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Astrotourism: No Requiem for Meaningful Travel

Eduardo Fayos-Solá*
Ulysses Foundation

Cipriano Marín**
Starlight Initiative

Jafar Jafari***
The Tourism Intelligence Forum

Abstract: Astrotourism is an activity of travelers wishing to use the natural resource of well-kept nightscapes for astronomy-related leisure and knowledge. This practice has increased in popularity during the past few years, adding value to offbeat tourism destinations offering high quality night skies and astronomical or archaeoastronomical heritage. Astrotourism initiatives contribute to the dissemination of knowledge and human capital formation, both among the visitors and within the host community. Therefore, it can act as a potential instrument for development. The best destinations for astrotourism have very special characteristics, which makes for a likely favorable strategic positioning in domestic and even international markets. However, astrotourism consumers demand high knowledge content and excellent quality in their visits. This requires a professional approach to resource use and conservation, product development, and adequate provision of ancillary services in the destination. A sophisticated tourism policy and governance is a must for successful launch and operation of astrotourism.

Keywords: Astrotourism, scientific tourism, human capital, natural and cultural heritage, tourism policy, governance.

Astroturismo: No réquiem por un turismo con significado

Resumen: El astroturismo, entendido como actividad lúdico-científica, ha crecido considerablemente en los últimos años. Se han puesto en valor importantes recursos naturales y culturales vinculados a la buena conservación de paisajes y patrimonios en el ámbito de la astronomía. Su práctica contribuye a la diseminación científica y la formación de capital humano, tanto entre los turistas usuarios como en las comunidades anfitrionas, por lo que puede contribuir al desarrollo. Los destinos turísticos con posibilidades para su articulación tienen características singulares, lo que permite un buen posicionamiento en los mercados, incluso a nivel internacional. Sin embargo, las exigencias de contenido en conocimiento y de calidad de los productos de astroturismo son altas, por lo que es recomendable un planteamiento profesional de esta actividad, valorando adecuadamente la estructura de factores, productos y servicios soporte del destino turístico considerado, y las medidas de política turística y gobernanza necesarias para su buen lanzamiento y desarrollo.

Palabras Clave: Astroturismo, turismo científico, capital humano, patrimonio cultural y natural, política turística, gobernanza**.**

* Ulysses Foundation; E-mail: president@ulyssesfoundation.org
** Starlight Initiative, E-mail: c.marin@unescocan.org
*** The Tourism Intelligence Forum, E-mail: jafari@thetourismforum.com

