g. Rolková and Farkašová 2015). According to them, these values also include sustainability objectives and respect for the specific interests of the organizations involved.

The application of participatory management in tourism represents one of the essential tools for ensuring the long-term sustainability of tourism at national, regional or local levels. Pásková and Zelenka (2018b) defined tourism participation management as a supervised, gradual and targeted process of involvement of key tourism actors and their groups into the destination activities and management. They specifically mention destination information processes, creating common awareness, preserving, transferring and sharing values, preparing joint projects and implementing them, contribution to creating information and knowledge necessary for decision-making, developing plans, visions, objectives, alternative strategies and practices and participating in decision-making and control processes, including

monitoring and evaluation of jointly achieved results. The application of participatory management in tourism is elaborated on a theoretical level (e.g. Bramwell 2010) and verified in practice in locations representing different destination types and diverse in terms of available resources. Participatory management applied in the field of protected areas has received a lot of attention (NT Parks and Wildlife Commission 2002; Těšitel et al. 2005, 2007; Zelenka et al. 2013), where information and participation of local residents is a central approach to finding limits for acceptable changes. In destinations striving for tourism sustainability and corporate social responsibility, the sharing of values and knowledge is an integral part of the destination's social capital development (Pásková and Zelenka 2018a: 162). According to Zelenka and Kacetl (2013), the level of participatory management represents an important criterion for visitor management. A fundamental moment for the application and development of participative management as well as knowledge management is networking, enabling different levels and ways of involvement of destination actors at local, national, regional and transnational levels. Networking and its application in participatory tourism management do not represent yet a major research subject in tourism studies (Van der Zee and Vanneste 2015).

Emphasis is put on the economic and social benefits brought by geoparks to the regions, mainly new jobs, new economic activities and types of income (Fassoulas and Zouros 2010; Zouros and Valiakos 2010; Pásková and Řídkošil 2011; Farsani et al. 2012a, c), stimulation of local agricultural and craft production (Farsani et al. 2011) and both traditional and innovative regional production (Farsani et al. 2011). Geoparks can also significantly boost local culture (Farsani et al. 2012a, d). Many authors emphasize the role of geoparks in sociocultural sustainability and the importance of the role of indigenous peoples (Farsani et al. 2010; Pásková and Dowling 2014; Pásková 2015, 2017, 2018). According to Pásková (2018), it can be very enriching to involve local and indigenous peoples, their knowledge and experience in the management, operation and activities of the geopark within different bodies (consultative bodies, general assemblies), workshops, conferences, competitions, strategic partnerships, training courses, geosites' interpretation or geoguide services. This represents an effective combination of participative and knowledge management. They play a considerable role in geoparks Earth heritage conservation in cooperation with volunteers and the local community (Fassoulas and Zouros 2010; Farsani et al. 2014).

5 Certification Process as a Base of Geoparks Quality Management

5.1 Evaluation Prerequisites and Criteria for the Certification of UNESCO Global Geoparks

Growing interest in geotourism and UGGps would not be possible without the active involvement of geoscientists, hard work of various NGO's, enthusiasm of many

individuals, interest of locals and visitors, UNESCO professional support, coordination of GGN and regional networks. The key principles of UGGps' evaluation and certification are formulated in the UGGps' Statutes and Operational Guidelines (UNESCO 2015). This document describes the UGGps' objectives, their link to key aspects of sustainability management and their relation to the support of regional development. According to the guidelines and considering the aim of gradual and systematic improvement of sustainability management, the geopark management body, its participative management, financial management, strategic planning, knowledge management and the use of best practice examples are periodically evaluated (Fig. 1). The UGGps' evaluation process represents an important part of UGGps' approach to the knowledge management. An active strategic partnership with the key actors is required for participative management (e.g. Hörisch et al. 2014), In the case, when the geoparks territory collides with some type of protected

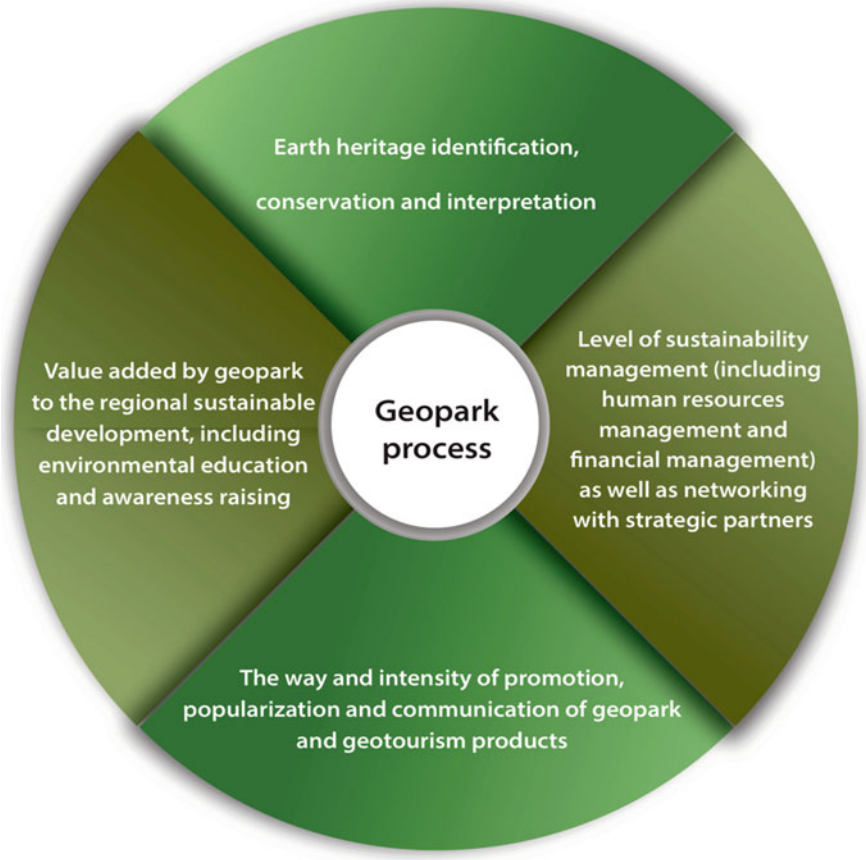

Fig. 1 Basic steps of geopark evaluation process. Source: Adapted from Pásková and Zelenka (2018b)

area or some UNESCO's designation, the fruitful synergy between them has to be demonstrated with the aim to prevent any confusion in their identity. It is necessary to demonstrate co-operation with the relevant authorities and eliminate any kind of mutual overlapping in identity and visibility.

An essential task for the aspiring geopark is not only the international recognition of its geoheritage, but also the recognition of its geotourism potential, as well as an adequate quality and degree of its infrastructure development. Based on the desktop assessment report provided by the International Union of Geological Sciences (IUGS), the geoheritage evaluation and related landscape heritage (e.g. Kubalíková 2013, 2017), is evaluated by independent scientific experts (UGGp evaluators). They control and assess the value of internationally significant geosites, as well as occurrence of geological periods, and rock types declared in the geopark application document. A candidate has to classify its sites to distinguish between geosites having prevailingly interpretative (equipped with trails, interpretation panels or leaflets), geosites with scientific significance and those with non-geological (e.g. cultural, agricultural and technical) significance. The UGGp has to inventory all these sites through well maintained and updated both database and maps.

In the frame of the environmental quality management, cooperative care for Earth heritage is also assessed. It includes evaluation of relevant research and its popularization, legal conservation and non-legislative bottom-up protection as well as the quality of the presentation and interpretation of Earth heritage.

The general nature protection, as well as geoheritage conservation in the geopark, has to be ensured by legal protection of key both biotic and abiotic (including geological) elements of nature. Both quality and intensity of the local inhabitants' education and participation in the geoheritage conservation are also evaluated in these localities, according to the zoning system of the given protected area as well as in the rest of the geopark area (Mc Keever and Zouros 2005; Santucci 2005; Azman et al. 2010; Farsani et al. 2014; GGN 2016; Pásková and Čtveráková 2017; Pásková and Zelenka 2018b). "According to the ABC concept, geoheritage conservation has to be approached holistically, which means that except for physical protection of geosites by e.g. fencing and natural pavements, it must be integrated into the living nature conservation, monument care and intangible heritage protection" (Pásková and Zelenka 2018a). In this context, the local geoheritage interpretation has to be inter-linked with the interpretation of non-geological heritage which includes both natural and cultural monuments as well as intangible heritage (e.g. local toponyms and related geostories; Athanasaki and Fassoulas 2010). The geoheritage interpretation has to use the available technologies to achieve the best possible comprehension of the phenomenon and to prevent visual pollution of the landscape. The networking realized by the strategic partners of the UGGp represents one of the key elements of the participatory management. The local tourism business, environmental educators, museums and academic subjects are among the most important strategic partners. An evaluated geopark has to demonstrate its impact on the quality of local life, which includes the scale and quality of geotourism products. They should be developed with respect to local authenticity and cooperation with the local

destination management and geopark strategic partners. The key geoheritage including the most important geosites has to be legally protected.

An important consideration is the proper selection of geopark's territory within which its geodiversity, international geological value its specific features and uniqueness are evaluated according to the UGGps' statutes and operational guidelines (UNESCO 2015). Based on a detailed map indicating the boundaries of the aspiring geopark and its key geosites, the suitability of delimiting the territory is evaluated, especially in view of the representativeness and diversity of the local geological, geomorphological and other related landscape heritages. How these geosites are able to enhance geoscience popularization and research as well as Earth heritage interpretation in the frame of education or geotourism is also assessed.

Regarding the management quality of the aspiring geopark, areas which are evaluated include according to Pásková and Zelenka (2018b) "its managerial structure, geopark management methods, staff size and quality and human resources management in general, technical and financial conditions, strategic management and cooperation, approach to the participative management". It is assessed also on the basis of "achieved results (e.g. suitability of geopark territory delimitation or modification, visibility and identity level, geoheritage conservation efficiency, geotourism quality, marketing efficiency, acceptance by local population, level of stakeholders' involvement, or quality of environmental education"; Pásková and Zelenka 2018b).

As networking is among the essential principles of the UGGps', their mutual cooperation and participation in common activities are highly appreciated. This approach enables continuous and consistent sharing of values, experience and knowledge (e.g. Mc Keever and Zouros 2005) which represents a useful synergy of knowledge management and participatory management.

Methods of interpretation Earth heritage, geopark promotion and visibility are also assessed as a geopark achievement of its precertification and recertification (revalidation) period. In the case of revalidated geopark, the accuracy, the extent and way of using the UGGp's logo and the unified design of the geopark, the quality and scope of the interpretative publications and infrastructure, the "welcome boards" on the geopark's access roads are evaluated as well. "The geopark's website, its promotional activities and materials, regular participation in tourism trade fairs, social media presentations, mobile applications, geopark's image in media, and its public reputation are among other assessed components of geopark marketing including its visibility" (Pásková and Zelenka 2018b). Marketing with a focus on visibility needs to be realized in synergy with geopark's strategic partners; however, the use of UGGps' logo has to follow the UNESCO relevant rules.

An important theme, based on the concept of sustainable management, as well as essential for UGGps' concept and discussed at GGN or European Geoparks Network (EGN) conferences (e.g. Zouros and Valiakos 2010), is UGGps' contribution to the UN Sustainable Development Goals (SDGs). Many of these goals are approached through the UGGps' environmental education programs targeted not only on the local inhabitants, but also on the UGGps' visitors, entrepreneurs and other relevant UGGps' actors. The UGGps' contribution to sustainable development on the local

and regional levels is conditioned by cooperation with authorities of municipalities and regions of the UGGps' territories. This collaboration encourages responsible tourism based on "sharing authentic local life with visitors, support for regional production, especially small farmers and craftsmen, and preference for the use of alternative energy sources" (Pásková and Zelenka 2018b). In addition, the Earth Sciences education should be supported by the systematic cooperation with the local schools (so-called geoschool concept, e.g. Fermeli et al. 2011) as well as by the informal educational facilities represented by various types of interpretative and visitor centres including their educational programmes. Apart from the standard scale of educative and interpretative tools as museums, interpretative panels or trained and certified geoguides, it is recommended to provide an IT based offer that applies gamification elements, QR codes, virtual reality, mobile applications, animation etc.

5.2 The Process of Certification and Revalidation of UNESCO Global Geoparks

5.2.1 Application and Certification Process

"*The process of UGGp establishment is a typical bottom-up initiative in which geopark manager's activity is supported by the experience and advice of external bodies such as the relevant member states' institutions and implemented in the form of gradual, well-prepared steps towards the certification process coordinated by UNESCO. The process of preparing the establishment of a geopark takes several years (usually nearly one decade); an aspiring geopark has to function as a de facto global geopark*" (Pásková and Zelenka 2018a, b). On the national level, the National Geopark Forum/Council plays an important role in the certification process, and coordinates the activities of geoparks in the respective country and facilitates application and revalidation processes of its UGGps. This Forum/Council, or another competent authority, petitions UNESCO with an official expression of intent to aspire on the designation of UGGps. The application is accompanied by self-assessment which is submitted by the management body of the petitioner, using the template provided by UNESCO.

Following the receipt by UNESCO of the application, the International Geosciences and Geopark programme (IGGP) evaluation process begins. The IUGS experts realize a desktop assessment and then two independent experts conduct field studies, devoted to analysis of fulfilment of UGGps' mission. One of them evaluates mainly the geoheritage conservation and geosciences education, while the other focuses mainly on the contribution of geopark to the regional development and geotourism products. However, their general assessment is a synergic exercise. They do this evaluation according to the UGGps' Statute and Operational Guidelines (UNESCO 2015), and UGGps' evaluators have to observe GGN ethical code. Their task is to compare their field findings with the application

document and the self-evaluation provided by aspiring geopark management and prepare a comprehensive evaluation report for UNESCO. This assessment process integrates components of knowledge management and environmental quality management. It results in the evaluation report which serves as a basis for debate of UNESCO Global Geopark Council regarding the given aspiring geopark. Apart from 12 voting members with proven experience and knowledge, the Council includes GGN President, UNESCO Director-General representative, IUCN Director-General representative and the IUGS Secretary-General representative (UNESCO 2015). In the case of a positive decision of the Council, the UNESCO Executive Board endorses the aspiring geopark as UGGp. As a result, the certificate is granted to the management body of the new UGGp as well as the right to use the UGGp logo.

5.2.2 Revalidation and Recertification Process

A common and effective part of the certification system is to grant a certificate for a specific period, usually accompanied by a set of recommendations for the next revalidation period. In line with this practice, UNESCO grants the aforementioned just for 4 years. At the end of this period, UGGps' revalidation process begins. One of the components of the implementation of the environmental quality management, incorporated in accordance with the common procedures used in the certification schemes (see, e.g. ISO 9001, ISO 14001), is the requirement for the continuous management improvement. Therefore, the revalidation procedure requires proof of progress and compliance with recommendations resulting from the initial evaluation or the last revalidation. Improvement should be seen in strategic management, financial management and human resources management. The revalidation process results in one of three variants, which for clarity and ease of communication are expressed in colour cards (Box 1). The revalidation process is also based on the revalidation mission, conducted by evaluators after studying of revalidation progress report, self-assessment and other related documents, prepared by the geopark.

Box 1 Classification of UGGps' Revalidation Output

- "*Green card*" means recertification of the UGG for the next 4 years,
- "*Yellow card*" means the UGG recertification just for the next two years (the identified UGG's weakness have to be eliminated; the "yellow card" cannot be repeated, only "green card" or red one can follow),
- "*Red card*" means the lost of the UGG certifications a result of situation when the previous "yellow card" was not used successfully for the solution of the indicated problems.

Source: Pásková and Zelenka (2018b)

Evaluators propose in their report which card should be granted to the revalidated geopark and then it is discussed and decided by the UGGps Council.

5.3 *Discussion of Quality of the Certification of UNESCO Global Geoparks*

The results of the process (Pásková and Zelenka 2018b) and relevant literature indicate that UGGps' sustainability management is based on the following six principles (Pásková and Čtveráková 2017; Pásková and Zelenka 2018b):

- Delimitation of appropriate territory for the selected Earth heritage of international importance, with a sufficient area allowing support for regional development and the active involvement of the local population (application of knowledge management and participative management).
- Geoheritage conservation, mainly in the form of voluntary bottom-up Earth heritage protection supplemented by top-down nature conservation provided by the state (application of environmental quality management and participative management).
- Complex system of the environmental education targeted on the general public, which includes the Earth heritage interpretation of the geopark based on a multidisciplinary approach, e.g. the ABC concept (application of environmental quality management and knowledge management).
- Interacting with other national and international programmes, including mutual co-operation with other UGGps, and sharing knowledge and experience between UGGps through multilevel networking (knowledge management application).
- Evaluation and revalidation procedures in the frame of the complex UGGps' certification scheme (application of knowledge management and environmental quality management).
- Application of principles and objectives of the sustainable development strategic partnerships, strategic planning, revalidation action planning and controlling in the frame of the revalidation process (strategic management application and participative management application).

