
Smart Island and Sustainable Tourist Development with the example of Madeira. Part 1: Theoretical Contexts and Development Conditions

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Abstract:

Purpose: The main objective of the article was to analyze the conditions and factors that determine the tourist development of Madeira Island in relation to the assumptions of the sustainable development concept and the smart city concept. Moreover, the conducted own research made it possible to identify key problem areas related to the development of tourism in the discussed area, formulated by representatives of the local community and tourists.

Design/Methodology/Approach: The research presented in this paper was conducted in April 2021. It was addressed to both permanent residents of Madeira and tourists visiting the island. A total of 391 people participated in the survey (diagnostic survey, questionnaire). Based on the collected opinions, the preferences observed in the surveyed groups were analyzed and an extensive list of recommendations was proposed. These recommendations have broad implementation potential, both in relation to Madeira and other tourist locations with similar social, economic, and environmental conditions.

Findings: Areas of strong tourist reception are usually a common ground for actions of various institutions, environments, and people representing different and sometimes conflicting interests. The Portuguese Island of Madeira described in the paper is a perfect example: in a relatively small area, one can find both areas that require protection due to the valuable natural and cultural assets, areas of agricultural and industrial character (on a small scale), and places with strongly developed tourism and tourism-related infrastructure. Ongoing discussions on the future of Madeira indicate that the economy based on sustainable tourism and smart city concept will play a key role. Own research made visible that the catalogue of problem areas is very extensive and includes phenomena of various character and intensity. The concepts of sustainable tourism and smart city, which are the key reference point for the presented research, can be perceived as a certain ideal, being a source of inspiration and a tool for searching for optimal (taking into consideration interests of various groups) development paths for a given area.

Practical Implications: Based on the collected data, the preferences observed among the respondents were analyzed and an extensive list of recommendations was proposed. These

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recommendations have broad implementation potential, both in relation to Madeira and other tourist locations with similar social, economic, and environmental conditions.

Originality/Value: Previous studies are mostly limited to the discursive domain of the problem under consideration. Few studies have extensively discussed the implementation area of the concept in relation to the theoretical indications, especially concerning social expectations and preferences, formulated by both representatives of the local community and tourists.

Keywords: Tourism, sustainable development, group of interests, smart city.

JEL Classification: O10, O11.

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1. Introduction

Areas of strong tourist reception are usually a common ground for actions of various institutions, environments, and people representing different and sometimes conflicting interests. The most important co-existing and at the same time interdependent links include local authorities, investors and entrepreneurs, non-profit organizations, administrators, and owners of tourist attractions (public and private), ecologists representing the natural environment, tourists with specific expectations and preferences, and representatives of the local community, including people with special needs (Piłatowicz *et al.*, 2018; Majdak, 2020). Moreover, tourists' hotspots are characterized by different typologies in terms of pressure upon the natural resources, with areas with high density in terms of hotel establishments and tourists per square kilometer, followed by protected areas (Mazurkiewicz, 2010). While the above list certainly does not include all possible aspects, it does identify groups that are typical of tourism ecosystems.

1.1 Madeira Island: Development Conditions

The Portuguese island of Madeira described in the paper is a perfect example, in a relatively small area (the island has a little over 800 km²), one can find both areas that require protection due to the valuable natural and cultural values, areas of agricultural and industrial character (on a small scale), and places with a strongly developed tourism and tourist-related infrastructure (hotels, airport, ports adapted to receive cruise ships) (Jankowska *et al.*, 2014).

A strong developmental impulse was associated with the accession of Portugal to the European Union in 1986, as Madeira received significant funding. Based on these funds, new roads were built (replacing those old, dangerous, and often collapsing on the edges of cliffs over the ocean), the airport was significantly expanded (today the fourth largest airport in Portugal), a free trade zone was created to stimulate the economy, and significant funds were invested in not only the capital city of Funchal but also in rural areas (<https://simpleflying.com/madeira-airport>).