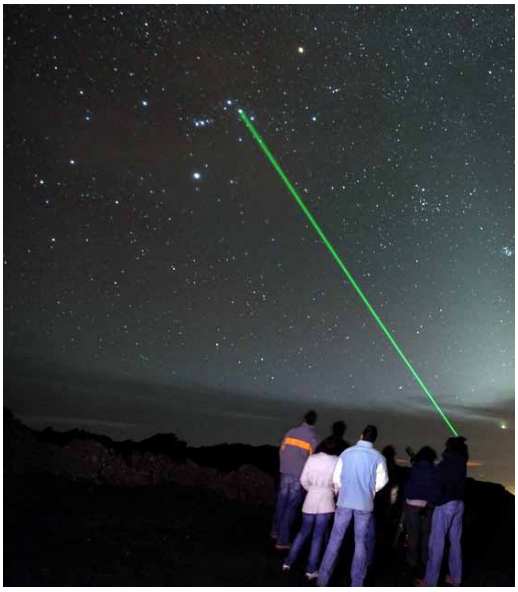
1. Introduction

Even as the primogenial mass travel paradigm shows resilience, and renewed impetus, new kinds of tourism have emerged since the start of the 21st century. More educated and seasoned travelers are demanding knowledge-rich experiences, and the industry perceives the need for specialization as an element of competitiveness. There is also a heightened feeling for community participation, and tourism may be at the dawn of an era of greater rationality and real contribution to the needs of human development. Hence, in this context and in the face of growing competition among destinations, the archetypical foundation resources for tourism, natural and cultural factors, are subject to increasing pressure to offer meaningful experiences. All in all, two key human urges must be properly addressed in destinations: the life drive, *eros*, including the appetite for content, enjoyment, sharing, and satisfaction, and the knowledge drive, *epistemophilia*, including the compulsion for information, education, understanding and new solutions to deep existential questions. Different emphases on these two different urges/drives mark the distinction between "traditional/mass" (psychocentric) tourists and new "voyageur/explorer" (allocentric) tourists (Plog, 1974; Litvin, 2006; Valsiner, 2013: 5-6) as well as amidst the corresponding destinations of choice.

In this framework, the concept of astrotourism is acquiring new meanings and insights (Jafari, 2007), from the original significance of "leisure activities of travelers paying to fly into space for recreation", to "tourism using the natural resource of unpolluted night skies, and appropriate scientific knowledge for astronomical, cultural or environmental activities" (Fayos-Solà and Marín, 2009:5). The StarLight Declaration states that "[astrotourism]… opens up unsuspected possibilities for cooperation among tourism stakeholders, local communities, and scientific institutions" (Jafari, Fayos-Solà, and Marin (2007:4). In a broad sense, astrotourism now focuses on travelling for the purpose of astronomy related purposes or simply doing amateur astronomy activities during the journeys. Additionally, some cultural resources, including archaeological sites at Stonehenge, Chichen Itzá, Giza, Chankillo, Mesa Verde, Persepolis, Almendres, Gochang or Chaco Canyon, have also proven to have an astrotourism potential, enabling the development of *archaeoastronomy* experiences for the general public, as well as offering research opportunities for specialists (Fayos-Solà, Marín, and Rashidi, 2014). Similar arguments can be made for other scientific resources of physics and astrophysics, including observatories, laboratories, advanced technology installations and science museums, as well as even for knowledge itself (Burtnyk, 2000; Marin, Wainscoat, and Fayos-Solà, 2010; Fayos-Solà and Jafari, 2010; Weaver, 2011; Kossack, 2013).

This evolution of astroturism is of special relevance at a time when the dissemination of science and scientific ethics and methodology may be the key to prosperity and the wellbeing of contemporary societies (UNESCO, 1999, 2002; ESC, 2013; European Commission, 2014), as well as the way to avoid or mitigate the effects of climate change and other human- and nature-caused disasters (Bunde, Kropp, and Schellnhuber, 2002; Smolin, 2013: 217-30). It can be argued that tourism has often internalized 19th century thinking, in adopting a rather arbitrary separation between "nature" and "human-made" experiences. Some types of tourism would hence be based on natural resources, while others are artificial constructs. Similarly, there would be poorly designed destinations and products, causing profound negative impacts on natural environments (as well as on sociocultural systems), while other destinations and experiences would belong in a "sustainable tourism" category, minimizing adverse effects.

Figure 1



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But the distinction between a supposedly pristine natural world and the sphere of human activities has ceased to be useful, both in society at large and in tourism. It is high time to recognize that all of

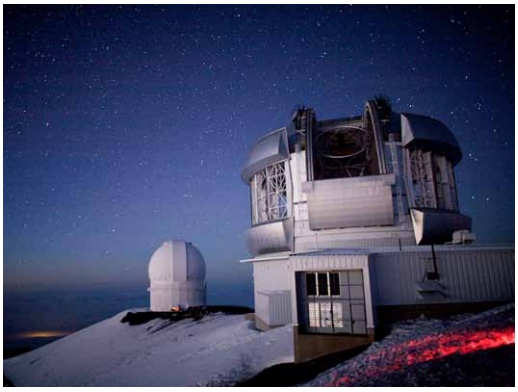
mankind's activities, tourism included, take place in the midst of nature, and do impact on natural resources and ecosystems. The question is whether tourism can contribute both to the long-term equilibrium of these ecosystems and simultaneously to community development, and how this process can be guided with proper mobilization of institutions, policies, and human capital.