These principles can be clustered into the four approaches to sustainability management, knowledge management, participative management, environmental quality management and strategic management. As already mentioned, some UGGps are serving as destination management organizations. It includes both coordinative and corrective activities, which can be integrated into another cluster. All these clusters of sustainability management of UGGps are illustrated in Fig. 2.

An overview of how these selected sustainability management concepts are applied in UGGps' certification procedures and networking is provided in Table 1.

According to Pásková and Zelenka (2018b), the UGGps' experienced an institutional transformation, framed by the IGGP, from a voluntary network to the official

Fig. 2 The basic aspects of the sustainable management of the UNESCO Global Geoparks. Source: Adapted from Pásková and Zelenka (2018b)

UNESCO designation. They perceive this kind of transition as a useful synergy between the voluntary networking and UNESCO standard setting, which resulted in substantial shift in participation of various subjects and institutions as well as to operational rules and guiding principles. As one of the most important changes, they recognize the decisive role of UNESCO and the higher intensity of involvement of the UNESCO member states.

As a part of the UN system, UNESCO is striving to implement sustainable development goals (so-called SDG; UN 2021). This is also the case of the UGGps' where the support and contribution to the sustainable development of the given region are among the most important goals. In this context, geotourism is appreciated not only as an educational instrument, but also as an efficient multiplicator of the regional development. Together with geotourism, or even as a part of geotourism, the UGGps enhance the local production, especially in the frame

Table 1 Sustainability management concepts applied by the UGGps' certification and networking

Selected concept of sustainability management	The way of application of the given concept in the sustainability management of the UNESCO Global Geoparks (UGGps)	Problems and limits connected to application of the given concept in the UGGps sustainability management
Participatory management	• Each UGGps represented in General Assembly • Each UGGps represented in the coordination commission of the given regional network • The key geoparks' actors are involved in their decision-making process • Network of strategic partners in each UGGps	• Demands on moderation skills and time • Limits in predictability of the behaviour of some stakeholders • Lack of activity of stakeholders
Strategic management	• GGN strategic documents and statutes • Strategic planning of UGGps • Revalidation documentation • Managing authorities of UGGps and regional networks • Focal topics of UGGps (key areas of activities) • Strategic planning in geoparks • Financial and action plans • UNESCO Guidelines and Statutes of GGN • Strategic cooperation with destination management organization • Charter of regional networks	• Demands in time, knowledge, human resources management and fundraising • Organizational and personnel dynamics of local and national governments, as well as in management of the key relevant subjects • Demands on deploying the management of regional networks (unpaid function)
Knowledge management	• Thematic working groups of global and regional networks • Regular conferences of global and regional networks of UGGps • Training, education and mentorship system of UGGps • Workshops of UGGps evaluators • GGN awards of best practice examples • Coordination Committees in global and regional networks • Executive Board and General Assembly of GGN • Advisory Committees in all the networks • Coordinator and vice coordinator in all the networks • National forums of geoparks • International Intensive Course "UNESCO Global Geoparks and Geoheritage Management" • Inventory of UGGp geosites and system their evaluation • UNESCO collaboration with IUGS on geological evaluation	• Demands on time, finances and language skills • Ethically and politically fragile issue of exploitation of local and indigenous knowledge, problems with violation of the intellectual rights • Demands on collective memory transmission and continual involvement of local actors in the networking and evaluation and revalidation process

(continued)

Table 1 (continued)

Selected concept of sustainability management	The way of application of the given concept in the sustainability management of the UNESCO Global Geoparks (UGGps)	Problems and limits connected to application of the given concept in the UGGps sustainability management
	• Cooperation between UGGps and scientific institutions • Monitoring of the geotourism effects • Systems of local and indigenous knowledge • Mapping and evaluation of geological values and risks	
Environmental quality management	• System of regular of UGGps revalidation, • Annual UGGps reporting • Management and conservation of Earth heritage • Geohazards management and knowledge exchange • Environmental education and awareness raising of local stakeholders • Geodiversity mapping • Monitoring of climate change impacts	• Requires investments in infrastructure and human resources • Demands on transparent approach, knowledge skills and ethics, and the work of UNESCO evaluators • Extra costs and time are devoted to these activities by the geopark team as well as by its strategic partners

Source: Pásková and Zelenka (2018b)

of so-called "geofood" concept (Gentilini 2019). In some cases, these local initiatives are accompanied by the special certificate scheme, granted to its strategic partners. This can happen only on the basis of agreed criteria. The active networking with strategic partners, including the local and regional authorities, enables efficient management of the entire UGGp area. The management plan should be agreed upon by all the strategic partners, and it should include "the social and economic needs of the local populations", protection of their landscape heritage and support their cultural identity as well as "the governance, development, communication, protection, infrastructure, finances, and UGGps' partnerships" UNESCO (2018b).

The Earth heritage conservation is implemented by UGGps always in cooperation with the state conservation of nature and landscape as well as with the various volunteers and nongovernmental organizations. The assessment of geoheritage value of the aspiring geopark and its "intentional importance is realized by the IUGs experts in the frame of the International Geosciences and Geoparks Programme" (UNESCO 2018a). The Earth heritage interpretation is implemented in a complex way, always in connection with environmental education, geotourism, local production, intangible heritage etc. This holistic approach is embraced by implementation of the ABC concept (Dowling 2013; Pásková 2012, 2014a, b; Pásková et al. 2021).

Apart from visibility effect, the UGGps' certification main mission is to stimulate systematic work on the quality improvement in all its phases: pre-certification, evaluation and revalidation. The aforementioned UGGps' principles of

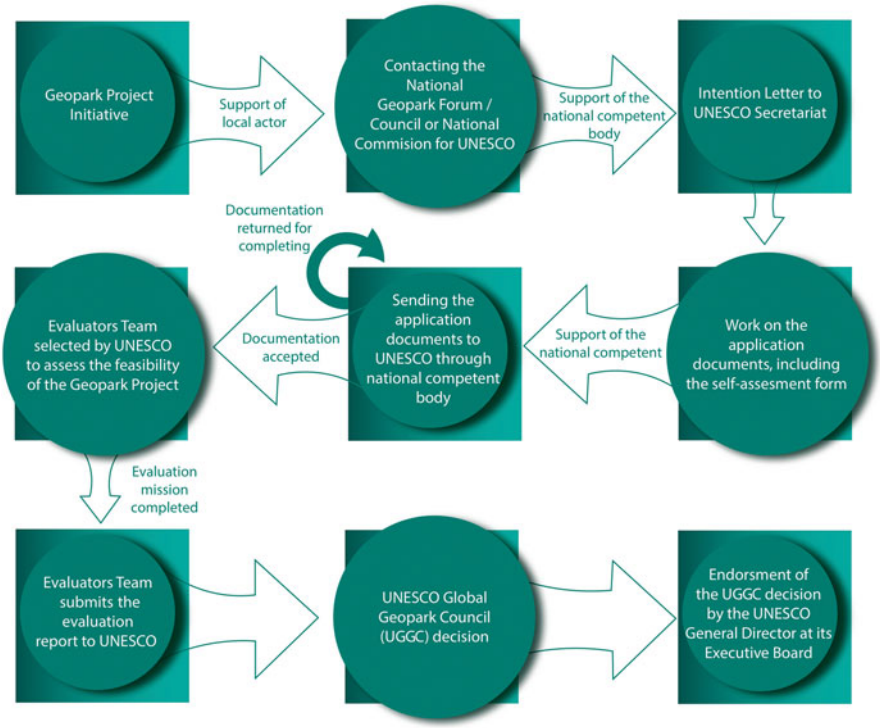

Fig. 3 Evaluation process of the UNESCO Global Geoparks. Source: Adapted from Pásková and Zelenka (2018b)

sustainability management apply to all the certification phases (Figs. 3 and 4). The pre-certification phase consists of work on the geopark project, preparation of the application, participation in the available GGN activities (conferences, workshops, common projects, promotional activities etc., and in the activities of the respective regional network. The aspiring geopark realizes its first contacts with UGGps and collects first experiences with the performance quality expected from UGGps. Then follows the evaluation phase, which consists of the initial assessment of fulfilment of the six UGGps' principles of sustainability management including financing mechanism, geotourism management and visibility policy. This phase as well as the regular quality assessments realized in the frame of revalidations brings the continuous feedback needed for the systematic work on quality improvement. It is a participatory job, while all the UGGps' strategic partners as museums, interpretation centres, universities, schools, research institutions, private companies, nongovernmental organizations etc. are involved. In this way, apart from progress in Earth heritage interpretation and conservation, the improvement of local education, research, nature conservation, transmission of traditions, sustainable endogenous economy as well as the creative and responsible society is permanently stimulated.

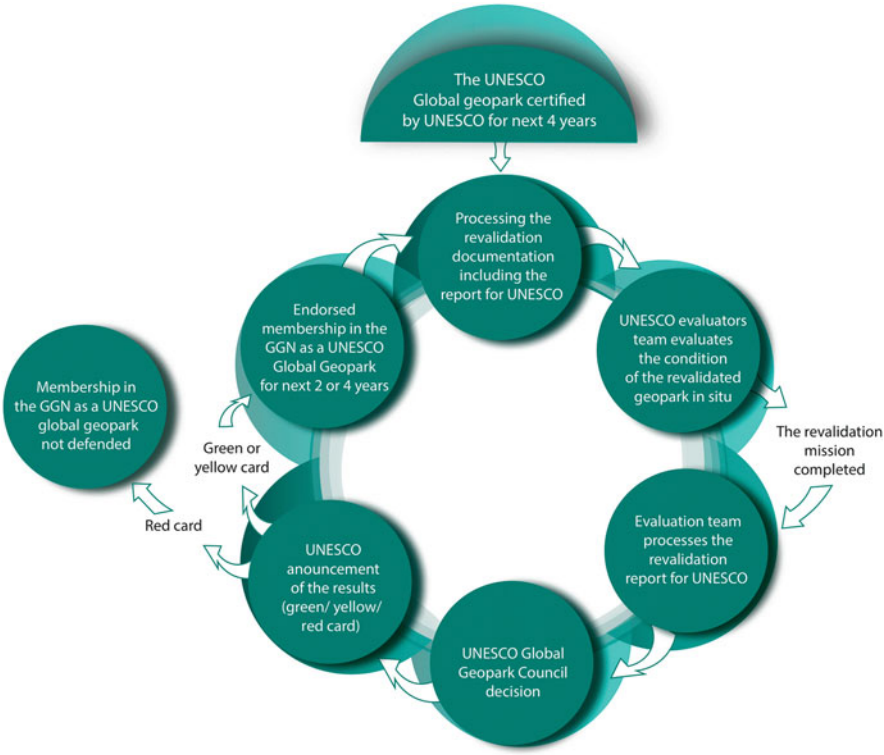

Fig. 4 Application and evaluation process of the UNESCO Global Geoparks. Source: UNESCO (2018b), Pásková and Zelenka (2018b)

The UGGps' strategic vision is expressed in the UGGps' statutes and operational guidelines, GGN statutes (GGN 2016) and EGN/GGN Charter. The UGGps' strategic management plans, as well as periodic revalidation planning and controlling represent strategic management tools for all the UGGps. Not only GGN but also regional networks develop and implement their strategies to plan and systematically control their continual progress. The UGGps managing authorities and regional networks are striving to implement ten focal topics of UGGps outlined by UNESCO. Long-term cooperation with destination management organizations working in the geoparks' territories is another example of the strategic management applied by UGGps.

Participative management is at the core of UGGp's philosophy, based on bottom-up and networking approaches. The main UGGps' mission consists of dissemination of Earth heritage knowledge to the local people through both direct and indirect involvement in UGGps' activities. Other key actors of UUGs are involved in their management and activities mainly through strategic partnerships. The UGGps are certified by UNESCO; however, their performance is co-ordinated through

networking on the global, regional and national levels. Within the GGN, its institutional UGGps representatives, individual, honorary and cooperating members are involved in its General Assembly and in a similar way, all the European UGGps are involved in the EGN Coordination Commission activities. A similar participative approach is applied also to coordination of UGGps' activities of UGGps in other regional networks.

The application of environmental quality management seems to be a principal mainly in the controlling management component of the UNESCO Global Geoparks. Both initial evaluation and revalidation schemes include control of the progress in geoheritage protection and management, geohazards management, continuous environmental awareness raising of local residents and visitors, systematic Earth heritage interpretation and annual reporting.

The UGGps apply knowledge management predominantly through their multilevel networking and certification system. The most commonly applied tools include thematic working groups of both EGN and GGN, biennial conferences of global and regional networks, regular meetings of the GGN Executive Board, GGN, EGN and other continental Advisory Committees, EGN Coordination Committee and committees of other regional networks, national geoparks forums and their and workshops of UGGp's evaluators. For example, the assessment of the geoheritage value of aspiring geoparks "is based on the international peer-reviewed, published research" conducted on the geosites and the scientific experts "make a globally comparative assessment to determine whether the geological sites constitute international value" (Ministry of the Environment of the Czech Republic 2018). Other useful knowledge management instruments used by UGGps are represented by GGN best practice awards, an International Intensive Course "UNESCO Global Geoparks and Geoheritage Management", inventory of UGGp's geosites and their assessment system as well as monitoring of the geotourism impacts. UNESCO systematically organizes or supports activities such as workshops, seminars and consultations, including the mentorship missions to aspiring geoparks or emerging geoparks networks. Cooperation with scientific institutions is also very important.

6 Conclusions

In the context of SDGs, geotourism can be seen as a socially responsible activity, generating revenue while providing substantial environmental education and nature conservation. Geoparks represent areas with systematically managed sustainability. The certification process of geoparks as geotourism destinations allows for the implementation of various sustainability management concepts and their various combinations. Management of geotourism sustainability represents an integrated part of it.

The opportunities and risks of geotourism development, together with the obstacles and problems associated with the implementation of different management approaches to geoparks and geotourism sustainability should be subjects of future

interdisciplinary research. It would be also useful to compare differences in the sustainability assessment of geotourism, geo-interpretation and other geo-activities between individual geoparks and their respective regional networks.

Acknowledgements This chapter was financially supported by the Faculty of Informatics and Management of the University of Hradec Králové (FIM UHK) within the framework of the Specific Research Project "Information and knowledge management and cognitive science in tourism". The authors wish to express their thanks to Zuzana Kroulíková, FIM UHK student, who assisted with the graphical elements.

References

Athanasaki K, Fassoulas Ch (2010) Intangible aspects of Geoparks. Local names, toponyms and geoheritage in Crete (Greece). In: 9th European Geoparks Conference 2010, Lesvos, Greek

Azman N et al (2010) Public education in heritage conservation for Geopark community. Procedia Soc Behav Sci 7:504–511

Barrow GC (2013) Interpretation planning and its role in sustainable tourism and visitor management at geoheritage sites. Int J Geoherit 1(1):30–38

Bramwell B (2010) Participative planning and governance for sustainable tourism. Tour Recreat Res 35(3):239–249. https://doi.org/10.1080/02508281.2010.11081640

Brilha J (2016) Inventory and quantitative assessment of Geosites and geodiversity sites: a review. Geoheritage 8(2):119–134

Cayla N, Hobléa F, Reynard E (2014) New digital technologies applied to the management of geoheritage. Geoheritage 6(2):89–90

Dowling RK (2013) Global Geotourism – an emerging form of sustainable tourism. Czech J Tour 2 (2):59–79

Dowling RK, Newsome D (eds) (2006) Geotourism. Butterworth-Heinemann, Oxford

Eagles PJF, Mccool SF, Haynes CD (2002) Sustainable tourism in protected areas: guidelines for planning and management. Huntingdon Road Cambridge, Cambridge

Erikstad L (2013) Geoheritage and geodiversity management – the questions for tomorrow. Proc Geol Assoc 124(4):713–719

Farsani NT, Coelho C, Costa C (2010) Geoparks as art museums for geotourists. Rev Tur Des 13 (14):567–576

Farsani TN, Coelho C, Costa C (2011) Geotourism and geoparks as novel strategies for socio-economic development in rural areas. Int J Tour Res 13(1):68–81

Farsani NT et al (eds) (2012a) Geoparks and Geotourism: new approaches to sustainability for the 21st century. Brown Walker Press, Florida

Farsani NT, Celeste OAC, Costa CMM (2012b) Analysis of network activities in Geoparks as geotourism destinations. Int J Tour Res 16(1):1–10

Farsani NT, Coelho OA, Costa CMM (2012c) Tourism crisis management in Geoparks through geotourism development. J Tour Dev 3(17/18):1627–1638

Farsani TN, Coelho C, Costa C (2012d) Geotourism and Geoparks as gateways to socio-cultural sustainability in Qeshm Rural Area, Iran. Asia Pac J Tour Res 17(1):30–48

Farsani TN et al (2014) Geo-knowledge management and geoconservation via Geoparks and Geotourism. Geoheritage 6(3):185–192