Since 2015, with easy access to EU funds and subsidies from government agencies, many private entrepreneurs and citizens have been able to offer their local accommodation for tourists with a significantly reduced contribution of their investments, while large hotels have also begun to be constructed at a rapid pace (<https://www.luxurytravelmagazine.com/news-articles/3-new-luxury-hotels-to-open-on-madeira-portugal-this-june>), and the port has been renovated (<https://funchalnoticias.net/2015/05/25/apram-quer-melhorar-imagem-da-marina-do-funchal>). At the same time, sustainable development programs have started to be implemented, such as PRODERAM 2020, which is funded by the European Union and aims to make agriculture and rural areas more sustainable by increasing the competitiveness of traditional local products and improving the environment and landscape (<https://proderam2020.madeira.gov.pt/>) while considering selected elements of the smart city concept in relation to tourist districts and the entire island.

Furthermore, some studies question the benefits of the island's tourism boom and point out that Madeira is still far from sustainable. One example is hotels, with many of them closed during the COVID-19 pandemic. However, hoteliers believe that there is still room for new investments on the island and that there should be more control over local accommodations as the construction of hotels has so far been strictly limited by urban plans, while to open a local accommodation, the entrepreneurs only needed to apply to the City Council. The occupancy rate is characterized by a declining trend, with the 2019 figures below the threshold of 60%. Moreover, the phenomena of the local lodgment have multiplied the number of establishments all around the island, which put the traditional 3- to 5-star hotels under increasing pressure (<https://www.dnoticias.pt/2021/6/1/263651-ha-alojamento-turistico-a-mais-na-madeira>) (Crisp, 2021). There are also claims that despite the financial investments, tourism has not become a brand product (Gierczak-Korzeniowska, 2019) and has not yet managed to develop to the expected level. Among other reasons, this leads to a high unemployment rate among young people (at the beginning of 2019, the unemployment rate for young people under 24 was 28%, while for Madeira as a whole it was around 7%).

(<https://estatistica.madeira.gov.pt/en/download-now-3/social-gb/merctrab-gb/merctrab-ie-gb/merctrab-ie-publicacoes-gb/send/144-ie-publicacoes/11978-estatisticas-do-emprego-da-ram-4-trimestre-2019756.html>).

Many islanders have emigrated in search of a better life, mainly to Venezuela, the USA, South Africa, or the UK. Furthermore, the sector is plagued by poorly paid jobs making it difficult to attract highly qualified young professionals.

Ongoing discussions on the future of Madeira indicate that the economy based on sustainable tourism will play a key role, mainly due to the lack of viable alternatives. The findings of our study presented in the further part of the paper are a part of a broader trend in the research devoted to sustainable tourism and analyses related to expectations of interest groups functioning in each area.

The fieldwork supporting this piece of research article was conducted in 2021. The target group was both permanent residents of Madeira and tourists visiting the island. A total of 391 people participated in the survey (diagnostic survey, questionnaire) (Nowakowska, 2021). Based on the collected data, the preferences observed among the respondents were analyzed and an extensive list of recommendations was proposed. These recommendations have broad implementation potential, both in relation to Madeira and other tourist locations with similar social, economic, and environmental conditions.

1.2 Sustainable Development and Smart City Concept: Theoretical Contexts

As a key reference point for the presented research, the concepts of sustainable development and smart city are one of the most universal tools for development planning in complex situations and those requiring long-term planning (Majdak, 2018). It assumes, among other things, the necessity to seek compromises between all interest groups operating in each area (Lubowiecki-Vikuk and Đerčan, 2021) (Majdak 2019). As Pawlikowska-Piechotka (2010) argues, *the concept of sustainable tourism does not have one universal definition; it is most often understood to mean respecting cultural, social, and natural values of the area in which tourists stay, respecting and protecting natural and cultural resources, respecting the identity, tradition, and lifestyles of local communities, while at the same time taking advantage (especially by local communities) of the economic opportunities offered by tourism for the economic development of the region* (Pawlikowska-Piechotka, 2010, p. 203).