It is at this point when the concept and practice of astrotourism can become extremely relevant. Astrotourism is probably one of the most effective ways to bring tourism and tourists closer to nature for a comprehension of the physical world systems and dynamics. It serves both the purpose of meaningful tourism (contributing to the dissemination of scientific values and human capital formation) and to the conservation of essential resources, such as unpolluted nightscapes, as well as to host communities' appreciation of conservation policies (institutional capital development). Astrotourism can hence become a key constituent of tourism as an instrument for development (Fayos-Solà, Alvarez, and Cooper, 2014).

2. New resources and meanings

Astrotourism epitomizes the tendencies towards more meaningful tourism experiences, based on conservation of natural resources, knowledge, and science, potentially enriching the traveler and the host communities. In the recent years, astrotourism has gained its pace in the list of tourism motivations and thus it should not be taken lightly. However, its progress will continue to depend on its professional integration into advanced destination management and governance systems.

Figure 2



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From a demand perspective, astrotourism clienteles are quite varied, ranging from the general public to amateur and even professional astronomers. Of course this ample spectrum of customers requires competent provisions from both destinations and entrepreneurial initiatives. In parallel, the scientific community has also been interested in astrotourism, as a way to appeal to young scientists and amateurs, a means to disseminate knowledge, and a vehicle to engage the understanding and approval of taxpayers, donors, and investors. In a historical perspective, amateur astronomy has its origins in the late 19th century, at a time when increased professionalization of astronomers required a differentiation of practitioners' types, while "hard core" astronomy could still continue to benefit from non-professional contributors widespread around the globe. Actually, amateurs and "astronomical societies" have pre-dated the concept and practice of astrotourism, and greatly assisted in its recent consolidation. The popularity of amateur astronomy and increasingly affordable equipment provide a best case and scenario for the dissemination of scientific ethic and method beyond the laboratory or observatory walls (Kannappan, 2001). Interest in astronomy increased with the success of sci-fi literature (from Jules Verne and H.G. Wells onwards), the popular appeal of scientific pioneers, such as Percival Lowell, and then with the rapid advances of space exploration technology from the 1950s. It reached a high with the first human space flights in the 1960s, culminating with the successful landing on the moon in 1969. Then, as the rationalist values and scientific progress vision of the post-war era began to vanish in US society by the 1970s, so did passion for the space program in general and space exploration in particular. Astrotourism had to wait for a new generation of citizens, concerned with the great dilemmas of the 21st century, and interested afresh in scientific answers to progress and development.

Additionally, when adopting a supply viewpoint, not all locations are apt to become a player in astrotourism's growing offer, similar to other natural resource-based tourism destinations and experiences, The main resource for astrotourism is a high quality night sky, but this is very sensitive to atmospheric conditions and light pollution. Atmospheric conditions are not controllable, and depend on the site chosen and weather develpment during the night. The astronomical term "seeing" refers to absence of turbulence. Good seeing, with little or no blurring and twinkling of astronomical objects, means that a magnification of 400-500x will be possible with a good 10 inch (25 cm) aperture telescope. "Extinction" (lack of air "transparency") refers to other causes of light degradation when

passing through the atmosphere and colliding with atoms, molecules, droplets of water, dust, and more. It is hence clear that astrotourism locations with best "seeing" and "transparency" are to be preferred, which constitutes a primary filter for potential sites. This is an advantage for locations with unpolluted and diaphanous night skies, having specific resource, service, and product offerings. These include national/regional parks, unique astronomical or archaeoastronomical sites and events, as well as astronomical observatories. As it turns out, many of these astrotourism potential sites of excellence are at high elevation, away from sources of atmospheric contamination, and in rather dry areas. This often puts them geographically apart from traditional destinations, and provides unheard-of opportunities for out-of-the-beaten-track host communities.

