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## ► To cite this version:

Christine Petr, Paul Caudan. Participatory sciences to measure tourist flows : involving islanders and visitors in the creation and use of digital counting solutions. ERSA 62nd Congress - Urban challenges and sustainable technological revolution, Aug 2023, Alicante, Spain. hal-04385362

**HAL Id: hal-04385362**

**<https://hal.science/hal-04385362v1>**

Submitted on 10 Jan 2024

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# **Participatory sciences to measure tourist flows : involving islanders and visitors in the creation and use of digital counting solutions**

## **Key Words :**

Participatory science; visitor; tourist; digital solutions; study design; research method

## **Abstract :**

In order to experiment with visitor flow management techniques, managers need to have objective, quantified data that is updated throughout the year, and framed on a half-day basis. In view of the lack of this type of measure, particularly in small island territories, it is necessary to consider the potential of the involvement of the inhabitants and residents of these territories. Based on the case of French islands, we describe the bases of a project design allowing to obtain data on tourism, and more specifically on visitor counts, based on the principles of participatory sciences.

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## Introduction

The UNWTO (2018) defines overtourism as "the impact of tourism on a destination, or parts thereof, that excessively influences perceived quality of life of citizens and/or quality of visitor experiences in a negative way". In order to properly distribute tourist visits over the territory and avoid feelings of overtourism (especially in the context of the relationship between tourists and residents, cf. Favier & Frochot, 2022; Holmes, Dodds & Frochot, 2019), it is crucial to propose solutions for managing tourist flows. However, in order to envisage innovations that are conducive to good management of visitor flows, an essential prerequisite is to have objective, quantified and updated data, ideally continuous throughout the year and over a time spectrum of hours (or at least half-days) on these visits. However, to date, this data, available in barometric format, is still lacking, particularly in small island territories.

However, local and regional managers keep insisting on the fact that they need a barometer-type measurement tool that meets the threefold objective of 1) measuring and auditing visitor numbers, 2) putting the various experiments and management choices of each island into perspective, and ideally, 3) providing a basis for the daily management of these numbers so as to be able to provide a real welcome to visitors. The aim is to allow the tourism actors of the islands to stop being subjected to a frequentation perceived as deeply volatile, but to be able to anticipate the situations at least on a half-day scale.

In order to assess the feasibility of this type of barometric tool and to envisage - or invent - the modalities for constructing such a tool for measuring visitor numbers, **the creation of a counting method based on the participatory science approach is envisaged**. In essence, the idea is that each individual is capable of contributing individually to the collection of data if they are rigorously trained and equipped by the researcher to act within an established scientific framework. In this way, on a voluntary basis, research can be informed by a multitude of individual observers. This approach significantly increases the efficiency of the count and the volumes of data collected at minimal cost. Thus, it is all the volunteer citizens (whether they are permanent inhabitants, residents, day-trippers, tourists or tourism professionals) who can form the first link in the collection system. By providing a complete kit (explanation of the scientific project and the issues at stake, presentation of the counting tools, explanation of the counting methodology and the use of the tools), the researcher is setting up the conditions for a new source of data that is massive, reliable and inexpensive.

By illustrating the case of a project to measure tourist numbers on various French island territories, the aim here is to describe a scientific design that makes it possible to obtain data on tourist numbers and that is based on the principles of participatory science.

After presenting the theoretical framework and the problem, we describe the main stages of the research design envisaged, before concluding with the obstacles to be overcome and the expected contributions.

## Theoretical framework

Participatory science (citizen science) is defined as scientific research conducted with the active participation of the population (Cham 2021). The population is then solicited for all or part of the research: helping to collect data, helping to classify them, etc., which increases the power of the scientific community tenfold (Kullenberg & Kasperowski, 2016).

Originally, participatory science was developed mainly in the context of biology and biodiversity (e.g. counting the birds of each species in one's garden over a given period, following a specific protocol and standards). Today it is used in many fields, including the most modern ones. For example, image recognition algorithms are trained on sets of images whose characteristics or nominalisation have been made by groups of volunteers.

The huge potential of participatory science has since been established (Kosmala et al, 2016) proven methods for obtaining quality data (training of volunteers, statistical adjustment tools, accessibility, standardisation and simplicity of protocols and analysis methods to facilitate their appropriation, etc.). Beyond its practical usefulness, participatory science also responds to a social and public policy issue: the relationship between citizens and science. According to Irwin (1995), science must respond to the needs and concerns of citizens, and citizens themselves are capable of producing scientific and reliable knowledge. It is therefore a public good to be opened to the public. Furthermore, in the same logic, Doyle et al (2019) argue that involving citizens in scientific projects improves their knowledge of the scientific process and fosters their awareness of the issues being studied.