Furthermore, theoreticians of the problems discussed here enumerate the following components of the concept: promoting quality /of provided services, offered product, lifestyles associated with recreational activity, etc., (Górska *et al.*, 2018), integration of tourist activity with the objectives of environmental protection (Dębowski and Gałązka, 2010; Majdak, 2020), providing a sense of security to tourists and hosts (local community), the necessity to protect the natural, social, historical, and cultural environment (preventing degradation, conservation protection), shaping new attitudes among tourism organizers and tourists (Coccosis and Parpairis, 2000; Gołembski, 2002; Mosz, 2018; Ostrowska-Tryzno and Pawlikowska-Piechotka, 2021).

Sustainable tourism was interpreted in a similar way by Jędrzejczyk (2010), who pointed out the basic principles on which the concept is based. Among them, the author enumerated:

- the principle of economic governance, meaning the necessity of maintaining specific proportions between the increase in the rate of resource consumption in the tourist economy and the rate of reproduction of natural resources;
- the principle of socioeconomic efficiency of the tourism economy;
- the need to conserve and save resources;
- the principle of mutual benefits of all interest groups presents in a given area (Jędrzejczyk, 2010).

The above indications are also present in documents and strategies developed by organizations responsible for the protection of the naturally valuable areas in individual countries. Interesting guidance is provided by the National Park Service, which in its documents repeatedly points to the need to integrate the human environment (civilization) with the natural environment (Majdak 2017; Majdak and Mosz, 2020), according to which:

- Sustainable design should use an alternative approach to the traditional way of planning. A new approach to design must consider the utilization of the potential based on the natural and cultural resources of local, regional, and global environments.
- The concept of sustainability recognizes that human civilization is an integral part of the natural world, and that nature must be preserved and perpetuated if humanity is expected to survive.
- Sustainable design articulates this idea through changes that illustrate conservation principles and encourage their application in daily life (Tefft, *et al.*, 1993).

Long time horizons and the stage-based actions that are reflected in the concept of *The Limits of Acceptable Change Planning System* (LAC) developed by the US Forest Service remain an important element in the implementation of the concept of sustainable development. One of the pioneering studies devoted to the program indicates that *the LAC is not a new idea. It is, however, the latest step in a continuing effort to improve wildland recreation management through the definition of more explicit, measurable objectives. Nine steps are involved in the overall process* (Stankey *et al.*, 1985).

The document goes on to identify nine steps necessary to achieve the desired goals: 1. Identification of problems, areas, and issues. 2. Identification and description of alternative actions. 3. Selection of indicators to describe social resources and determinants. 4. Inventory of existing resources and description of social determinants. 5. Establishing standards for social resources and indicators. 6. Identification of alternative solutions that reflect problems in relation to resources and social determinants. 7. Identification of actions for each alternative. 8.

Evaluation and selection of the most advantageous solution. 9. Implementation of actions and monitoring of effects (Stankey *et al.*, 1985).

The concept of designing the development and management of an area understood in this way means striving to achieve *an ideal model, which can only appear if there is a state of equilibrium between its four essential elements (natural environment, tourists, local communities, tourism service providers)*. (...) *In general, a situation resembling the state close to sustainable tourism can only exist when the active elements of the system, such as (a) tourists, (b) local communities and authorities representing them, and (c) legal and natural persons providing tourist services in the broad sense and profiting from them are willing to introduce various kinds of restrictions (self-restrictions) on themselves* (Kowalczyk, 2010).

In the context of the abovementioned theoretical indications that determine the framework of sustainable development, a broad diagnosis of needs and expectations of interest groups functioning in each area of tourism should be considered as extremely important (Majdak, 2018). Knowledge of preferences and expectations in relation to local economic, environmental, and political conditions is a starting point for reliable consideration and planning of development consistent with the principles of sustainable development.

2. Sustainable Development of Areas with a Dominant Tourist Function: Research Review

The presented results of our research are part of the strand of literature devoted to the analysis of expectations of local communities and tourists in relation to the postulates and principles formulated within the concept of sustainable development. It is worth mentioning here a thematically similar study conducted in 2018 by Diogo Teixeira and José Cadima Ribeiro from the University of Minho. The study involved 148 people living on the island for at least 5 years and was conducted using a diagnostic survey and a conventional survey questionnaire, completed by respondents in person in the towns of Calheta and Funchal.