However, availability of primary resources does not imply that the tourism activity will be successful. It has been shown (Fayos-Solà, and Alvarez, 2014) that measures must be taken to preserve the resources from undesirable impacts affecting sustainability, as well as ensuring that additional supporting services contribute to the tourism products' marketability, competitiveness, and improvement of community development in the destination. In this context, light pollution is perhaps the main impediment when considering resource conservation policies at an astrotourism site.

As already discussed, astrotourism entails stargazing locations, and often heritage sites, observatories, or natural dark-sky areas of outstanding beauty. The common condition is to have a clear dark sky to see astronomical objects. However, dark skies are becoming a scarce resource as light pollution increases. Humankind has for millennia admired the spectacle of the night skies, speculated, dreamed, and on occasion built scientific theories and actual practice such as agriculture on these theories. Yet, today, for the first time in human history, a majority of celestial objects can no longer be seen from cities and wide surrounding areas. Up to the 1970s, many major cities in Europe, North America, and the rest of the globe had an observatory. These observatories conducted research on various scales, but were in general also open regularly for visits, thus actively engaging the public. Good examples, still existing, of these·historical astronomic sites in urban areas are the Royal Observatory in Greenwich (UK), and the Griffith and Lowell Observatories (USA) among many other. However, this practice has ended in most sites, partly because of lesser interest from the public, but mainly due to increased light pollution in and around urban locations (Spennemann, 2008).

Nowadays, countries such as Chile, South Africa, Portugal, Canada, Namibia, New Zealand, Spain, and the United States, as well as specific regions like La Palma, Alqueva, Baja California, La Serena, Antofagasta, Tekapo, Western Australia or Hawaii, have invested in protected "StarLight" and "Dark Sky" areas, often through astronomical associations and astrotourism startups (Rashidi, 2012; Collison and Kevin, 2013; Fayos-Solà et al, 2015). Light pollution in cities has essentially given rise to the modern phenomenon of astrotourism. In order to experience the night sky and to be able to see the fainter celestial objects, the vast majority of urbanized people in developed countries have to travel to locations sufficiently far away from the built-up areas.

All in all, harnessing this resource depends on the ability to abate light pollution. The combination of increased awareness of the need to minimize impacts of light pollution, a growing urgency to promote energy efficiency, and a better appreciation by tourists and residents of the associated benefits, are premises for the development of astrotourism destinations. Reducing light pollution and adopting intelligent lighting options are not only *sine-qua-non* conditions to recover the starry sky dimension as a landscape for tourism; they also suppose a smart choice, bringing energy savings, improved health, and other social and economic benefits.

Nevertheless, a cloudless, transparent, "good seeing", and light pollution free night sky is but the main resource of astrotourism. Astronomical heritage --including both cultural heritage and cultural landscapes relating to the sky— is another, and it must be recognized as a vital component of heritage in general, as well as an important resource for astrotourism and archaeoastrotourism. For societies in the past, the nightscape was a prominent and immutable part of the observed surroundings, its repeated cycles helping to regulate human activity as people strove to make sense of their world and keep their actions in harmony with the cosmos as they perceived it (Ruggles, 2009). Along this line, UNESCO's (2014) thematic initiative, "Astronomy and World Heritage", shows the close relationship between the observation of the firmament and many existing heritage tourism sites, cultural landscapes, and monuments which were reference coordinates of past civilisations. They are places of mystery and wisdom based on the "knowledge of the stars" (Marin, 2009). The relevance of these sites, the commemoration of key dates in ancient calendars, and other intangible and oral manifestations are a still largely untapped resource for cultural-scientific event astrotourism. Thus, the cultural heritage associated with astronomy is also an important resource for astrotourism. Great opportunities arise for many destinations where heritage is connected with astronomy, often with intangible and oral manifestations (Cotte and Ruggles, 2010).