Fassoulas C, Zouros N (2010) Evaluating the influence of Greek Geoparks to the local communities. Bull Geol Soc Greece 43(2):896–906

Fassoulas C, Paragamian K, Iliopoulos G (2007) Identification and assessment of Cretan Geotopes. Bull Geol Soc Greece 37:1780–1795

Fassoulas C et al (2012) Quantitative assessment of geotopes as an effective tool for geoheritage management. Geoheritage 4(3):177–193
Fermeli G, Hevia MG, Calonge A et al (2011) Geoschools: innovative teaching of geosciences in secondary schools and raising awareness on geoheritage in the society. In: Proceedings of Conference IX Reunión Nacional de la Comisión de Património Geológico (Sociedad Geológica de España). At: Leon Volume: Avances y retos en la conservación del Património Geológico en España, 120–124
Forte J et al (2012) Quantitative evaluation of geodiversity: development of methodological procedures with application to territorial management. Geophys Res Abstr 14:8739
Gentilini S (2019) GEOfood introduction. Presentation in the frame of Project "GEOfood as quality brand for UNESCO Global Geoparks", September 2019. https://doi.org/10.13140/RG.2.2.16552.08964, [online]. Available: https://www.researchgate.net/publication/349734533_GEOfood_introduction
GGN (2016) The global Geoparks network statutes, [online]. Available: http://globalgeoparksnetwork.org/wp-content/uploads/2016/07/GGN-Association-Statutes-FINAL-SEPTEMBER-2016.pdf
Hörisch J, Freeman RE, Schaltegger S (2014) Applying stakeholder theory in sustainability management. Links Similar Dissimilar Concept Framew Organ Environ 27(4):328–346
Inskeep E (1991) Tourism planning: an integrated and sustainable development approach. Van Nostrand Reinhold, New York
Islam W, Ruhanen L, Ritchie BW (2018) Adaptive co-management: a novel approach to tourism destination governance? J Hosp Tour Manag 37:97–106
Jakulin TJ (2016) Systems approach for contemporary complex tourism systems. Int J Qual Res 10 (3):511–522
Jakulin TJ (2017) Systems approach to tourism: a methodology for defining complex tourism system. Organ 50(3):208–215
Kubalíková L (2013) Geomorphosite assessment for geotourism purposes. Czech J Tour 2 (2):80–104
Kubalíková L (2017) Mining landforms: an integrated approach for assessing the geotourism and geoeducational potential. Czech J Tour 6(2):131–154
Leung Y-F et al (eds) (2014) Tourism and visitor management in protected areas. Guidelines for sustainability, World Headquarters, Gland
Mc Keever PJ, Zouros N (2005) Geoparks: celebrating earth heritage, sustaining local communities. Episodes 28(4):274–278
Ministry of the Environment of the Czech Republic (2018) Geoparky (Geoparks). [online]. Available: https://www.mzp.cz/cz/geoparky
Newsome D, Dowling R, Leung Y-F (2012) The nature and management of geotourism: a case study of two established iconic geotourism destinations. Tour Manag Perspect 2–3:19–27
Novelli M (ed) (2005) Niche tourism: contemporary issues, trends and cases. Butterworth-Heinemann, Oxford
NT Parks & Wildlife Commission (2002) Public participation in protected area management best practice. [online]. Available: https://www.environment.gov.au/system/files/resources/45209a20-1ab1-40d1-aa26-cf4838948782/files/public-participation.doc
Palacio-Prieto JL et al (2016) Erosion, culture and Geoheritage; the case of Santo Domingo Yanhuitlán, Oaxaca, México. Geoheritage 8(4):359–369
Pásková M (2001) "Udržitelný rozvoj" cestovního ruchu ("Sustainable" tourism development). Geografie – Sbornik CGS 106(3):178–195
Pásková M (2011) Geoturismus a ekoturismus – Fascinace krajinou (Geotourism and ecotourism – fascination by landscape). In: Výzvy a hrozby ekoturismu a geoturismu pro ochranu biodiverzity a geodiverzity (Challenge and threads of ecotourism for the biodiversity and geodiversity conservation). Telč, Czech Republic, pp 15–28
Pásková M (2012) Environmentalistika cestovního ruchu (Tourism environmentalism). Czech J Tour 1(2):77–113

Pásková M (2014a) Interpretace krajiny v geoparcích (landscape interpretation in geoparks). In: Geoparky ČR Možnosti ochrany geodiverzity (Geoparks of the Czech Republic Geoheritage conservation options). Brno, Czech Republic

Pásková M (2014b) Koncept Gaia a geoparky (Gaia concept and geoparks). 2. Konference národních geoparků, Doksy, Czech Republic, pp 44–55

Pásková M (2015) The potential of indigenous knowledge for Rio Coco Geopark Geotourism. Procedia Earth Planet Sci 15:886–891

Pásková M (2017) Local and indigenous knowledge regarding the land use and use of other natural resources in the aspiring Rio Coco Geopark. IOP Conf Ser: Earth Environ Sci 95(5):1–10

Pásková M (2018) Can indigenous knowledge contribute to the sustainability management of the aspiring Rio Coco Geopark, Nicaragua? Geosciences 8(8):277

Pásková M, Čtveráková I (2017) Geoparky a jejich role v ochraně přírody a krajiny (Geoparks and their role in nature and landscape conservation). Ochrana přírody 4:38–41

Pásková M, Dolejský V (eds) (2011) Výzva a hrozby ekoturismu pro ochranu biodiverzity a geodiverzity (Challenge and threads of ecotourism for the biodiversity and geodiversity conservation). Telč, Czech Republic

Pásková M, Dowling RK (2014) The usage of local and indigenous knowledge in the management of geotourism destinations. In: 14th international multidisciplinary scientific geoconference SGEM 2014, Geoconference on ecology, economics, education and legislation. Ecology and Environmental Protection, Albena, pp 805–812

Pásková M, Řídkošil T (2011) Geoparks and geotouristic educational trails. In: 10th European Geoparks Conference, Langesund, 99

Pásková M, Zelenka J (2018a) Společensky odpovědný cestovní ruch (Social Responsible Tourism). IDEA Servis, Prague

Pásková M, Zelenka J (2018b) Sustainability management of UNESCO global Geoparks. Sustain Geosci Geotour 2:44–64

Pásková M, Zelenka J, Ogasawara T, Zavala B, Astete I (2021) The ABC concept – value added to the earth heritage interpretation? Geoheritage 13:38

Pricop OC (2012) Critical aspects in the strategic management theory. Procedia Soc Behav Sci 58: 98–107

Rolková M, Farkašová V (2015) The features of participative management style. Proc Econ Financ 23:1383–1387

Santucci V (2005) Historical perspectives on biodiversity and geodiversity. Geodivers Geoconserv 22(3):29–34

Shen TT (1999) Total environmental quality management. In: Industrial pollution prevention. Environmental engineering. Springer, Berlin, pp 81–139

Starik M, Kanashiro P (2013) Toward a theory of sustainability management: uncovering and integrating the nearly obvious. Organ Environ 26(1):7–30

Swan J et al (1999) Knowledge management and innovation: networks and networking. J Knowl Manag 3(4):262–275

Těšitel J, Boháč J, Matějka K, Bartoš M, Kušová D, Kopáčková M (2005) Participativní management chráněných území – klíč k minimalizaci konfliktů mezi ochranou biodiversity a socioekonomickým rozvojem místních komunit (Participatory management of protected areas – the key to minimizing conflicts between biodiversity conservation and the socio-economic development of local communities). Závěrečná zpráva projektu (Final report of the project) VaV/610/03/03, Institute of Landscape Ecology of the Academy of Sciences of the Czech Republic, České Budějovice, p 28

Těšitel J, Kušová D, Bartoš M (2007) Šetrný turismus v biosférických rezervacích – nástroj formování sítí spolupráce: případová studie Biosférické rezervace Šumava (Sound tourism in biosphere reserves – a tool to form a network of cooperation: a case study of the Šumava Biosphere Reserve). Office of the Provincial Government of Carinthia, Klagenfurt, p 32

UN (2021) Transforming our world: the 2030 Agenda for Sustainable Development. [online]. Available: https://sdgs.un.org/2030agenda

UNESCO (2015) Statutes and operational guidelines for UNESCO Global Geoparks. [online]. Available: http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/SC/pdf/IGGP_UGG_Statutes_Guidelines_EN.pdf

UNESCO (2018a) Application process for aspiring UNESCO Global Geoparks. [online]. Available: http://www.unesco.org/new/en/natural-sciences/environment/earth-sciences/unesco-global-geoparks/application-process/

UNESCO (2018b) Fundamental features of a UNESCO Global Geopark. [online]. Available: http://www.unesco.org/new/en/natural-sciences/environment/earth-sciences/unesco-global-geoparks/fundamental-features/

Van der Zee E, Vanneste D (2015) Tourism networks unravelled; a review of the literature on networks in tourism management studies. Tour Manage Perspect 15:46–56. https://doi.org/10.1016/j.tmp.2015.03.006

Zelenka J, Kacetl J (2013) Visitor management in protected areas. Czech J Tour 2(1):5–18

Zelenka J, Těšitel J, Pásková M, Kušová D (2013) Udržitelný cestovní ruch. Management cestovního ruchu v chráněných územích (Sustainable tourism. Management of tourism in protected areas), Gaudeamus Hradec Králové, 327 p

Zouros N, Valiakos I (2010) Geoparks management and assessment. Bull Geol Soc Greece 43:965–975

The Management of Arouca Geopark's Route of Geosites: A Strategic Geologically Based Product in a Geotourism Destination

Daniela Rocha and António Duarte

Abstract On territorial development area, a Geopark approach is based on the conservation of the Geological Heritage and its use in educational and geotourism activities, together with other natural and cultural resources of this territory. The Arouca UNESCO Global Geopark manages a unique touristic product with geological value designated by the name of the Route of Geosites that defines this territory as a geotourism destination. This chapter aims to highlight the importance of having a Destination Management Organization on the use of geological heritage as an opportunity to create a thematic tourism product with a holistic approach to a geotourism destination. Some future perspectives are identified for continuous improvements of this geotourism destination study case.

Keywords Geotourism · Route of geosites · Arouca UGGp · DMO · Geoparks

1 Introduction

1.1 UNESCO Global Geoparks and Geosites

The beginning of the 1990s was marked by the rise of the geoscientists' sensitivity to the need for preservation of the geological heritage for the future generations. Within this framework, in 1991, the Digne Declaration was approved, known as the

D. Rocha
AGA – Arouca Geopark Association, Arouca, Portugal
e-mail: daniela.rocha@aroucageopark.pt

A. Duarte (✉)
AGA – Arouca Geopark Association, Arouca, Portugal

CETRAD – Centre for Transdisciplinary Development Studies, University of Trás-os-Montes e Alto Douro, Vila Real, Portugal

ESTG – School of Management and Technology, Institute Polytechnic of Porto, Porto, Portugal
e-mail: antonio.duarte@aroucageopark.pt

V. Braga et al. (eds.), *Economics and Management of Geotourism*, Tourism, Hospitality & Event Management, https://doi.org/10.1007/978-3-030-89839-7_5

International Declaration of the Rights of the Memory of the Earth, a document that foresees the sustainable development of territories based on protection and promotion of its geological heritage. Later, in 1996 and during the 30th International Geological Congress, in Beijing (China), the concept of Geopark was developed and discussed, and was consolidated in 2000, with the foundation of the European Geoparks Network. This network, composed of four European territories—Réserve Geologique de Haute-Provence (France), Gerolsteiner/Vulkaneifel (Germany), Maestrazgo Cultural Park (Spain), and Petrified Forest of Lesbos (Greece)—aimed at exchanging knowledge, sharing strategies, and solving common problems, always with the sustainable development as a shared horizon, as well as the LEADER IIC project, promoted by the European Union, as a fundamental support (Martin and Zouros 2001; Zouros and Martini 2003; Zouros 2004, 2006). Then, the concept of geopark was promoted, from 2004 onward, by the Global Geoparks Network (GGN) under the auspices of UNESCO (Eder 2004; Eder and Patzak 2004), and its designation as UNESCO Global Geoparks (UGGPs) was approved, integrated into the International Geoscience and Geoparks Programme, by the UNESCO General Assembly, in tenth of November 2015 (UNESCO 2020).

UGGps reflects UNESCO's aims to build peace through education, science, culture, and communication; they seek the best strategies and practices for sustainable development in the designated areas. The recently UNESCO designation, created in November 2015, has established since its inception that UGGps are "single, unified geographical areas where sites and landscapes of international geological significance are managed with a holistic concept of protection, education and sustainable development. Their bottom-up approach [combines] conservation with sustainable development while involving local communities" (UNESCO 2020).

A geosite is a place on the Earth's surface that represents "truly significant processes and events, time periods, features and topics" (Wimbledon 1998). It can be recognized through the application of the singularity principle, i.e., a place becomes a geosite due to some specific property it detains, acknowledged and valued by experts, and which is singular and therefore relevant for the understanding of the Earth's history and dynamics. Geological Heritage is understood as the set of geosites of a given area (Brilha 2005). As a global concept assigned to the geological heritage was pointed in the eighth item of "Digne Declaration" (1991), which states: "Man and the Earth share a common heritage, of which we and our governments are but the custodians. Each and every human-being should understand that the slightest damage could lead to irreversible losses for the future. In undertaking any form of development, we should respect the singularity of this heritage."

The concept of geopark is, therefore, a bonding agent, having as action vectors the Geoconservation of the heritage, including geological heritage, the Geoeducation for the sustainable use of the resources, and the local development through sustainable Geotourism. On the basis of these courses of action, it is possible to create opportunities for the development of the local products and services, with particular emphasis on the handicraft, generate economic dynamics and employment

opportunities, and reinforce the territory identity, while preserving the legacy of the past, transforming it into future opportunities (Zouros 2004, 2006; Eder and Patzak 2004).

The UGGps are ruled by high standards and a strict quality control, not only upon accession but also in the processes of revaluation of its territories (Eder 2004). At the end of 2020 this network had 161 members distributed by 44 countries. However, even though the UGGps are spread around the world, they are concentrated mainly in Europe and eastern Asia (UNESCO 2020).

1.2 Geotourism and Storytelling of Geological Heritage

In 2011, the Global Geoparks Network and the Center for Sustainable Destinations of the National Geographic Society have established and approved the "Arouca Declaration," which defines that Geotourism is a "tourism that sustains and promotes the identity of a territory, considering its geology, environment, culture, aesthetic values, heritage and well-being of its inhabitants" and clarify saying that "geological tourism is one of the multiple components of geotourism." Thus, the geology of a territory constitutes the context in which everything is supported and develops and to where everything converges on a dynamic geosystems process connected with other dimensions as atmosphere, geosphere, biosphere, and of course the different ecosystems of earth planet, including the presence of humanity and its usages and customs. The Time and specially the Geological Time is an important dimension on the Storytelling for understood the evolution of life and of the geodynamic process in Earth planet. Humans are connected to Earth Planet due this ongoing Geological Time.

While the UGGps must demonstrate geological heritage of international significance, their purpose is to explore, develop and celebrate the links between that geological heritage and all other aspects of the area's natural, cultural and intangible heritages. It is about reconnecting human society at all levels to the planet we all call home and to celebrate how our planet and its 4600 million year long history has shaped every aspect of our lives and our societies (UNESCO 2020).

The experiences lived in this context, in direct contact with the natural and cultural heritage of the destinations, reinforce the involvement of the knowledge and the dynamics of the local communities, thus opening doors to a distinguishing economic impetus, based on the identity, sustainable development, and authenticity of the offer. Strong connections between the Geoconservation, Geoeducation, and Geotourism are established through the promotion of the development of new local products and services, the encouragement of handicraft industry and the local economic growth and, this way, the creation of new employment opportunities. The implementation of these activities has allowed us to share the concept of geopark, promote the environmental values and give the visitors a sense of respect for the Planet Earth's resources. This implies that the participants transform

themselves into promoters of the territory, sharing with others what they learned and encouraging them to discover this territory.

There has been an ongoing debate about how to explain geoheritage and geosciences most efficiently. Storytelling and narratives should support the communication of scientific phenomena to nonexperts (Dahlstrom 2014). Although stories can potentially result in a distorted display of scientific data (Katz 2013), they are also found by nonexpert audiences to be more engaging than formal scientific communication. The potential of storytelling can be particularly high in communicating scientific phenomena that lie beyond the human scale and cannot be directly experienced (Dahlstrom 2014), for example, the Geologic Time Scale. The scientific communication of Earth science facts can therefore significantly benefit from the concept of storytelling.

1.3 Geotourism and Destination Management Organizations

Geotourism was used in two different ways as a special type of tourism "geological based" (Hose 1995) or as a territorial and tourism integrated approach "geographical based" used by the National Geographic Society in 2002 and reinforced by "Arouca Declaration" in 2011. Geotourism is not exclusive of geographical areas classified by UNESCO as UGGps. However, the growth of Geotourism Destinations in the last decades is frequently promoted effectively by UGGps management structures that implement geotourism territorial approaches.