However, most respondents (75%) did not work in the tourism sector. The objectives of the survey were, among other things, to obtain an accurate picture of the perceptions of the residents of Madeira about the impact of tourism and to determine whether there was a pattern or relationship between the perception of tourism and the sociodemographic profiles of the respondents. Some respondents stated that tourism causes mobility and parking problems, destroys community moral standards, increases social insecurity and crime, and causes degradation of places of historical, architectural, and cultural value, but these were few. According to most respondents, tourism development in Madeira was at a high level and residents often met tourists during leisure activities. They stated that this contact did not interfere with their activities. Also, when asked if they would like more tourism in Madeira in the future, 46% of respondents answered at the level of 4 (more). This was followed by

responses of 3 (the same) and 5 (much more), of which each was characterized by the same percentage (25%). Based on these results, the authors concluded that tourism activity on the island was positively perceived at the time, which would also indicate the overall impact of the sector. This fact is particularly noteworthy given that Madeira is classified as a mature tourist destination (Ribeiro and Teixeira, 2020). Therefore, this positive perception could not be due to a relative lack of knowledge about the impacts (economic, social, cultural, and environmental) that the industry can have on the island. This was probably the first study of its kind.

A similar study was also conducted on the island of São Miguel (Azores Archipelago, Portugal) in 2017. Its main aim was to demonstrate the practical aspect of the problems, i.e., to identify solutions used for the implementation of the concept of sustainable development (Wichlińska, 2018). Among the conclusions, one can find an extensive range of practical solutions serving the implementation of the principles of sustainable development, as presented on Table 1.

Table 1. Solutions for the implementation of principles of sustainable development

ENVIRONMENTAL	SOCIAL	ECONOMIC
Establishment, conservation, and monitoring of legally protected areas	Maintaining a dialogue between the actors in the tourism industry, residents, government, and tourists	Inclusion of local entrepreneurs in decision-making processes, support for small businesses
Education for good environmental practices, information on problems	Government cooperation with local entrepreneurs	Promoting local products
Conducting scientific research	Respect for other attitudes, awareness of the need to make compromises	Controlling the foreign investment market
Biodegradation of waste, recycling	Availability of information	Development of business sectors towards sustainability
Use of energy from renewable sources	Preserving local traditions and protecting heritage	Renovating regional accommodations instead of building huge hotels
Implementing sustainable tourism (e.g. collecting trash from the ocean floor while diving)	Education of residents and tourists on sustainable development	Building tourist infrastructure in accordance with sustainable development principles
Sustainable activities concerning livestock (especially cattle)	Striving to improve the quality of life of residents through the implementation of the principles of sustainable development	Investment in programs that reward those who implement sustainable solutions
Limits on catches of fish		Care for quality of services
Introduction of restrictions and monitoring of pollutant emissions		Creation of new job opportunities
Introduction of an environmental tax		

Source: Wichlińska, K., 2018, *Rozwój zrównoważony obszarów turystycznych na przykładzie wyspy São Miguel. Etyka biznesu*, 4/2018, 119.

Some analogies in reporting on the identified social, economic, infrastructural, and environmental problems can also be observed in research dedicated to the Hel Peninsula in Poland, which is one of the most prominent tourist areas in Poland (Majdak, 2019). The attractiveness of this area is determined by its location as well as unique and diverse natural, historical, and cultural values, allowing for developing the tourist functions of the area (Gerstmannowa, 1995).

The above-mentioned assets and tourist resources have gained particular significance in the face of multifaceted transformations which have taken place in this area in the last several years. The liquidation of military units, almost complete disappearance of fishing, decline of local industry forced the authorities and local community to look for new functions for the towns located on the Hel Peninsula and alternative sources of income for its residents.