However, pristine nightscapes and cultural heritage sites do not exhaust the list of potential resources for astrotourism. The fact is that scientific and cultural *knowledge* is the ultimate resource. Hence, to the list of worldclass possible sites for amateur astronomical observation, and for interpretation of archaeological remains, other tangible and intangible, natural, cultural, and built resources must also be considered. In the tangible category belong the facilities for visits to the existing large observatories, including those in Hawaii, northern Chile, and the Canary Islands, as well as some specialized themeparks, such as NASA's Kennedy Space Center in the United States, Space World in Japan, or Space City and Futuroscope in France. Then, in the intangible category there is a growing number of astronomical events and celebrations, not to forget the myriad of smaller activities for the dissemination of astronomical knowledge organized, both outdoors and indoors, by universities, cultural groups, and even travel entrepreneurs.

Figure 3

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3. Astrotourism destinations: Policy and governance

Somehow mimicking initial entrepreneurial behaviour in the 1950s and 60s, elementary astrotourism products and experiences have certainly proliferated in the last few years, often in a spontaneous manner. Amateurs, and even professional astronomers, sometimes jointly with tourism operators, have launched astrotourism ventures. Frequently, these scientific-led initiatives have been based on a solid knowledge foundation, although with little grasp of tourism markets. But the opposite has also occurred: small, medium and large tourism entrepreneurs, aiming for different and "exciting" new products, setting their intents on astrotourism with scanty scientific groundwork.

The fact is that for astrotourism to thrive, it needs a solid professional approach to both destination and product management. Gone are the times when the positioning of a destination could be improvised, and products "invented" by private concerns or public bodies. Destination management, as well as tourism policy and governance, have developed solid strategic and operational procedures. These can only be ignored at great risk for community development and business success (Muñoz, Fuentes and Fayos-Solà, 2013; Fayos, Solà, Alvarez, and Cooper, 2014).

An astrotourism destination can be positioned as such in the markets only after careful consideration of all options. The right mix of resources, support services, and high quality astrotourism products must be there or be developed in time. A three step analysis and policy process consisting of a *Green Book* of the destination, a *White Paper* of strategic decisionmaking, and a *Tourism Policy Plan* delineating different actions is recommended (UNWTO, 2010; Fayos-Solà and Alvarez, 2014) in order to systematize the stages of a tourism policy and governance plan.. In the *Green Paper* stage, a detailed inventory of the destination resources is prepared to study the feasibility of a positioning based on astrotourism capacity. This inventory may be preliminarily extended to cover existing astrotourism products and support services as well, following a "FAS model methodology" (Fayos-Solà, Fuentes, and Muñoz, 2014). Relevant destination stakeholders are identified and called upon to examine the possibilities. An astrotourism main postioning is feasible if some astrotourism products and support services are already operating, and the astrotourism resources discussed above (quality of the night skies and nocturnal landscapes, archaeoastrotourism heritage, scientific facilities, knowledge dissemination capabilities, etc.) exist and clearly predominate over other resources. If this is not the case, there is still the prospect of simply having astrotourism as a substantial product in the destination's portfolio, with the possibility of consolidating a stronger positioning further into the future. In any case, the compatibility of astrotourism initiatives with other tourism products in the destination must be carefully evaluated at this stage.

After a first governance agreement is established among stakeholders favouring an astrotourism positioning and/or operations, a *White Paper* stage may follow, with focus on the right mix of resources, support services, and products necessary to launch this proposal. This stage must be used to analyse the competitiveness and robustness of the destination regarding astrotourism, as well as the trends

affecting its positioning, following the classic SWOT (strengths, weaknesses, opportunities, and threats) and PESTEL (political, economic, sociocultural, technological, environmental, and legal scenarios) analyses to complete both an internal and external evaluation of the area for astrotourism activity. The comparative and competitive advantages, the policy actions needed, and thus the advisability of an astrotourism positioning (or simply of developing a range of products in this category) should be apparent by the end of this stage.