According to Duarte et al. (2020), Geoparks and Geotourism are based on unique and exceptional geological heritage, which value this asset as inimitable and non-transferring natural resources, which allows, by its differentiation, to support a development strategy based on the paradigm of endogenous territorial development theory illustrated by Amaral Filho (2001) and Barca et al. (2012).

In accordance with UNESCO (2015) the UGGps are managed by geopark management structures composed of local partnerships, encouraged to use bottom-up approach, in which public and private organizations, as well as local communities, are called to participate in the definition and implementation of their sustainable territorial development strategies by means of specific Geopark Action Plans.

The management structure of Geoparks is a relevant response on the side of the organization of geotourism supply. These structures based on partnership, support the management of the UGGps as geotourism destinations and actively manage a structured geological heritage geotourism product. This structuring involves, directly or indirectly, several activities related to goods and services tradable through the provision of infrastructures of visiting, lodging, catering, or handicrafts, among others, and a response on the demand side, which is based on flows of geotourists who, for multiple reasons, travel to such geotourism destinations. The Geopark management structures are managed in part with the same role of Destination Management Organization (DMO) on two different levels of management: an internal environment and an external environment of the UGGps. In fact, according

to Mira et al. (2017), there are two levels of analysis that deserve the same attention in a DMO: the internal level and the external level. According to these authors, the role of a DMO is to manage the factors that contribute to the success and affirmation of the destinations. At the internal level, a DMO should assume the management of resources, products and services, stakeholders, and the community where it operates, with systematic monitoring and evaluation of actions with a focus on results. At the external level, a DMO should ensure policies, partnerships, marketing, and benchmarking. In fact, as Presenza et al. (2005) already mentioned, the global management model has an effect on the positioning and displacement of tourist destinations.

2 Arouca Geopark's Route of Geosites

2.1 Arouca UGGp: Geodiversity Stories at the Service of Development

The Arouca UGGp is a territory with approximately 328 km^2, which corresponds to the administrative boundaries of the Municipality of Arouca. Integrated into the sub-region of Entre Douro e Vouga, in the north of mainland Portugal, this territory with 22.359 inhabitants (2011 Census) is located in the extreme northeast of the Aveiro district and is part of the Metropolitan Area of Porto and the Tourism Region of Porto and North of Portugal. The "Route of Geosites" is, since 2015, a brand registered in the Portuguese Institute of Industrial Property, used in the territorial marketing strategy of the Arouca UGGp, reinforcing it as an innovative geotourism destination (Rocha 2016).

Indeed, it is not easy to find, both in Portugal and in the world, a natural place with such small dimensions that, at the same time, groups so many charms and potentialities of the geological nature that project the Arouca UGGp at international level. Birthing stones ("Pedras Parideiras"), giant trilobites, trails of trilobites trace fossils, waterfalls, bread, and onion rocks and, additionally, old wolfram mines, are just some of the exceptional aspects of the geology of this region that have attracted many thousands of visitors to this territory. This reality is directly related to the diversity of the rocks that occur in this territory, with several schist and granite outcrops, pronounced in the construction of the traditional villages; quartzites forming ridges of great hardness that stand out in the landscape; impressive narrow granite cliffs over the carved Paiva valley ("Paiva river gorge"); the presence of a fairly detailed stratigraphic sequence that represents geologic periods such as the Cambrian, Ordovician, Silurian, and Carboniferous. The above-mentioned geologies are related to the remarkable palaeontological wealth of the region. One of the highlight points is the paradigmatic case of the Valério's quarry that has brought to light several findings of the Middle Ordovician, as well as the outcrops of the Silurian and Carboniferous, where there occur graptolites and vegetable fossils,

respectively. Another highlight is the fantastic outcrops with folds, faults and other structures that indicate how the tectonic forces have worked throughout its geological history. Besides these aspects, there is a huge wealth of geomorphological elements, which are characteristic features of a mountain territory, and the existence of the Arouca Monastery, the biggest religious granite building of Portugal, thus called "geomonument" (Rocha 2016).

Arouca Geopark is a classified area since April 2009, assuming a commitment to study, preserve and promote this heritage, on the basis of an international concept of nature and biodiversity conservation, along with the Portuguese Member State and UNESCO. This is reflected in the Decision by the Executive Council of UNESCO 161EX/Decisions, adopted in Paris, 2001, the Decree-Law 42/2008, of July 24, with regard to the geosites, geoparks, and the nature and biodiversity preservation and more recently the decision 196EX/Decisions and 38 C/Resolutions on 2015 with the creation of the new International Geoscience and Geoparks Programme (Rocha 2016).

The management of this UNESCO designation site as UGGp and the implementation of a sustainable development strategy is carried by AGA—Arouca Geopark Association, since 2008, a DMO that assumes the responsibility for the Geoconservation, Geoeducation, and Geotourism actions in partnership with strategic stakeholders.

Attending to an increasing demand and a necessarily more qualified Geotourism offer in the Arouca UGGp it was fundamental to create a training course for local guides (Interpreters of the Arouca Geopark) and the service of interpreted visits recognized as a quality service. The "Interpreter of the Arouca Geopark" is considered the guide who accompanies visitors on trips and visits to places of tourist interest, integrated into the Arouca UGGp, telling geodiversity stories and providing information about natural and cultural heritage (Rocha et al. 2018). Deserves particular highlight the annual program of interpreted visits to the Arouca Geopark's Route of Geosites, a tourist entertainment program of reference in our territory. The service of interpreted visits has high socio-economic potential being an incoming for several families in our territory.

In 2015, AGA and the Municipality of Arouca has promoted two strategic Geotourism projects "Paiva Walkways" and "Arouca Geopark's Route of Geosites" based on the construction of new facilities and infrastructures to promote new geotourism attractions, new structured products and reinforce the competitiveness and the growth of the region. These two geotourism projects were awarded as Geoconservation Award 2017 by PROGEO—Portugal. On another hand, the "Paiva Walkways" of Arouca UGGp was awarded annually since 2016 as "Europe's leading tourism development project" and, in 2019 and 2020, was awarded, as world dimension, with the designation of the World's Leading Adventure Tourist Attraction. No less important, in 2020, the Arouca UGGp destination was awarded by top 100—Sustainable destinations, by Green Destinations, a nonprofit foundation for sustainable destination development.

2.2 Implementation and Promotion

The Route of Geosites is the best way to tell geodiversity stories in the Arouca UGGp geotourism sustainable destination. Since 2015 it is a new way of dealing with tourism, culture, and science. Throughout the proposed three itineraries, the visitor will be able to see, feel, experiment, live, and know a whole set of new emotions and sensations. Based on the qualification and appreciation of the geological heritage of the region and the enhancement of the tourist and educational activity in the territory, this is a new way to get to know the Arouca UGGp, combining the knowledge and the unique, remarkable, and unforgettable experiences, in an excellent geotourism destination, which stands out for its difference, uniqueness, and beauty of the nature, for the magnificence and history of its monastery, for the human warmth of its people, for the flavors of its gastronomy, for the wisdom of its traditions and for everything that transforms this territory into UGGps (Rocha 2016; Rocha et al. 2016; Duarte and Rocha 2017).

The structuring of this Route resulted from a long and meticulous work, which allowed to include 31 geosites previously inventoried and characterized in this territory (Rocha 2008), in three itineraries to be done by car with some sections on foot (Rocha 2016: Figs. 1, 2, 3 and 4).

The proposition of these itineraries was based on five criteria: the geographical proximity of the geosites, the tourist interest of the itinerary, the accessibility and the vulnerability of the geosites and the diversity of the interests of the geosites. Therefore, the outcome was an interesting proposal consisting of three itineraries that seek to briefly define the geographical areas where they go through (Rocha 2016):

A: "Freita: the enchanted mountain" (Fig. 2), an itinerary that goes through the south area of the territory, revealing the mysteries and charms of the Freita Mountain throughout 11 geosites (Rocha 2016).

G1: Detrelo da Malhada viewpoint; G3: S. Pedro Velho viewpoint; G6: Frecha da Mizarela waterfall; G5: Mizarela geological contact; G4: Caima river potholes; G7: Birthing stones; G8: Castanheira folds; G10: Costa da Castanheira viewpoint; G11: Maize bread rocks; G13 e G14: Espinho spheroidal weathering ("Pedras Cebola").

B: "Through the Mines and unknown spots of Paiva" (Fig. 3), going through the southeast area via eight geosites, going back to the ancient times of the mining exploration in the region (Rocha 2016).

G16: Rio de Frades wolfram and tin mines; G22: Regoufe wolfram and tin mines; G23: "Hell's door" and "the claw"; G19 e G20: Paiva river "meanders" and roman "conheiras"; G17 e G18: Paiva river library and Ichnofossils from Mourinha; G24: Senhora da Mó viewpoint.

C: "Paiva: the amazing valley" (Fig. 4), links 12 geosites in the northeast area, offering the nature and the wild state of the Paiva's valley, as well as the mysteries hidden in the rocks of the Paleozoic Era (Rocha 2016).

G25: Fossil collection of the Geological Interpretative Center of Canelas; G26: Ordovician glaciation; G27: Silurian outcrop; G28: Carboniferous conglomerate;

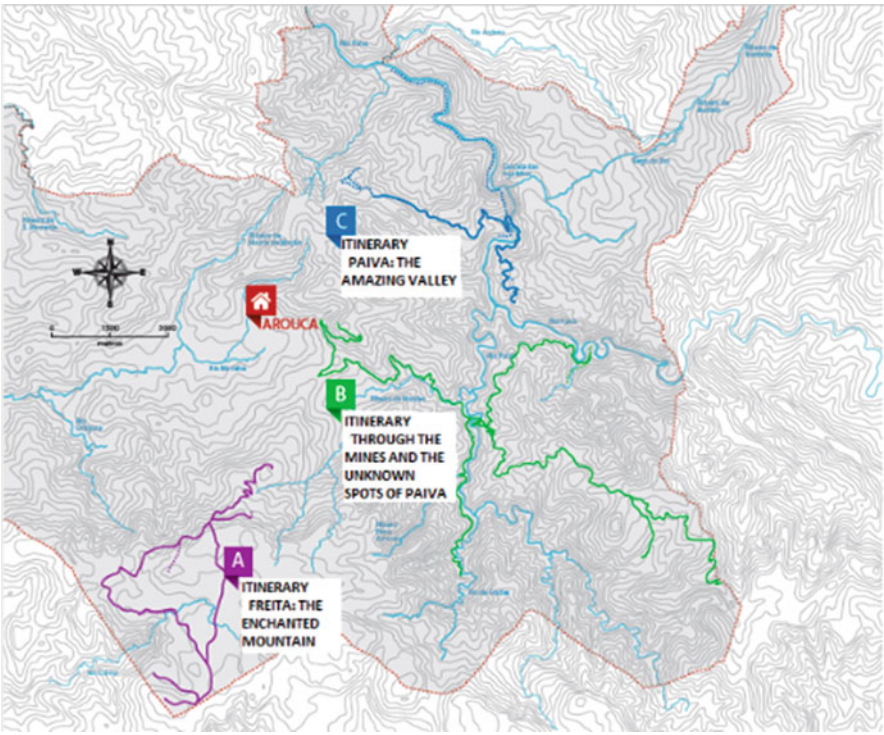

Fig. 1 The three itineraries of the Route of Geosites: A, "Freita: the enchanted mountain"; B, "Through the Mines and unknown spots of Paiva"; C: "Paiva: the amazing valley"

Fig. 2 Geosites that can be visited by car and on foot within the A itinerary

Fig. 3 Geosites that can be visited by car and on foot within the B itinerary

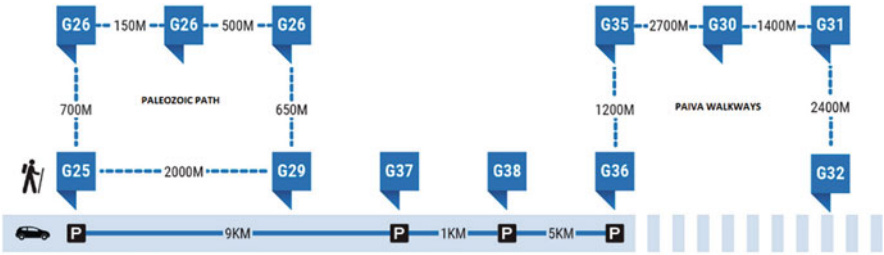

Fig. 4 Geosites that can be visited by car and on foot within the C itinerary

Fig. 5 House of the Birthing Stones—Interpretation Center; Panoramic floor of the Arouca Meteorological Radar; Trilobites Museum

G29: Gralheira d'Água site; G37: Ichnofossils from Cabanas Longas; G38: Mira Paiva site; G36: Paiva river gorge; G35: Agueiras waterfall; G30: Vau site; G31: Gola do Salto site; G32 Espiunca fault.

The Arouca Geopark's Route of Geosites is duly signposted through this classified territory in accordance with the transit regulations, provided by the Highway Code. Therefore, the visitor to these itineraries should follow the entrance or directional signs of the Route.

All geosites of this Route have an identification flag. In this one, the visitor will find a QRCode that can be read through his phone or tablet to access more information about the geosite, directly from the Arouca Geopark's website (www.aroucageopark.pt).

The implementation of the Route of Geosites was accompanied by the infrastructure of many of the sites through interpretative centers, viewpoints/observation platforms, and interpretative panels. Three geosites are equipped with interpretative units: the House of the Birthing Stones—Interpretation Center (Birthing Stones geosite—Itinerary A—Fig. 5), the panoramic floor of the Arouca Meteorological Radar (Costa da Castanheira viewpoint geosite—Itinerary A—Fig. 5), and the Trilobites Museum (Canelas Geological Interpretative Center Fossil Collection—Itinerary C—Fig. 5: Table 1).

Six geosites of this Route benefit from viewpoints, most of them equipped with interpretative panels: Detrelo da Malhada viewpoint, S. Pedro Velho viewpoint, Mizarela waterfall, Costa da Castanheira viewpoint, Gralheira d'Água and Mira Paiva site (Itinerary C); and four of them of observation platforms: Birthing Stones, Maize Bread Rocks, Castanheira folds, and Ichnofossils from Cabanas Longas.

Table 1 Equipment to support the Arouca Geopark's Route of Geosites

Geosite name	Interpretative unit	Viewpoint/ observation platforms	Interpretative Panels	Paiva Walkways	Pedestrian trails
Itinerary A: "Freita: the enchanted mountain"					
G1: Detrelo da Malhada viewpoint	–	Yes	Yes	–	PR16
G3: S. Pedro Velho viewpoint	–	Yes	Yes	–	PR16
G6: Mizarela waterfall	–	Yes	Yes	–	PR7
G5: Mizarela geological contact	–	–	–	–	PR7 and PR15
G4: Caima river potholes				–	PR15
G7: Birthing stones	House of the Birthing Stones—Interpretation Center	Yes	Yes	–	PR15
G8: Castanheira folds	–	Yes	Yes	–	PR15
G10: Costa da Castanheira viewpoint	Panoramic floor of the Arouca Meteorological Radar	Yes	–	–	–
G11: Maize bread rocks	–	Yes	Yes	–	PR15 and PR16
G13 and G14: Espinho spheroidal weathering	–	–	–	–	PR4
Itinerary B: "Through the Mines and unknown spots of Paiva"					
G16: Rio de Frades wolfram and tin mines	–	–	Yes	–	PR6 and PR8
G22: Regoufe wolfram and tin mines	–	–	–	–	PR13 and PR14
G23: "Hell's door" and "the claw"	–	–	Yes	–	–
G19 and G20: Paiva river "meanders" and roman "conheiras"	–	–	–	–	PR5
G17 and G18: Paiva river library and Ichnofossils from Mourinha	–	–	–	–	PR5

(continued)

Table 1 (continued)

Geosite name	Interpretative unit	Viewpoint/ observation platforms	Interpretative Panels	Paiva Walkways	Pedestrian trails
G24: Senhora da Mó viewpoint	–	–	–	–	GR28
Itinerary C: "Paiva: the amazing valley"					
G25: Fossil collection of the Geological Interpretative Center of Canelas	Trilobites Museum — Interpretative Center	–	Yes	–	GR28
G26: Ordovician glaciation	–	–	–	–	–
G27: Silurian outcrop	–	–	–	–	–
G28: Carboniferous conglomerate	–	–	–	–	–
G29: Gralheira d'Água site	–	Yes	–	–	–
G37: Ichnofossils from Cabanas Longas	–	Yes	Yes	–	–
G38: Mira Paiva site	–	Yes	–	–	–
G36: Paiva river gorge	–	–	–	Yes	–
G35: Agueiras waterfall	–	–	–	Yes	–
G30: Vau site	–	–	–	Yes	GR28
G31: Gola do Salto site	–	–	Yes	Yes	–
G32 Espiunca fault	–	–	Yes	Yes	PR10

Five geosites are included in the superstructure of the Paiva Walkways (Fig. 7): Paiva river gorge, Aguieiras waterfall, Vau site, Gola do Salto site, and Espiunca fault, which integrates the itinerary C. In the geosites Gola do Salto and Espiunca fault (Itinerary C), there are also interpretative panels of the respective geosites (Table 1). In addition, in 2021, a new infrastructure will be implemented to support the Route of Geosites: the 516 Arouca—Suspension pedestrian bridge (Fig. 7), which will allow a better use of the Paiva Gorge and Aguieiras Waterfall geosites.