Numerous investments and initiatives aimed at managing resources and values of the area for tourism purposes are a manifestation of the activities undertaken. With these activities, the number of visitors to the peninsula remains high, which, on the one hand, positively affects the financial situation of permanent residents, but on the other hand, poses a real threat to nature and other tourist values, and often also social life and respect for cultural traditions of the region.

The methodological apparatus of the abovementioned research indicates the necessity to identify the interest groups functioning in the area discussed and broad characterization of their expectations regarding further developments in the tourism sector. Especially noteworthy are the final conclusions of the studies quoted, which indicate that with overexploitation and progressive degradation of the environment, poor planning in the long term will result in a significant and noticeable decline in the number of visitors. This will obviously have a negative impact on the financial status of not only the gminas (gminas are principal units of territorial division in Poland), but also of the residents of the area who derive income from tourism and thus will have the opposite effect to that intended (Majdak, 2019).

The above-mentioned studies show how critically important the issues concerning the needs of local communities and visitors are. Such issues should be given adequate priority in planning the sustainable development of tourist areas. On the other hand, they are a source of valuable findings supported by scientific research (Olszewski, 2021), which were also used in the present study. Relevant references are also included in the conclusions contained at the end of the paper, which makes the author's recommendations part of a broader scientific discourse on sustainable development in areas of strong tourist reception.

3. Conclusions

As can be seen, the catalogue of problem areas is very extensive and includes phenomena of various character and intensity. The concepts of sustainable tourism

and smart city, which are the key reference point for the presented research, can be perceived as a certain ideal, being a source of inspiration and a tool for searching for optimal (taking into consideration interests of various groups) development paths for a given area. Among the main problems indicated by residents were:

- Problems with jobs: too few jobs, too insecure, and easy-to-lose jobs. The low wages of residents and the excessive prices of goods and services, especially real estate, which are completely out of reach of the residents of Madeira.
- Lack of control over *Airbnb (Alojamento Local)* and private accommodations for tourists, and consequently, artificially raising prices and residents having to move further and further away from Funchal to afford the rent.
- Using the work of local people for tourism and providing services for tourists.
- Excessive construction of tall, multi-story hotels. Too many all-inclusive hotels. Destroying the landscape and allocating an already limited land for tourist resorts.
- Getting rich on tourism observed only in people who are already wealthy and controlling the industry. No benefits of tourism and improved standard of living among residents. Little government involvement in the planning and management of sustainable tourism.
- Too high a proportion of imported goods and too low a proportion of the island's production. Too large a share of large foreign companies in the island's economy.
- Commercialization of local products. Tourism in Madeira is becoming increasingly massive and too concentrated. Focusing on *quantity* instead of *quality*.
- Arrogant tourist behavior. Non-compliance with rules, especially pandemic sanitary regulations. Changing characteristics of tourists themselves: more and more mass tourists.
- Inadequate operation of sewage treatment plants. Huge amounts of pollution and waste generated by tourism and visitors. Garbage on the streets ending up in the ocean, heavy use of plastic. Public transport (buses) that is obsolete and polluting. Inadequate protection of the environment and laurel forest (*laurissilva*).
- Animal mistreatment. Too many dogs and cats that are homeless, malnourished, or kept in poor conditions.

The major concerns noted by tourists were:

- Difficulties in using public transport and getting around outside Funchal and tourist sites: lack of transport (taxis, buses), unmarked stops, unreliable timetables. Obsolete and polluting buses.
- Continuous construction works and construction of new buildings.

- Too many huge five-star hotels and luxury resorts that do not benefit the residents.
 - Animal mistreatment: too many homeless and malnourished dogs and cats.
 - Water pollution and a significant amount of garbage in the streets, heavy use of plastic.
- Insufficient tourist information, e.g., about biodiversity, unique natural aspects of the island, or places with access to drinking water.

The next part of the paper titled “*Smart Island and sustainable tourist development with the example of madeira. Part 2: Analysis of expectations of local community and tourists*” presents the results of surveys conducted in April 2021 among permanent residents of Madeira and tourists visiting the island.

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