When a final decision has been reached to develop an astrotourism destination and/or launch important products and experiences of this type, a destination's *Tourism Policy Plan* must be prepared (or adapted if already existing) to advance towards actual performance. Such a plan is a structured set of programmes to analyse market conditions, attract visitors, and satisfy their and the resident's needs. It must also produce crucial feedback for further strategic and operational developments. The usual framework for the Tourism Policy Plan consists of several programmes:

Data. This programme is designed to produce a vital and continuous flow of information regarding all the components of the destination's astrotourism operations. This information concerns both demand and supply factors, as well as dynamic elements respecting trends and innovation.

Sustainability. Actions within this programme's reach refer to the conservation of resources, such as the quality of the nightscapes and the rest of natural and cultural factors of the destination. They concern both an *analytical stage*, including impact appraisal, and *policy formulations*. These latter involve establishing carrying capacity indicators, and enacting corrective provisions for light pollution abatement. Policy measures must also address other negative impacts, as well as establish norms to control and curb other threats to the quality of the resources.

Knowledge. This refers to the set of actions fostering the creation and enhancement of human capital. This programme concerns the needs of the supply side (scientific content and interpretation of astrotourism resources and products, education and training of providers and guides, appropriateness of facilities, etc.). It also involves the actual delivery of tangible experiences and interpreted knowledge to tourists, maximizing the intended scientific content, and dissemination of the astrotourism experiences.

Quality and Excellence. Actions in this programme concern the satisfaction of the stakeholders in the astrotourism destination, involving both tourists and providers. It implies the creation of quality standards and subsequent certification processes, encompassing most of the other programmes in the tourism policy plan. Its actions reach not only the final astrotourism products on offer, but also matters of resource quality and conservation, as well as the availability and level of support services.

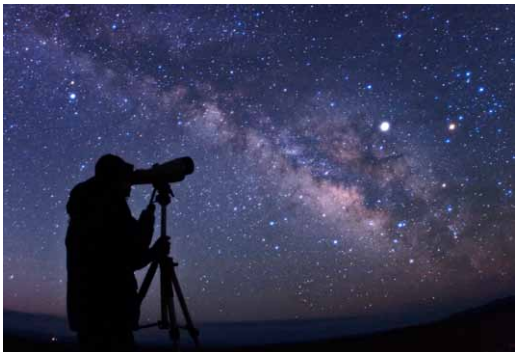
Product and Promotion. This programme groups all processes relating to the product and promotion mix for the attraction of visitors and expectative creation, perception management, and final satisfaction, being closely linked to the quality and excellence programme. It includes the production, communication, support, distribution, pricing, and ex-post assistance of the astrotourism experiences offered at the destination, as well as other ancillary products and services. It is a key programme both in respect of expectative creation and subsequent satisfaction, and impinges directly on perceived quality.

Innovation. This is a key tourism policy programme for astrotourism destinations. It refers to not only innovation in the delivery of the tourism experience, but also actual stakeholder involvement. The purpose of the experience itself is to commit to the dissemination and application of knowledge, contributing to readiness for innovation in the tourism audiences themselves. Thus, policy action in this area must address the content of the astrotourism products and make sure they keep in pace with scientific, technological, and governance advances.

Cooperation and Governance. Tourism governance goes beyond a mere programme in a policy plan, but it is still important to make explicit the provisions for collaboration among the agents in the destination and with those external. These include scientific and technological institutions in general, astronomy research centres in particular, and also the stakeholders and intermediaries in tourism markets. There is a quite broad misunderstanding, especially in European, South American, and African tourism destinations, that governance invokes specifically governments. But this is not the case, especially when referring to *common pool resources* (Ostrom, 1990, 2009; Poteete, Janssen, and Ostrom, 2010), as it is very often the case in the instance of astrotourism. While governments have played a large role in the tourism of these areas, it is widely admitted nowadays that the time has come for inclusive governance of the destinations, with ample involvement of stakeholders from the public and private sector as well as from civil society (De Bruyn, and Fernández, 2012). This is especially relevant in the case of astrotourism, because of the need for broad participation in the upkeep of resources, and the far-reaching benefits

in knowledge dissemination for both visitors and residents.