From the total of 14 small pedestrian trails, signalized by the territory according to the rules of the Portuguese Camping and Mountaineering Federation, 10 cross or pass near 16 geosites of this Route, making them trails with high geotouristic interest. Additionally, three other geosites are integrated into the big pedestrian

Fig. 6 Geosites viewpoints and observation platforms

Fig. 7 Paiva Walkways and 516 Arouca—Suspension pedestrian bridge

trail of this territory, designated GR28: Through Arouca's Hills and Valleys (Rocha et al. 2010; Rocha 2016: Table 1).

The Arouca Geopark's Route of Geosites benefits of a guide book which transforms the path into something more than just a walk, aiming to follow what we see along with the explanation (simple and objective), going beyond the mandatory stopping points in the geosites, proposing complementary tours to other aspects of the landscape, natural and cultural heritage of the Arouca UGGp, so that your journey can be as free and comprehensive as possible.

Since its implementation, the Route of Geosites has been dynamized with the educational and scientific community and has been the subject of several educational projects and numerous training actions and scientific field trips.

Table 1 Infrastructures supporting the Arouca Geopark's Route of Geosites (PR4: In the surroundings of Freita; PR5: Paiva's Library; PR6: Postman's Path; PR7: In the Mizarela's Cliffs; PR8: Black Gold Route; PR10: Route of Flavours; PR13: The

path of Paivô; PR14: The Magic Village; PR15: Prehistoric journey; PR16: S. Pedro Velho; GR28: Through Arouca's Hills and Valleys).

From a tourism point of view, this Route has been used professionally, not only by the Arouca UGGp staff, but also by local operator tours and local interpreter guides who offer new geotourism experiences to visitors (Duarte and Rocha 2017; Rocha et al. 2018). This Geotourism Route links the geosites in a sort of network that reinforces the touristic attraction of Arouca UGGp and, in this way, promotes restaurants, accommodations, local products, and museums which are beneficial for the local communities. The Route of Geosites have been increasing the Arouca geoconservation strategy, its local economic development and the social progress, which are the basic principles of sustainability that have already been embedded in this territory.

2.3 Interpretive Visits: Data

Since 2017 the Arouca UGGp local interpreter guides have been invited to dynamize interpreted visits to the Route of Geosites, through the promotion of an annual program. The service of interpreted visits ensures that visitors understand and value the existing geological heritage through the interpretation and personalization of the visited geosites, with the purpose of adding value and enriching their experience. The following data corresponds to the visits that were monitored between the years 2017 and 2020.

From 2017 to 2020, 30 interpreted visits were monitored, which were attended by 593 participants. Twenty-two of these visits occurred during Saturday mornings, 4 of them on Saturday full days and 8 of them on Summer nights. All these interpreted visits included the accompaniment of an interpreter local guide of Arouca UGGp, transport/bus, entrances to the interpretative units and/or Paiva Walkways and the offer of Geofood products. Participation in these visits involved registration and payment in advance.

Of the 593 participants in these visits, 326 were women and 267 were men, and there was no significant gender imbalance among the participants (Fig. 8).

For ages, the most representative group were participants between 41 and 50 (177 attendees). However, the range of people aged 51 to 60 years (140 attendees) and 31 to 40 years (95 attendees) was also high. It can be concluded that the age profile of the participants in these visits reveals a higher incidence in adulthood (Fig. 9).

The participants in these visits came from 13 different Portuguese districts (Aveiro, Beja, Braga, Castelo Branco, Coimbra, Guarda, Leiria, Lisboa, Porto, Santarém, Setúbal, Viana do Castelo, and Viseu). However, it can be concluded that most of them did not make much of a trip to Arouca, as they travelled from the nearest districts: Aveiro (326) and Porto (142) (Fig. 10).

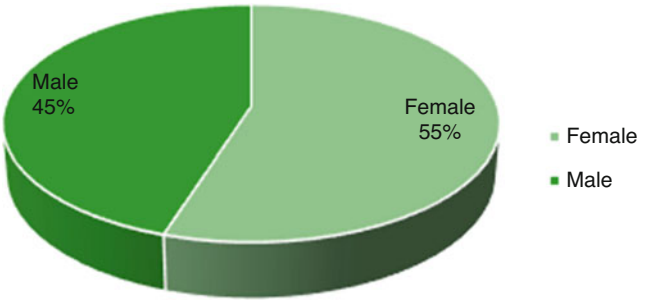

Fig. 8 The gender of the participants in the annual Geosites Route Interpreted (2017–2019)

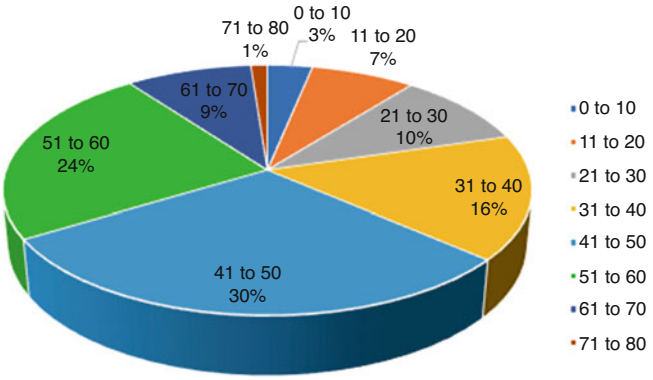

Fig. 9 The age of the participants in the annual Geosites Route Interpreted (2017–2019)

2.4 SWOT Analysis

SWOT stands for Strengths, Weaknesses, Opportunities, and Threats, and so a SWOT Analysis of the Arouca Geopark's Route of Geosites is a technique for assessing these four aspects of this strategic touristic product (Table 2).

3 Discussion and Future Perspectives

The Route of Geosites is the main strategic geotourism product of the Arouca UNESCO Global Geopark. It is a well-structured product, existing in Arouca UGGp since 2015, which benefits from its own signage and a set of supporting infrastructures (like interpretative units, viewpoint/observation platforms, walk-ways, or interpretative panels). Since 2017, the Arouca Geopark management structure dynamize interpreted visits to the Route of Geosites, through the promotion

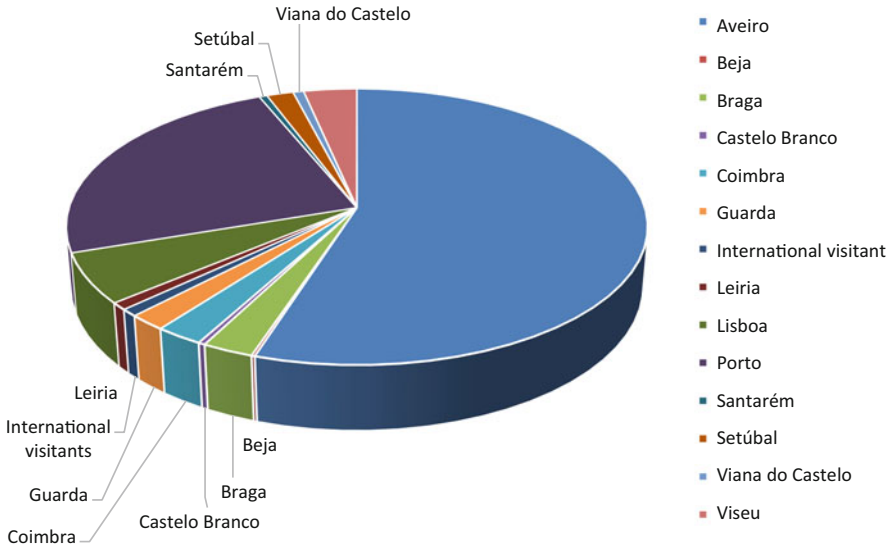

Fig. 10 The geographical region/district of the participants in the annual Geosites Route Interpreted (2017–2019)

of an annual program, which involves the local interpreter guides. The promotion of interpreted visits aims to combine territorial development with specific market niches with the goal of spreading the knowledge and preservation of the local heritage, thus ensuring its integrity. This fact reinforces the Arouca UGGp as a territory over (and for) the people who live there, these being its greatest asset.

In the next few years, it will be key to promote the Route of Geosites as a brand of geological tourism inside the Arouca UGGp destination. The reinforcement of communication of this geological tourism product can be done in several ways, for example: (1) creation of its own web page; (2) creation and dynamization of its own pages in social networks, such as Facebook and Instagram; (3) realization and promotion of promotional videos allusive to this thematic Route; (4) promotion of internationalization actions; (5) increasing the number of visitors to the interpreted visits, as well as their provenance; (6) adaptation of some geosites, making them accessible; and (7) monitoring the geosites on real time with a smart connection to the Smart Geotourism Destination an on-going project promoted by AGA.

The Route of Geosites is focused on the unique Arouca geology and landscape, by attracting visitors to geosites with a view to provide both a pleasurable and an educational experience by deepening understanding of earth sciences and raising awareness of the need to preserve geological heritage and its interaction with biodiversity and cultural heritage. At the same time, it is a sustainable form of tourism that has the potential to deliver economic and social benefits to the local and regional communities.

Table 2 Arouca Geopark's Route of geosites SWOT analysis

Opportunities	*Strengths*
The growing trend of demand for destinations based on Nature Tourism: Ecotourism and Geotourism. UNESCO classification and international recognition of the Arouca UGGp as a sustainable destination. The proximity to the Oporto International Airport. The integration of the Regional Oporto Metropolitan Area. The adaptation of some geosites, making them accessible. The COVID-19 vaccine reduces risk for tourism industry and facilitates economic recovery.	Geotourism product inside a territory classified by UNESCO. Integration of the new Atlantic European Geotourism Route concept. Arouca Geopark's main strategic tourist product. A storytelling way to know the history of the Earth through the Arouca Geopark. Constant monitoring of geosites. Trademark registered at the Portuguese Institute of Industrial Property. Geotourism product that benefits from units and interpretative panels that help in its enjoyment. Nearby there are excellent complimentary services like accommodation and restaurant facilities. The Route's itineraries are almost fully integrated into the Natura 2000 Network classified area. Low pollution levels due to weak industrial agglomeration. Contribution to the Geoconservation of Natural and Cultural Heritage. A monitorization of the visitor profile data of some interpreted visits. The Smart Geotourism Destination project approved by "Turismo de Portugal I.P."
Threats	*Weaknesses*
Exaggerated concentration of visitors in certain periods of time in different locations. Forest fires continue to be a threat to the development of Nature Tourism in the region. The depopulation and agricultural abandonment evident in the space calls into question the preservation of the quality of the built landscape.	Lack of financial investment on the brand awareness. Lack of financial resources to make constant investments and improvements in geosites. No web page dedicated exclusively to the Route of Geosites. Nonexistence of social networks (Facebook and Instagram, for example) dedicated exclusively to the Route of Geosites. Nonexistence of a system for identifying and updating information regarding the profile of visitors of the Route of Geosites, their expectations and requirements. The majority of the participants in the interpreted visits were from near the territory.

References

Amaral Filho J (2001) A endogeinização no desenvolvimento econômico regional no local. Revista Planejamento e Políticas Públicas, IPEA – Instituto de Pesquisa Econômica Aplicada, Rio de Janeiro, n. 23 (junho 2001), pp 261–286. https://www.ipea.gov.br/ppp/index.php/PPP/article/view/78/89

Arouca Declaration (2011) International Congress of Geotourism– Arouca 2011. http://www.aroucageopark.pt/pt/documentacao/. Accessed 3 June 2020

Barca F, Mccann P, Rodríguez-Pose A (2012) The case for regional development intervention: place-based versus place-neutral approaches. J Reg Sci 52(1):134–152. https://doi.org/10.1111/j.1467-9787.2011.00756.x

Brilha J (2005) O Património Geológico e Geoconservação: a Conservação da Natureza na sua vertente Geológica. Palimage Editores, 183 p

Dahlstrom MF (2014) Using narratives and storytelling to communicate science with nonexpert audiences. Proc Natl Acad Sci USA 111:13614–13620

Digne Declaration (1991) Declaration of the Rights of the Memory of the Earth. http://www.progeo.ngo/downloads/DIGNE_DECLARATION.pdf. Accessed 3 June 2020

Duarte A, Rocha D (2017) Geosites route of Arouca Geopark: a geological-based touristic product in a geotourism destination. In: Lima E, Nunes JC, Meirinho P, Machado M (eds) Abstract book of the 14th European Geoparks conference, Ponta Delgada, Azores, Portugal, p 116

Duarte A, Braga V, Marques C, Sá A (2020) Geotourism and territorial development: a systematic literature review and research agenda. Geoheritage 12:1–19

Eder FW (2004) The global UNESCO network of Geoparks. In: Zhao X, Jiang J, Dong S, Li, Zhao T (eds) Proceedings of the first international conference on Geoparks, Beijing, Geological Publishing House, pp 1–3

Eder FW, Patzak M (2004) Geoparks – geological attractions: a tool for public education, recreation and sustainable economic development. Episodes 27(3):162–164

Hose TA (1995) Selling the story of Britain's stone. Environ Interpret 10:16–17

Katz Y (2013) Against storytelling of scientific results. Nat Methods 10:1045

Martin G, Zouros N (2001) European Geoparks: Geological Heritage & European Identity – cooperation for a common future. In: Frey M-L (ed) European Geoparks magazine. Issue 1, p 4

Mira M, Breda Z, Moura A, Cabral M (2017) O papel das DMO na gestão dos destinos turísticos: abordagem conceptual (1999–2014). Observatório de Inovação do Turismo – Revista Acadêmica vol XI, n° 1, junho – 2017

Presenza A, Sheehan L, Ritchie JB (2005) Towards a model of the roles and activities of destination management organizations. J Hospit Tour Leis 3:1–1

Rocha DMT (2008) Inventariação, Caracterização e Avaliação do Património Geológico do concelho de Arouca. Dissertação de Tese de Mestrado, Departamento de Ciências da Terra, Universidade do Minho, Braga, Portugal, 159 p. + CD-ROM

Rocha D (2016) Rota dos geossítios do Arouca Geopark. AGA – Associação Geoparque Arouca (ed) 159 p. ISBN: 978-989-99633-1-3

Rocha D, Paz A, Sá AA, Vilar O, Belém M (2010) Percursos pedestres geoturísticos: instrumentos de divulgação da Geologia no Geoparque Arouca. VIII Congresso Nacional de Geologia. Rev Electrón Ciências Terra 18(12):4 p

Rocha D, Paz A, Neves R, Duarte A, Sá AA (2016) The route of geosites: a new approach for the promotion of the Arouca UNESCO global Geopark geosites. In: Abstracts book of the 7th international conference on UNESCO global Geoparks, English Riviera UNESCO global Geopark, pp 276–276

Rocha D, Duarte A, Belém M, Neves R (2018) Geoeducation from trainees to local interpreters (guides): the case study of Arouca Geopark. In: Abstracts book of the 8th international conference on UNESCO global Geoparks, Adamello Brenta Geopark, pp 266–266

UNESCO (2015) 38 C/Resolutions. 38th UNESCO general conference, Paris. https://unesdoc.unesco.org/ark:/48223/pf0000243325. Accessed 3 June 2020

UNESCO (2020) UNESCO Global Geoparks. http://www.unesco.org/new/en/natural-sciences/environment/earth-sciences/unesco-global-geoparks/. Accessed 3 June 2020

Wimbledon WAP (1998) An European geosite inventory: GEOSITE – an International Union of Geological Sciences initiative to conserve our geological heritage. In: Duran JJ, Vallejo M (eds) Comunicaciones de la IV Reunion Nacional del Patrimonio Geológico, Miraflores de la Sierra (Madrid). Soc Geol España, Madrid, pp 15–18

Zouros N (2004) The European Geoparks network. Geological heritage protection and local development. Episodes 27(3):165–171

Zouros N (2006) The European Geoparks Network: geological heritage protection and local development – a tool for geotourism development in Europe. In: Fassoulas C, Skoula Z, Pattakos D (eds) Proceedings of the 4th European Geoparks Network Meeting, pp 15–24

Zouros N, Martini G (2003) Introduction to the European Geoparks Network. In: Zouros N, Martini G, Frey M-L (eds) Proceedings of the 2nd European Geoparks Network Meeting. Lesvos, Natural History Museum of the Lesvos Petrified Forest, pp 17–21

Geotourism and Destination Brand Selection: Does Social Media Matter?

Aidin Salamzadeh, Mehdi Tajpour, Elahe Hosseini, and Yashar Salamzadeh

Abstract Geotourism is a profitable business that relies on different elements. The purpose of this study was to investigate the impact of geotourism on destination brand selection with social media as the moderating variable. This paper falls into the category of applied studies in terms of purpose and follows the descriptive-correlational methodology. The statistical population consists of tourists who travelled to selected geotourism destinations of Iran in 2019 to visit the geological heritage. As the population size could not be determined, 384 individuals were selected based on Krejcie and Morgan's sample size table. The data were collected through a researcher-developed questionnaire. The reliability of the questionnaire was confirmed using Cronbach's alpha coefficient and composite reliability. The validity of the questionnaire was also confirmed by calculating its content and construct validity. Structural Equation Modeling (SEM) in SmartPLS 3.0 was used for data analysis. It was found that all the hypotheses which implied a direct impact were confirmed; however, when social media was introduced as the moderating variable, it was not significant enough to affect the outcome. Sharing pictures and videos about the attractions of Iran is not enough to warrant the selection of a given destination for prospective visitors.

Keywords Geotourism · Social media · Destination brand · Iran

A. Salamzadeh (✉)
Faculty of Management, University of Tehran, Tehran, Iran
e-mail: salamzadeh@ut.ac.ir

M. Tajpour
Faculty of Entrepreneurship, University of Tehran, Tehran, Iran
e-mail: tajpour@ut.ac.ir

E. Hosseini
Faculty of Management, Yazd University, Yazd, Iran
e-mail: elahe.hosseini@stu.yazd.ac.ir

Y. Salamzadeh
Graduate School of Business, Universiti Sains Malaysia, Penang, Malaysia
e-mail: yashar@usm.my

V. Braga et al. (eds.), *Economics and Management of Geotourism*, Tourism, Hospitality & Event Management, https://doi.org/10.1007/978-3-030-89839-7_6

1 Introduction

Tourism, as a leading global industry, could generate significant wealth for a country and contribute to higher employment in the tourism industry (Fang et al. 2016; Duarte et al. 2018, 2020). In developed countries, a more thriving tourism industry means higher income diversity and economic improvement (Pourahmad et al. 2018; Oliveira et al. 2018). In developing countries, however, the tourism industry offers export opportunities that could be exploited more quickly than through the traditional channels (Shahhoseini et al. 2017; Ratten et al. 2018). The Iranian government tends to invest in the tourism industry according to the country's natural attractions and cultural heritage in local areas as a way to gain competitive advantages (Torabi Farsani et al. 2012). Although the tourism industry in Iran suffers from negative perceptions in the world, social media can be used to eliminate and correct these perceptions and to encourage foreign tourists to travel to the country and visit its different sights (Mousazadeh et al. 2018). In this line, geotourism is another way to attract more tourists (Ghazi et al. 2013). Given the unstable and challenging environments in the new century, there is a pressing need for creativity and innovation through entrepreneurial efforts at the organisational levels to achieve the desired outcomes (Tajpour and Salamzadeh 2019; Ratten et al. 2019a). With the present economic conditions and modern-day life problems as factors that cause high levels of stress, geotourism could be a choice for those who seek to get away from the everyday stressful life and focus more on their entertainment and wellbeing (Yalgouz-Agaj et al. 2010; Salamzadeh and Dana 2020). Travel to visit geological heritage and touristic destinations is one of the most important goals of geotourism, and often, in addition to receiving touristic services, leisure activities are also added to the travel package (Eshraghi et al. 2012). In addition to the optimal use of domestic capital, governments could encourage growth in geotourism as a national strategy for increasing income and thus achieving national security. Thus, it is crystal clear that there is a theoretical gap that could be studied by investigating the relationship between geotourism and destination branding.

2 Statement of the Problem

Geotourism is considered as one of the most lucrative and competitive industries in the world and is one of the new areas of advanced tourism. At the macro-level, governments are interested in gaining the economic benefits of this industry (Bastaman 2018). There is also increasing competition between different countries, especially in developing Asian countries, to attract geotourists. Globalisation and trade liberalisation in the field of geotouristic services are the basis for the rapid growth of tourism in developing countries (Radovic Markovic and Salamzadeh 2012; Salamzadeh et al. 2021; Millaningtyas and Hatneny 2019). Due to the low cost and high profitability of this industry, many countries interested in tourism

development focus on and develop plans for this area of the tourism industry. In its *Year 2021 Strategic Plan*, Iran has also been considered to become one of the main hubs of geotourism in the region (Hamidi et al. 2020). In this regard, Iran can monitor the outflow of foreign currencies and the workforce to other countries.

With the emergence of global standards and rules in different parts of the world, people began to seek higher quality touristic services at lower and more competitive prices (Estiri et al. 2018). That is why social media plays a vital role in the selection of a tourist destination (Foroudi et al. 2016). There are no accurate statistics on the number of people by country who travel to other countries for such services, and these figures are sometimes contradictory (Momeni et al. 2018). Nonetheless, the number of geotourists is increasing, and it is expected to increase sharply in the coming years. This study aims to fill the theoretical gap by providing a model for understanding the impact of social media on geotourism (Salamzadeh 2020). The model is expected to help various stakeholders such as policymakers and academics to use social media to promote geotourism and modify the *negative!* perceptions about Iran. To achieve this goal, a researcher-made model for foreign users on social networks has been selected as the research strategy.

3 Background

3.1 Geotourism in Iran

Iran is a large country with a variety of locations in terms of weather, culture and geological heritage (Tavallaei et al. 2012). Therefore, geotourism in the country has a long history which is full of eye-catching destinations. As geotourism deals with '*non-living parts of the natural environment*' (Sadry 2009), which is an integral part of the country, there are several opportunities to be explored, evaluated and exploited by those who are in this industry (Moradipour et al. 2020). The geotouristic destinations in Iran are increasingly drawing the attention of visitors as there are different attractions in those destinations, including geological and geomorphological sites, as well as ancient and cultural heritages (Ranjbaran et al. 2020). Hopefully, Iranian researchers have focused on this interesting area during the last two decades. Amrikazemi conducted the first research in 2002. He has published several books on the capacities of the Iranian geoparks and geotourism and continued his research on indigenous geosites and landforms in Iran (Shahhoseini et al. 2017).

Numerous authors have followed his work, and these led to new streams of research and practice in this domain (Molchanova and Ruban 2019). Most of the research in this domain is concentrated on particularities of various geotourism destinations, including but not limited to Manesht and Ghelarang (Mokhtari et al. 2019), Qeshm Island (Shahhoseini et al. 2017; Pourahmad et al. 2018), Khorramabad (Moradipour et al. 2020), Isfahan (Shafiei et al. 2017), Bangestan (Molchanova and Ruban 2019), Takht-e Soleymān (Khoshraftar and Farsani 2019), Shiraz (Habibi

et al. 2018), the Lut Desert (Maghsoudi et al. 2019), Ali-Sadr Cave (Safarabadi and Shahzeidi 2018), Gachsaran (Habibi and Ruban 2017), Dasht-e-Kavir (Bahak 2016), Lorestan (Maghsoudi and Rahmati 2018), and Neyriz (Habibi and Ruban 2018). These locations are among the most well-known geotourism destinations in Iran; however, as a rule of thumb, these are less than 1% of the whole destinations.

3.2 Geotourism and Destination [Brand] Selection

Although the destination selection is affected by several factors, such as the image, reputation (Salamzadeh et al. 2016; Bañegil-Palacios and Sánchez-Hernández 2018), and the like, yet previous research on geotourism and destination [brand] selection is very limited and rare (Estima et al. 2014). Nevertheless, a few research papers have implicitly pointed out such a relationship. For instance, Chan and Zhang (2018) concentrated on the gap between the projected image with the perceived image of the destination and its relationship with the development of geotourism. Soliman and Abou-Shouk (2017) also followed a behavioural approach toward destination selection of geotourists. They believed that predicting the behavioural intention of geotourists could affect geotourism industry of a typical country. Moreover, Boley et al. (2018) argued that the development of geotourism could affect the intention to select a destination as well as the social return. Some researchers, such as Awaritefe (2004), concentrated on the differences between prospective and actual geotourists' approach toward destination image. They believed that the image could be affected by geotourists approach. In another seminal research, Dryglas and Lubowiecki-Vikuk (2019) investigated the image of Poland as perceived by German and British tourists. They believed that destination selection was affected by tourists' approach toward the image of Poland as their destination.

In sum, as mentioned earlier, the relationship between geotourism and the destination selection is implicitly mentioned in the literature. Moreover, destination brand selection is also marginally studied in the extant literature of tourism. For instance, Bhattacharya and Kumar (2017a, b) scrutinised the factors affecting tourists' destination brand selection behaviour in India. They listed some factors to create improved relationships between the preferences of prospective tourists' and the marketing mix of the destination brands. Besides, Shafiei et al. (2017) made the connection between geotourism and destination brand selection by concentrating on geo-branding as a linking pin. Although this concept has been previously mentioned by scholars such as Brown and Campelo (2014), Freire (2005, 2006), and Ilieș and Ilieș (2015), yet its connection to geotourism was poor. Therefore, in this chapter, the authors put more emphasise on the concept of destination brand selection and its connection to geotourism.

3.3 Geotourism and Social Media

Previous scholars extensively studied the role of social media in the tourism industry (e.g. see, Munar and Jacobsen 2013; Harrigan et al. 2017). Nevertheless, findings in different contexts are contradictory to some extent (Zeng and Gerritsen 2014; Salamzadeh et al. 2017). While some studies have confirmed the positive impact of social media platforms (e.g. see, Miguéns et al. 2008; Hays et al. 2013; Munar and Jacobsen 2014), others have rejected such a significant effect (e.g. see, Wozniak et al. 2017). In the realm of geotourism, this connection is studied by a number of authors. For instance, Tormey (2019) offered the use of new approaches toward social media to improve geoheritage. Also, Green (2017) and Prendivoj (2018) considered social media posts and comments as marginal triggers to motivate potential visitors to become geotourists. Therefore, according to the points mentioned above of view, it is essential to see if geotourism and social media platforms, as they are currently operating, have any relationship, or in better words, is the relationship between geotourism and destination brand selection affected by social media platforms in the studied context?

4 Theoretical Foundations

The theoretical model of this research has been developed by the researchers based on Ólafsdóttir and Tverijonaite (2018). Geotourism is defined by four components, i.e. macro facilitators (Gil-Saura et al. 2013), information search (Lee and Chhabra 2015), demand triggers (Hassan and Einafshar 2012), and personal factors and travel experiences (Boley et al. 2011). It has been updated with recent findings on the role of social media in destination branding (Ebrahimi et al. 2020). In this theoretical model, geotourism is an independent variable that affects the choice of destinations. The destination brand is also considered as a dependent variable. The research hypotheses are derived from this model and are as follows.

Few studies have paid attention to macro-level facilitating factors of geotourism (Adem Esmail and Suleiman 2020), yet, this issue has been previously investigated in the tourism industry at a broader scope. For instance, according to Németh et al. (2017), volcanic geoheritage has been listed as some macro facilitating factors which affect tourism in areas with tremendous potential for hosting visitors. Besides, facilitating geo-knowledge management is another issue to be considered while exploiting geotourism-related opportunities (Farsani et al. 2018). Shafiei et al. (2017) also consider such factors critical for choosing a destination brand for geotourists, studying the rural geotourism destinations in Iran. In addition to such approaches, Mwesiumo and Halpern (2019) believe that facilitating factors at macro-levels could impact the internationalisation of geotouristic destinations. Scholars such as Farsani et al. (2012) argue that while managing the tourism crises in geoparks in order to develop geotourism, one should consider facilitating factors,

and this could affect the selection of geotouristic destinations. Besides, Mulec and Wise (2012) investigated the strategic guidelines for the potential geotourism destinations, and they implicitly indicated that during such strategic planning, one must take macro-level factors into account. Such a consideration might lead to the selection of a destination by geotourists. Therefore, the following hypothesis is proposed.

H1 Macro facilitating factors have a significant impact on the choice of a destination brand by geotourists.

Individuals in geotourism industry frequently use social media as a tool for introducing and promoting destination brands, as well as for answering the questions of potential geotourists and interacting with them (Robertson 2015). Besides, Rozenkiewicz et al. (2020) argue that even the national tourism organisations in selected central European countries use their social media pages as well as web pages to provide more information about geotouristic destinations and promote their brands. By doing so, they could improve the chance of a geotouristic location to be selected by potential visitors. For instance, Tikoudi et al. (2016) and Hemmonsbey and Tichaawa (2018) discuss that social media platforms are used to leverage geotourism and destination branding. Some of the social media platforms, such as Instagram and Facebook, are considered as most used platforms to promote destination brands for geotourists. By highlighting the facilitating factors and macro-level advantages, geotourists might become more interested in travelling to specific geotouristic destinations (e.g. Fatanti and Suyadnya 2015). Thus, we proposed the following hypotheses and highlighted such a moderating role.

H1a Macro facilitating factors that affect the choice of a destination brand are moderated by social media by geotourists.

In addition to macro facilitating factors, information search is considered as a critical concern in choosing destination brands by geotourists (Widawski et al. 2018a, b). Geotourists must search and gather data and information about their destinations (Nelson 2014; Ezebilo 2014). Thus, the more data would be available and searchable for them regarding their destinations, the more likely they will choose that destination (Robertson 2015; Rozenkiewicz et al. 2020). By the way, online information search could improve the visibility of a brand and therefore improve its brand awareness, especially regarding geotouristic destinations (Park and Kim 2010; Pawłowska et al. 2015). Therefore, we believe that information search could affect the choice of a destination brand by geotourists, and then we proposed the following hypotheses.

H2 Information search has a significant impact on the choice of a destination brand by geotourists.

Social media plays a significant role in tourism, and more specifically, the geotourism industry, as such platforms could facilitate information search by providing potential geotourists with more information about their destination brands (Boley et al. 2013; Widawski et al. 2018a, b). Therefore, social media platforms play

a critical role in introducing, promoting and choosing destination brands (Robertson 2015; Duan et al. 2020). Some researchers like Rozenkiewicz et al. (2020) believe that social media and the Internet have facilitated communications and therefore have changed the ways players of the tourism industry used to promote their planned destinations. Nevertheless, we wonder if social media platforms could moderate the impact of information search on choosing a destination brand. Then, the following hypothesis is proposed accordingly.

H2a Information search on choosing a destination brand by geotourists is moderated by social media.

Several demand triggers motivate potential geotourists to choose specific destination brands. For instance, Cetinski et al. (2006) propose that there are 'elements of a destination's tourism offering that are of the utmost importance for tourism demand markets'. They mention some of the essential elements in their study and suggest that for example natural and cultural elements could affect destination brands. Besides, Dulău et al. (2010) consider the *appropriate management of tourist demand* a vital issue in promoting tourism and destination branding. There are a series of studies that both implicitly and explicitly highlight the importance of demand triggers (e.g. see, Dioko et al. 2011; Dryglas and Lubowiecki-Vikuk 2019). Therefore, we proposed the following hypothesis to investigate whether such demand triggers could affect the choice of a destination brand by geotourists or not.

H3 Demand triggers have a significant effect on the choice of a destination brand by geotourists.

Besides, social media platforms could be considered as useful tools for pushing demand triggers (Chatzigeorgiou and Christou 2020). For instance, by disseminating promotional campaigns and reminding potential geotourists about specific destination brands through reinforcing customer engagement and interactions, these platforms might improve the level of geotourism in specific locations (Agapito et al. 2017). A few scholars have marginally investigated this issue (e.g. see, Berselli et al. 2019; Duan et al. 2020). Therefore, by proposing the following hypothesis, we would like to scrutinise the possible impact of social media on the relationship between demand triggers and choosing a destination brand.

H3a Demand triggers that affect the choice of a destination brand by geotourists are moderated by social media.

Personal factors and previous travel experiences could also be a determinant for choosing a destination brand by geotourists. For instance, Jafari et al. (2017) investigated the factors affecting tourism destination brands. In their study, they mention some of the personal factors and previous travel experiences as critical elements in choosing destination brands. Several issues such as personal beliefs (Cascón-Pereira and Hernández-Lara 2014), inter-personal elements (Smith 2015), willingness (Nematolahi et al. 2017), personal issues (Božić et al. 2017), personal religious considerations (Różycki and Dryglas 2017), as well as personal

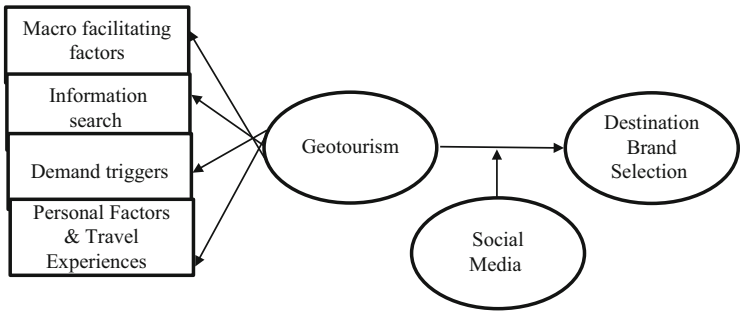

Fig. 1 The conceptual model of the research

experiences (Dryglas and Lubowiecki-Vikuk 2019) have been considered as critical elements for choosing destination brands. Thus, we proposed the following hypothesis accordingly.