Figure 4



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4. Conclusion

Astrotourism has expanded over the last few years, as the scientific community disseminates its objectives, knowledge, and ethics through society at large, and tourism entrepreneurs respond to increasing demand for meaningful tourism experiences.

The specific resources and factors decisive for astrotourism experiences are often quite different from those in other tourism subsectors and niches. The most important resource for astrotourism is clear night skies with astronomical high "seeing" and low "extinction". Other relevant resources are low light pollution, and scientific knowledge and facilities. This often sets astrotourism optimal destinations apart from other committed to mass tourism. It supposes an opportunity for offbeat host communities, geographically outside more traditional tourism havens.

Similarly, astrotourism diverges from more conventional forms of tourism both from the demand and supply perspectives..For tourists, it entails a knowledge-rich experience, combining the pleasures of unspoiled sites, enlightened company, and personal tangible experiences with learning, knowing, and understanding the observable surroundings at large. This can be an excellent investment for the time and money dedicated to tourism. For the host communities, it signifies a positive reputation, often beyond local reaches, additional *edutainment* and scientific facilities, motivation and implication of many stakeholders, and a notorious positioning, optimizing appeal chances in very competitive tourism markets. Finally, for astronomy and the general scientific community, it brings a unique chance to come near ample publics, and to gain support regarding science objectives, values, and financial needs. It also supposes an excellent opportunity to make these publics aware of the scientific viewpoints regarding strategic issues, such as human capital formation, good governance, and environmental conservation (including the need to control light pollution). These possibilities set astrotourism in the realm of new and more meaningful forms of tourism, and opens up expectations of a tourism industry contributing to progress in the 21st century.

However, these new forms of tourism require sophisticated policy and governance approaches, well above the spontaneous and improvised ways and means of many nascent initiatives. Few destinations can opt for astrotourism as their main strategic positioning, and only selected astrotourism entrepreneurships respond to real consumer preferences and need of quality tourism. The urge for fast profits, or even for well-intended goals, does not suffice to guarantee successful astrotourism destinations and businesses.

Perhaps the most important starting requirement for an astrotourism quest is applying state-of-the-art know-how to an inventory and analysis of the resources available. The key resources for astrotourism have been reviewed in this paper, as well as the need to systematize their appraisal. This done, conservation of these resources becomes a central issue, which must be tackled through the establishment of voluntary or compulsory standards and norms, followed by adequate programmes and actions.

Adequate governance proposals and decisions from the outset are also important. It is erroneously believed that tourism governance setups must always be organized and conducted by government, but this is not the case. Neither is the fundamentalist free-market doctrine that a left-alone private sector will do. Astrotourism resources are usually a clear-cut case of a *common pool resource,* and it is tailor-made governance solutions which can be the most effective and efficient to optimize resource use.

Finally, adoption of a Tourism Policy Plan, with specific provisions for astrotourism is highly recommended. This plan will usually include programmes and actions for (i) data production and mining, (ii) sustainability provisions, (iii) knowledge creation, dissemination, and application, (iv) supervision of quality and excellence of operations, (vi) product formulation, promotion, and follow-up, and (vii) explicit arrangements for institutional cooperation and governance.

Astrotourism is an emerging and promising field for enjoyable and meaningful experiences in contemporary tourism. It can enrich human

capital both among the visiting publics and within the host communities, while simultaneously fostering the quest for scientific, technological, and governance innovation in the institutional fabric. Many of big ideas behind tourism as an instrument for conservation, sustainability, and development, among others, can be both studied and implemented where astrotourism is fostered and practiced. It should be welcomed and embraced as a harbinger of intelligent futures for mankind.

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