H4 Personal factors and travel experiences have a significant impact on the choice of a destination brand by geotourists.

Finally, as social media platforms could affect personal factors and remind people of their previous travel experiences, this could affect the choice of a destination brand by geotourists (Hemmonsbey and Tichaawa 2018; Maia et al. 2018; Moghadamzadeh et al. 2020; Duan et al. 2020). This might be due to the various specifications of social media platforms, such as notifications of memories which could make people remember their previous travel experiences (Smith 2015; Agapito 2020). Therefore, we investigated the moderating effect of social media on the relationship between personal factors and travel experiences of geotourists on the choice of destination brand, using the following hypothesis.

H4a Personal factors and travel experiences that affect the choice of a destination brand by geotourists are moderated by social media.

Figure 1 shows the conceptual framework of the research, which includes the above-mentioned hypotheses.

5 Methodology

5.1 Sample

The statistical population of this study includes foreign tourists in three social media networks of Facebook, Instagram and Telegram in 2019 who had made at least one trip to selected geotourism destinations in Iran. In order to collect data, an immediately available sample of individuals who had the final say in the selection of Iran as the destination was selected as the study sample. As the number of individuals in the

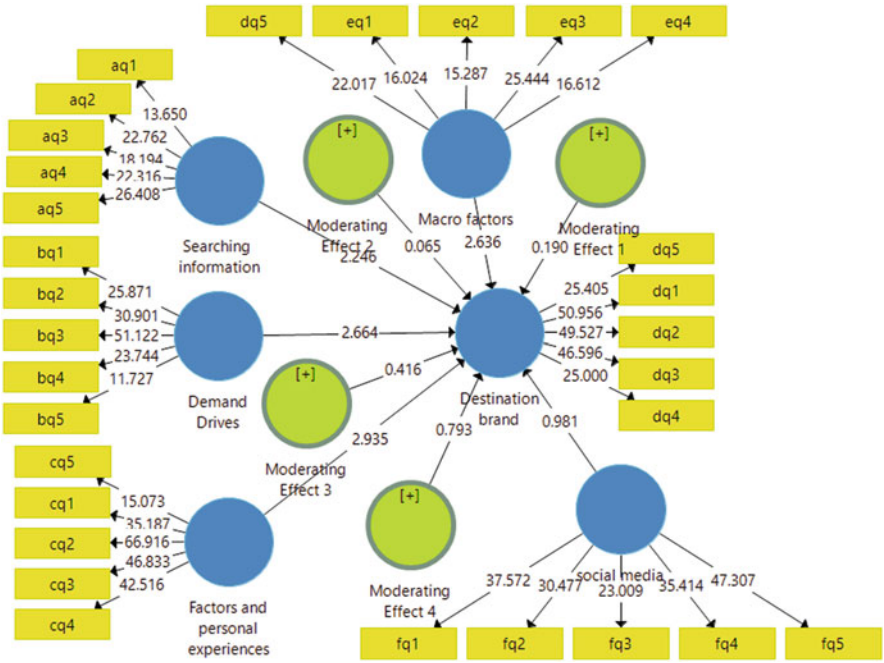

Fig. 2 T-statistics moderated by social media

statistical population could not be determined, the population size was considered unlimited; then, by referring to Krejcie and Morgan's (1970) table, a sample size of 384 individuals was determined. It is worth mentioning that communities with 100,000 people and more have been assigned a sample size of 384 individuals in this table. In the end, 327 valid questionnaires were collected from the sample. The data collection instrument is a researcher-made questionnaire whose content validity was confirmed by tourism experts, and its construct validity was confirmed through conducting a confirmatory factor analysis in the SmartPLS software. Also, the Cronbach's alpha coefficient was used to calculate the reliability of the questionnaire. In this instrument, answers to each question received different numerical values, which were considered as having acceptable reliability when they were above 0.7. The table shows the reliability of the questionnaire. Finally, the collected data were analysed with the Smart PLS 3.0 software (Fig. 2).

5.2 Reliability and Validity

In order to evaluate the relationships between the variables of the conceptual model, the data were collected with a questionnaire. The research questionnaire was designed based on a review of the literature and the model indices. It consists of

Table 1 The relationship between the variables and the questionnaire items

Variable	Dimensions	Items	Cronbach's alpha
Social media		1–5	0.943
Geo tourism	Macro facilitators	6–10	0.885
	Information search	11–15	0.900
	Demand triggers	16–20	0.902
	Personal factors and experience	21–25	0.934
Destination brand		26–30	0.947

two sections: the respondents' demographic information and the research questions which were designed across a five-point Likert scale from 1 (very low) to 5 (very high). Five questions were asked in order to measure each variable. Finally, Smart PLS 3.0 was used to analyse the data. This method involves a statistical model for examining the relationships between latent and observed variables. In order to ensure the accuracy of the research results, the technical features of the questionnaire were evaluated in terms of validity and reliability using different criteria (Henseler et al. 2015). Construct and content validity have been used in this study to examine the validity of the questionnaire. To this end, first, the questionnaire was given to five experts and faculty members to measure the content validity of the questionnaire; then, some modifications were made in the questionnaire according to their comments. Cronbach's alpha coefficient and combined reliability were used to evaluate the reliability of the instrument (Fornell and Larcker 1981). As can be seen in Table 1, Cronbach's alpha coefficients for all the variables are higher than the minimum acceptable value, i.e. 0.7, so it can be said that the research instrument has good reliability.

6 Findings

6.1 Descriptive Statistics

Table 2 shows the demographic information of the respondents.

6.2 Inferential Statistics

The partial least squares method was used in order to evaluate the reliability of the questionnaire. In this method, reliability is measured by two criteria: factor loadings and combined reliability. The loading factor is between 0 and 1, which indicates the power of the observed variable (question) in measuring the latent variable (main variable). The closer the number is to 1, the stronger will be the item. Also, items

Table 2 Demographic information

Gender	Frequency	Percentage	Age	Frequency	Percentage	of visits	Frequency	Percentage
Female	215	66	20–30	26	8	Once	117	36
Male	112	34	30–40	61	19	More than once	210	64
Total	327		40–50	153	47	Total	327	
			50+	84	26			
			Total	327				

Table 3 Composite and shared reliability and convergent validity

Variable	Dimension	Item	Factor loading	Composite Reliability	AVG	Reliability	R^2	R^2-adjusted
Social media		fq1	0.756	0.956	0.814	0.947		
		fq2	0.839					
		fq3	0.774					
		fq4	0.913					
		fq5	0.712					
Geotourism	Macro facilitators	eq1	**0.854**	0.916	0.686	0.889		
		eq2	**0.773**					
		eq3	**0.813**					
		eq4	**0.887**					
		eq5	**0.809**					
	Information search	aq1	**0.782**	0.926	0.716	0.901		
		aq2	**0.877**					
		aq3	**0.838**					
		aq4	**0.868**					
		aq5	**0.863**					
	Demand triggers	bq1	**0.854**	0.928	0.722	0.921		
		b12	**0.891**					
		bq3	**0.919**					
		bq4	**0.849**					
		bq5	**0.722**					
	Personal factors and travel experiences	cq1	**0.763**	0.951	0.795	0.943		
		cq2	**0.900**					
		cq3	**0.945**					
		cq4	**0.927**					
		cq5	**0.913**					
Destination brand		dq1	**0.879**	0.959	0.825	0.947	0.807	0.757
		dq2	**0.915**					
		dq3	**0.934**					
		dq4	**0.932**					
		dq5	**0.879**					

with loading factors greater than 0.4 are acceptable. The validity and reliability of the measurement model are reported in Table 3.

In this study, as shown in Table 2, all the coefficients indicate that this criterion is correct. All the factor loadings above 0.4% and at the 99% confidence level are significant, suggesting that the indicators explain the conceptual variables well. The results show that the Cronbach's alpha coefficient and the combined reliability of all the constructs are higher than the minimum acceptable value, i.e. 0.7. Therefore, the constructs of this study have acceptable reliability. Also, the Average Extracted Variance (AVE) and the reliability measures show that all the constructs have values higher than the minimum acceptable value, i.e. 0.5. Therefore, the constructs of this

Table 4 Divergent validity

	Demand triggers	Destination brand	Personal factors and travel experiences	Macro facilitators	Information search	Social media
Demand triggers	0.849					
Destination brand	0.784	0.908				
Personal factors and travel experiences	0.881	0.846	0.892			
Macro facilitators	0.797	0.810	0.797	0.828		
Information search	0.812	0.839	0.787	0.846	0.943	
Social media	0.902	0.790	0.831	0.808	0.887	0.940

study have acceptable convergent validity. According to the results (Table 3), all the indicators have AVE values higher than 0.5, which demonstrate their convergent validity.

In order to evaluate the convergent and divergent validity, the average variance extracted (AVE) and the root of AVE measures was used, respectively. As Table 4 shows, the AVE values are higher than the minimum acceptable value of 0.5. Therefore, the research variables have convergent validity. Additionally, since the AVE values are higher than the correlation of the respective variable with the other variables, divergent validity is only acceptable if the numbers on the main diagonal are higher than the numbers below it (Fornell and Larcker 1981). Therefore, we can say that the variables are valid, and their convergent validity is also confirmed.

Based on the above and the output of the SmartPLS 3.0 software in Tables 3 and 4, the measurement model has good reliability. The model was examined at three levels of measurement, structure and its general design in order to evaluate its fit (Hair et al. 2018). Several criteria are used to evaluate the fit of a structural model by using the partial least squares regression method. The primary criterion is the significance coefficients or the t-statistics, where they must be greater than 1.96 to be confirmed at the 95% confidence level. The second criterion for assessing the fit of a structural model is the R^2 coefficients which capture the endogenous latent variables of the model. R^2 is a measure that shows the effect of exogenous variables on an endogenous variable, and 0.19, 0.33, and 0.67 are considered weak, moderate, and strong R^2 values (Fornell and Larcker 1981). In this study, a strong R^2 value was obtained ($R^2 = 0.807$, which is higher than 0.67); therefore, the structural model has a good fit according to this criterion.

The overall fit of a model takes into account both its measurement and structural features. Therefore, the overall fit of a model can be assessed with the help of a GoF test. The GoF test returned a value of 0.962 for the research model, which indicates a very good overall fit. The GoF values range between 0 and 1 with the cut-off values of 0.1, 025, and 0.36, which have been considered as poor, acceptable and good,

Table 5 T-statistics and coefficients

Path	Impact coefficient	T-statistic	Result
H1	0.180	2.636	Confirmed
H1a	−0.062	0.190	Rejected
H2	0.743	2.246	Confirmed
H2a	−0.017	0.065	Rejected
H3	0.228	2.664	Confirmed
H3a	−0.100	0.416	Rejected
H4	0.454	2.935	Confirmed
H4a	0.219	0.793	Rejected

respectively. A GoF value of 0.962 for this criterion indicates a strong overall fit for the research model.

6.3 Hypotheses Testing

At this stage, the t-statistics have been used to investigate the proposed relationships between the variables. Four sub-hypotheses have been used to measure the main hypothesis, and according to Table 5, the t-statistics in the eight relationships have been confirmed. Therefore, the main hypothesis was confirmed. To determine the effect of predictor variables on dependent variables, the standardised coefficients of the factor loadings related to the pathways of each hypothesis were investigated. These coefficients indicate that change in dependent variables is captured up to a few per cent by independent variables.

7 Conclusion

Social media has changed the way people relate to different aspects of their lives and how they decide to travel. People use social media to obtain information to plan their travels, and they also share their experiences on social media by, for example making comments and recommending places and activities (e.g. see, Mokarram and Sathyamoorthy 2016; Pilogallo et al. 2019). Also, opportunities exist in the environment and are waiting to be discovered; hence, those with a greater level of human capital are able to discover opportunities more consciously (e.g. see, Tavallaei et al. 2012; Chitsaz et al. 2019). This research is a model for examining the variables that play a role in choosing a destination brand. It can be said that all the hypotheses that indicate a direct impact are confirmed; however, when social media is introduced as a moderating variable, it is not significant enough to affect the results. This could mean that simply sharing photos and videos of Iran's attractions is not enough to choose a destination in the minds of prospective tourists.

The results of this study show that the Information search component has the most impact on the choice of a destination brand. Therefore, information plays an important role in attracting geotourists. Facilities, insurance companies, travel agencies and accommodation centers play an important role in providing information. There should be a communication network between these different institutions that are involved in geotourism, and they should adopt a more integrative approach in implementing promotion and marketing activities. Also, timely promotion activities that provide tourists with information could result in the attraction of more geotourists to Iran. That is why an integrated promotion network is particularly essential (Ratten et al. 2019b).

In the same line, the officials of the Cultural Heritage and Tourism Organisation are suggested to launch promotion platforms by creating official websites and social networks on the Internet to introduce Iranian geotourism destinations better. It is also recommended that short films be made and shared on social media since they could act as local guides and provide the audience with the needed information about the destinations. Additionally, there are highly visited websites whose services could be purchased for promoting geological destinations in Iran. The Arabic and English languages can be used to promote and introduce touristic centers and the types of services that are provided. Cumbersome rules and regulations that have made room for brokers prevent entrepreneurs from operating in this field and should be therefore eliminated. Finally, it can be said that social media could be used to encourage prospective tourists to visit a particular commercial place. For this reason, and in the absence of professional management of social media by municipalities and tourism agencies, it is recommended that the cities of Iran use social media wisely to share interesting features and facts about their attractions. One of the limitations of this research was the difficulty of communicating with the individuals in the research sample who were foreign tourists.

Funding No grant funding was used to support the writing of this manuscript.

Conflicts of Interest/Competing Interests The authors have declared no conflicts of interest.

Authors' Contributions All authors read and approved the final manuscript. All authors collaborated on the conceptualisation, methodology design, data gathering, writing the manuscript, revising the manuscript and providing comments to the manuscript.

References

Adem Esmail B, Suleiman L (2020) Analysing evidence of sustainable urban water management systems: a review through the lenses of sociotechnical transitions. Sustainability 12(11):4481

Agapito D (2020) The senses in tourism design: a bibliometric review. Ann Tour Res 83:102934

Agapito D, Baggio R, Buffa F, Cannatella D, Cárdenas D, Castela G, Córdoba ML (2017) Knowledge transfer to and within tourism. In: Bridging tourism theory and practice, vol 8. Emerald Publishing, pp 313–325

Awaritefe OD (2004) Destination image differences between prospective and actual tourists in Nigeria. J Vacat Mark 10(3):264–281

Bahak B (2016) The study of tourism, ecotourism geotourism potentials of Dasht-e-Kavir. J Tour Hosp Res 5(1–2):33–41

Bañegil-Palacios TM, Sánchez-Hernández MI (2018) The challenge to foster foreign students' experiences for sustainable higher educational institutions. Sustainability 10(2):495

Bastaman A (2018) Bandung City branding: exploring the role of local community involvement to Gain City competitive value. J Entrepren Bus Econ 6(1):144–165

Berselli C, Tricárico LT, Rossini DDM (2019) Heritage signs and symbols in marketing actions: is a relationship possible? Considerations from the advertising of National Sweets Fair (Fenadoce) in Pelotas, RS, Brazil. Rev Bras Pesquisa Turismo 13(1):72–91

Bhattacharya S, Kumar RV (2017a) A RIDIT approach to evaluate factors influencing tourist destination brand selection behaviour pertaining to Indian tourism sector. J Model Manag 12(4):583–602

Bhattacharya S, Kumar RV (2017b) Modeling tourists' opinions using RIDIT analysis. In: Handbook of research on holistic optimisation techniques in the hospitality, tourism, and travel industry. IGI Global, pp 423–443

Boley BB, Nickerson NP, Bosak K (2011) Measuring geotourism: developing and testing the geotraveler tendency scale (GTS). J Travel Res 50(5):567–578

Boley BB, Magnini VP, Tuten TL (2013) Social media picture posting and souvenir purchasing behavior: some initial findings. Tour Manag 37:27–30

Boley BB, Jordan EJ, Kline C, Knollenberg W (2018) Social return and intent to travel. Tour Manag 64:119–128

Božić S, Jovanović T, Tomić N, Vasiljević DA (2017) An analytical scale for domestic tourism motivation and constraints at multi-attraction destinations: the case study of Serbia's Lower and Middle Danube region. Tour Manag Perspect 23:97–111

Brown S, Campelo A (2014) Do cities have broad shoulders? Does Motown need a haircut? On urban branding and the personification of place. J Macromark 34(4):421–434

Cascón-Pereira R, Hernández-Lara AB (2014) The Morocco brand from the Moroccan emigrants' perspective. Place Brand Public Dipl 10(1):55–69

Cetinski V, Perić J, Smolčić Jurdana D (2006) The "umbrella" brand and branding process in the Kvarner destination. Tour Hospit Manage 12(2):103–110

Chan CS, Zhang Y (2018) Matching projected image with perceived image for geotourism development: a qualitative-quantitative integration. Asian Geogr 35(2):143–160

Chatzigeorgiou C, Christou E (2020) Adoption of social media as distribution channels in tourism marketing: a qualitative analysis of consumers' experiences. J Tour Herit Serv Mark 6(1):25–32

Chitsaz E, Tajpour M, Hosseini E, Khorram H, Zorrieh S (2019) The effect of human and social capital on entrepreneurial activities: a case study of Iran and implications. Entrepren Sustain Issues 6(3):1393–1403

Dioko L, Harrill R, Bowman KS (2011) Sustainable tourism certification and state capacity: keep it local, simple, and fuzzy. Int J Cult Tour Hospit Res 5(3):269–228

Dryglas D, Lubowiecki-Vikuk A (2019) Image of Poland as perceived by German and British medical tourists. Tour Rev 74(4):861–871

Duan X, Marafa LM, Chan CS, Xu H, Cheung LT (2020) Measuring the gaps in the projected image and perceived image of rural tourism destinations in China's Yangtze River Delta. Sustainability 12(12):5121

Duarte A, Braga V, Marques CS (2018) How smart specialisation strategies in geotourism contribute to local economic development? The case of Atlantic Geoparks. In: International conference on innovation, engineering and entrepreneurship. Springer, Cham, pp 1005–1011

Duarte A, Braga V, Marques C, Sá AA (2020) Geotourism and territorial development: a systematic literature review and research agenda. Geoheritage 12(3):1–19

Dulău AV, Coroş MM, Coroş M (2010) The place of the public administration and gastronomic heritage in the destination branding and tourism promotion. WSEAS Trans Bus Econ 7(4):402–413

Ebrahimi P, Hajmohammadi A, Khajeheian D (2020) Place branding and moderating role of social media. Curr Issue Tour 23(14):1723–1731
Eshraghi M, Ahmad H, Toriman ME (2012) Contribution of geomorphological assessment for sustainable geotourism: a case of Iran's desert. Adv Environ Biol 6(3):1188–1195
Estima DC, Ventura MAM, Rabinovici A, Martins FMCPF (2014) Concession in tourism services and partnerships in the marine National Park of Fernando de Noronha, Brazil. Rev Gestão Costeira Integrada-J Integr Coastal Zone Manage 14(2):215–232
Estiri M, Amiri NS, Khajeheian D, Rayej H (2018) Leader-member exchange and organisational citizenship behavior in hospitality industry: a study on effect of gender. Eurasian Bus Rev 8(3):267–284
Ezebilo EE (2014) Choosing ecotourism destinations for vacations: a decision-making process. Asian Soc Sci 10(2):1–10
Fang B, Ye Q, Law R (2016) Effect of sharing economy on tourism industry employment. Ann Tour Res 57(3):264–267
Farsani NT, Coelho CO, Costa CM (2012) Tourism crisis management in geoparks through geotourism development. Rev Turismo Desenvolvimento 17(18):1627–1638
Farsani NT, de Carvalho CN, Xu K (2018) Education as a key tenet of geotourism. In: Handbook of Geotourism. Edward Elgar Publishing
Fatanti MN, Suyadnya IW (2015) Beyond user gaze: how Instagram creates tourism destination brand? Procedia Soc Behav Sci 211:1089–1095
Fornell C, Larcker DF (1981) Evaluating structural equation models with unobservable variables and measurement error. J Mark Res 18(1):39–50
Foroudi P, Gupta S, Kitchen P, Foroudi MM, Nguyen B (2016) A framework of place branding, place image, and place reputation: antecedents and moderators. Qual Mark Res 19(2):241–264
Freire J (2005) Geo-branding, are we talking nonsense? A theoretical reflection on brands applied to places. Place Branding 1(4):347–362
Freire JR (2006) 'Other tourists': a critical factor for a geo-brand-building process. Place Branding 2(1):68–83
Ghazi JM, Ólafsdóttir R, Tongkul F, Ghazi JM (2013) Geological features for geotourism in the western part of Sahand Volcano, NW Iran. Geoheritage 5(1):23–34
Gil-Saura I, Ruiz-Molina ME, Berenguer-Contrí G (2013) Facilitators and inhibitors of technologies to tackle climate change: opinions of government and private actors. In: Climate change governance. Springer, Berlin, pp 309–318
Green RJ (2017) Disturbing skippy on tour: does it really matter? Ecological and ethical implications of disturbing wildlife. In: Wildlife tourism, environmental learning and ethical encounters. Springer, Cham, pp 221–233
Habibi T, Ruban DA (2017) Outstanding diversity of heritage features in large geological bodies: the Gachsaran formation in Southwest Iran. J Afr Earth Sci 133:1–6
Habibi T, Ruban DA (2018) Geoheritage of the Neyriz ophiolite-related radiolarite sequence (cretaceous; Southwest Iran): first report and evaluation in regional and global contexts. J Afr Earth Sci 145:227–233
Habibi T, Ponedelnik AA, Yashalova NN, Ruban DA (2018) Urban geoheritage complexity: evidence of a unique natural resource from Shiraz city in Iran. Resour Policy 59:85–94
Hair JF, Sarstedt M, Ringle CM, Gudergan SP (2018) Advanced issues in partial least squares structural equation modeling. Sage, Los Angeles
Hamidi F, Shams Gharneh N, Khajeheian D (2020) A conceptual framework for value co-creation in service enterprises (case of tourism agencies). Sustainability 12(1):213
Harrigan P, Evers U, Miles M, Daly T (2017) Customer engagement with tourism social media brands. Tour Manag 59:597–609
Hassan SS, Einafshar A (2012) A tourism demand based method of geosites assessment on geotourism prioritisation modeling: the case of Razavi Khorasan Province. J Hosp Manage Tour 3(5):82–94

Hays S, Page SJ, Buhalis D (2013) Social media as a destination marketing tool: its use by national tourism organisations. Curr Issue Tour 16(3):211–239
Hemmonsbey JD, Tichaawa TM (2018) The effects of major sport event leveraging for tourism and destination branding: the case of South Africa as an emerging destination. GeoJ Tour Geosites 11(1):213–225
Henseler J, Ringle CM, Sarstedt M (2015) A new criterion for assessing discriminant validity in variance-based structural equation modeling. J Acad Mark Sci 43(1):115–135
Ilieș G, Ilieș M (2015) Identity based geo-and tourism branding strategies derived from rural Maramureș land (Romania). GeoJ Tour Geosites 8(2):179–186
Jafari V, Najjarzadeh M, Feizabadi ZK (2017) Survey factors affecting tourism destination brand equity (case study: Savadkuh County). J Tour Plan Dev 6(20):75–93
Khoshraftar R, Farsani NT (2019) Geomythology: an approach for attracting geotourists (case study: Takht-e Soleymān–Takab world heritage sites). Geoheritage 11(4):1879–1888
Krejcie RV, Morgan DW (1970) Sample size determination table. Educ Psychol Meas 30:607–610
Lee W, Chhabra D (2015) Heritage hotels and historic lodging: perspectives on experiential marketing and sustainable culture. J Herit Tour 10(2):103–110
Maghsoudi M, Rahmati M (2018) Geomorphosites assessment of Lorestan province in Iran by comparing of Zouros and Comanescu's methods (case study: Poldokhtar area, Iran). GeoJ Tour Geosites 21(1):226–238
Maghsoudi M, Moradi A, Moradipour F, Nezammahalleh MA (2019) Geotourism development in world heritage of the Lut Desert. Geoheritage 11(2):501–516
Maia C, Lunardi G, Longaray A, Munhoz P (2018) Factors and characteristics that influence consumers' participation in social commerce. Rev Gestão 25(2):194–211
Miguéns J, Baggio R, Costa C (2008) Social media and tourism destinations: TripAdvisor case study. Adv Tour Res 26(28):1–6
Millaningtyas R, Hatneny AI (2019) Creative economic development model based on coconut products through business mentoring. J Entrepren Bus Econ 6(2):115–131
Moghadamzadeh A, Ebrahimi P, Radfard S, Salamzadeh A, Khajeheian D (2020) Investigating the role of customer co-creation behavior on social media platforms in rendering innovative services. Sustainability 12(17):6926
Mokarram M, Sathyamoorthy D (2016) Relationship between landform classification and vegetation (case study: southwest of Fars province, Iran). Open Geosci 8(1):302–309
Mokhtari D, Roostaei S, Khodadadi M, Ahmadi M, Ebrahimi O, Shahabi H (2019) Evaluation of the role of environmental education in Manesht and Ghelarang Geotourism destination, Iran. J Qual Assur Hosp Tour 20(6):681–708
Molchanova TK, Ruban DA (2019) New evidence of the Bangestan geoheritage resource in Iran: beyond hydrocarbon reserves. Resources 8(1):35
Momeni K, Janati A, Imani A, Khodayari-Zarnaq R (2018) Barriers to the development of medical tourism in East Azerbaijan province, Iran: a qualitative study. Tour Manage 69:307–316
Moradipour F, Moghimi E, Beglou MJ, Yamani M (2020) Assessment of urban geomorphological heritage for urban geotourism development in Khorramabad City, Iran. Geoheritage 12(2):40
Mousazadeh H, Éva I, Akbarzadeh F (2018) The effect of social networks on oral advertisements and tourists feelings in northern Iranian Rivers. J Tour Hosp Res 7(1–2):83–96
Mulec I, Wise N (2012) Strategic guidelines for the potential geotourism destination Titel Loess Plateau (Vojvodina region, Serbia). Geoheritage 4(3):213–220
Munar AM, Jacobsen JKS (2013) Trust and involvement in tourism social media and web-based travel information sources. Scand J Hosp Tour 13(1):1–19
Munar AM, Jacobsen JKS (2014) Motivations for sharing tourism experiences through social media. Tour Manag 43:46–54
Mwesiumo D, Halpern N (2019) A review of empirical research on interorganizational relations in tourism. Curr Issue Tour 22(4):428–455
Nelson V (2014) Representations of a destination brand in online tourism information sources: the case of Slovenia. Tour Cult Commun 14(1):41–52

Nematolahi M, Najjarzadeh M, Balochi H (2017) Assessment the level sustainability of rural destinations to achieve rural tourism development with destination image modifier (case study: Derak Dehestan-Shiraz County). J Res Rural Plan 5(4):155–174
Németh K, Casadevall T, Moufti MR, Marti J (2017) Volcanic geoheritage. Geoheritage 9:251–254
Ólafsdóttir R, Tverijonaite E (2018) Geotourism: a systematic literature review. Geosciences 8(7):234
Oliveira A, Braga V, Silva EC (2018) Internationalisation strategies for tourism in Portugal. In: International conference on innovation, engineering and entrepreneurship. Springer, Cham, pp 978–984
Park S, Kim DY (2010) A comparison of different approaches to segment information search behaviour of spring break travellers in the USA: experience, knowledge, involvement and specialisation concept. Int J Tour Res 12(1):49–64
Pawłowska A, Matoga Ł, Stach E (2015) The use of information and communication technologies (ICTs) in tourist information and promotion of the polish Carpathians in foreign tourism markets. J Travel Tour Mark 32(5):554–577
Pilogallo A, Nolè G, Amato F, Saganeiti L, Bentivenga M, Palladino G, Las Casas G et al (2019) Geotourism as a specialization in the territorial context of the Basilicata region (southern Italy). Geoheritage 11(4):1435–1445
Pourahmad A, Hosseini A, Pourahmad A, Zoghi M, Sadat M (2018) Tourist value assessment of geotourism and environmental capabilities in Qeshm Island, Iran. Geoheritage 10(4):687–706
Prendivoj SM (2018) Tailoring signs to engage two distinct types of geotourists to geological sites. Geosciences 8(9):329
Radovic Markovic M, Salamzadeh A (2012) The nature of entrepreneurship: entrepreneurs and entrepreneurial activities. Lap Lambert Academic Publishing, Berlin
Ranjbaran M, Zamanzadeh SM, Sotohian F (2020) Geotourism attractions of Hormuz Island, Iran. GeoJ Tour Geosites 28(1):232–245
Ratten V, Duarte A, Marques CS, Braga V (2018) Sustainable transformational entrepreneurship at Arouca UNESCO geopark, Portugal. In: Transformational entrepreneurship. Routledge, London, pp 37–46
Ratten V, Braga V, Álvarez-García J, Del Río MDLC (2019a) Tourism innovation: technology, sustainability and creativity. Routledge, London
Ratten V, Braga V, Álvarez-García J, Del Rio MDLC (2019b) Future trends in tourism innovation. In: Tourism innovation. Routledge, London, pp 166–171
Robertson MH (2015) Heritage interpretation, place branding and experiential marketing in the destination management of geotourism sites. Transl Spaces 4(2):289–309
Rozenkiewicz A, Widawski K, Jary Z (2020) Geotourism and the 21st century–NTOs' website information availability on geotourism resources in selected central European countries: international perspective. Resources 9(1):1–4
Różycki P, Dryglas D (2017) Mining tourism, sacral and other forms of tourism practiced in antique mines-analysis of the results. Acta Montan Slovaca 22(1):1–15
Sadry BN (2009) Fundamentals of geotourism with a special emphasis on Iran. Samt Organization, Tehran (in Persian)
Safarabadi A, Shahzeidi SS (2018) Tourism silence in geomorphosites: a case study of Ali-Sadr cave (Hamadan, Iran). GeoJ Tour Geosites 21(1):49–60
Salamzadeh A (2020) What constitutes a theoretical contribution? J Org Cult Commun Confl 24(1):1–2
Salamzadeh A, Dana LP (2020) The coronavirus (COVID-19) pandemic: challenges among Iranian startups. J Small Bus Entrepr:1–24
Salamzadeh A, Kesim HK, Salamzadeh Y (2016) Entrepreneurial universities and branding: a conceptual model proposal. World Rev Sci Technol Sustain Dev 12(4):300–315
Salamzadeh A, Arasti Z, Elyasi GM (2017) Creation of ICT-based social start-ups in Iran: a multiple case study. J Enterp Cult 25(01):97–122

Salamzadeh A, Ebrahimi P, Soleimani M, Fekete-Farkas M (2021) An AHP approach to identify the barriers of sustainable geotourism development in Iran: an economic view. Geoheritage 13 (3):1–11

Shafiei Z, Farsani NT, Abdollahpour M (2017) The benefit of geo-branding in a rural geotourism destination: Isfahan, Iran. Geoj Tour Geosites 19:96–103

Shahhoseini H, Modabberi S, Shahabi M (2017) Study of factors influencing the attitude of local people toward geotourism development in Qeshm National Geopark, Iran. Geoheritage 9(1):35–48

Smith S (2015) A sense of place: place, culture and tourism. Tour Recreat Res 40(2):220–233

Soliman MS, Abou-Shouk MA (2017) Predicting behavioural intention of international tourists towards geotours. Geoheritage 9(4):505–517

Tajpour M, Salamzadeh A (2019) The effect of spiritual intelligence on organisational entrepreneurship: case study of educational departments in University of Tehran. Int J Manage Enterp Dev 18(3):205–218

Tavallaei S, Rashidi EHA, Fathi M, Farzaneh M, Mousavi S (2012) The evaluation of the geo-tourism for urban development: a case study in Ajabshir city, Iran. J Civil Eng Urban 2(2):80–85

Tikoudi A, Dimou I, Kourgiantakis M (2016) Local population's perceptions of the impact and potential of disaster tourism in Montserrat, West Indies. Tour Today 16:71–93

Torabi Farsani N, Coelho C, Costa C (2012) Geotourism and geoparks as gateways to socio-cultural sustainability in Qeshm rural areas, Iran. Asia Pac J Tour Res 17(1):30–48

Tormey D (2019) New approaches to communication and education through geoheritage. Int J Geoheritage Parks 7(4):192–198

Widawski K, Rozenkiewicz A, Łach J, Krzemińska A, Oleśniewicz P (2018a) Geotourism starts with accessible information: the Internet as a promotional tool for the georesources of Lower Silesia. Open Geosci 10(1):275–288

Widawski K, Rozenkiewicz A, Łach J, Krzemińska A, Oleśniewicz P (2018b) Geotourism starts with accessible information: the Internet as a promotional tool for the georesources of Lower Silesia. Open Geosci 10(1):275–288

Wozniak T, Stangl B, Schegg R, Liebrich A (2017) The return on tourism organisations' social media investments: preliminary evidence from Belgium, France, and Switzerland. Inf Technol Tour 17(1):75–100

Yalgouz-Agaj AG, Ardebil L, Karimdoust S (2010) Identification of some of the geotourism sites in Iran. World Appl Sci J 11(11):1342–1347

Zeng B, Gerritsen R (2014) What do we know about social media in tourism? A review. Tour Manag Perspect 10:27–36