The originality of this approach is that it makes it possible to involve the actors who are closest to the field, to federate them and get them to talk to each other around a shared activity and a common frame of reference (participation in the count, its purpose, the method). The aim of these approaches is to increase the chances of success of the project. On the one hand, it is a question of avoiding that certain actors feel cheated or abandoned, which can lead them to concretely oppose the project, or to slow it down and make it unviable because of voluntary resistance and misuse of principles and rules. It is also a question of enabling better adherence to projects. Rather than having to convince a posteriori of the interest of an approach and new infrastructures, it is a question of encouraging its appropriation and the collaboration of all.

This participatory science approach also refers to the principle of stakeholders, which is well known and used in the context of territorial development projects, and is now also at the heart of sustainable tourism management (Muzy and Furt, 2022). Let us recall the line of conduct advocated by the World Tourism Organisation according to which sustainable tourism must *take "full account of its current and future economic, social and environmental impacts, meeting the needs of visitors, professionals, the environment and host communities"* (UNWTO, 2016).

#### *Sustainable tourism for small islands: the importance of economic issues*

Sustainable tourism is a subject which mobilises a lot of attention from researchers, as shown by the large number of publications and productions on this topic (Bourelly, 2022; François-Lecompte and Gentric, 2013; François-Lecompte, Prim-Allaz and Durif, 2013; Falduto, 2022). This interest in sustainable tourism is stimulated by the observation of numerous issues related to preservation: the environment, heritage, cultural diversity (Camus et al, 2010), and recent literature abounds on the consideration of the social and environmental components of sustainable tourism, underlining the key importance of these elements for tourism (Couao-Zotti, 2022; Pupion, 2010).

The tendency of researchers to focus attention on the two pillars of sustainable tourism, the environmental and the social/societal, should not lead to the economic pillar being forgotten. Thus, the economic aspect of sustainable tourism is essential, as the UNWTO definition reminds us. And destination managers are all vigilant about this economic dimension, which is vital for the development of territories and the maintenance of a local population. In this respect, little has changed since Swarbrooke (1999) defined the economic stakes of sustainable tourism. Today, the economic aspect of sustainable tourism still involves and concerns the optimisation of benefits, the reduction of costs, the equitable redistribution and the development of local businesses.

In the case of islands, the tourism economy is often vital. Indeed, tourism allows the maintenance of an activity throughout the year, and to maintain services and infrastructures which are rare for their low density of inhabitants (doctor, pharmacy, school, etc.). Tourism places are first and foremost living places, and must be and remain so to continue to attract tourists (Pendlebury J et al, 2009). Thus, islands need to receive a flow of visitors, tourists and day-trippers, acceptable to the different stakeholders (neither too much nor too little). This confirms the need to objectify the real and felt frequentation of the islands.

#### **Issue**

In order to carry out this project to obtain data and indicators on tourist numbers, we propose to adopt the participatory science approach in the construction of collection tools and then in the stages of collection, measurement and qualification of tourist numbers on the island territories.

### **The main stages in the design of the participatory research on island tourism**

The approach is envisaged as follows

- Definition of the numerical objectives, scope and methods of the studies with the stakeholders: data to be collected, reference period, quantitative objectives, survey sites, number of observers expected for each site, practical organisation of the training and support of observers (e.g. location of training-flash sites, trainers of trainers, deployment of spots on the island, etc.), definition of the communication strategy
- Definition of observer training protocols, collection protocols (scheduling, points of vigilance, checkpoints, classification, reporting)
- Training of observers (a section presenting the project, a section presenting the tools, an accompanied observation phase with supervision by scientists to ensure the reliability of the methodology, and then the launch of the observers on their own)
- Opening of the observation phase, with monitoring of observers, ad-hoc controls, by sampling and in the field to ensure the quality of data collection and the relevance of established protocols
- Ongoing verification and curation of the data collected to ensure the quality of the knowledge accumulated
- Close the observation phase, consolidate and analyse the results, actively communicate with participants to thank them for their participation
- Provide feedback, update the protocols and create a turnkey kit that can be adapted for use by local authorities

### **Results and contributions**

The managerial contributions are to propose a complete protocol for measuring tourist numbers with a participatory approach: the kit (turnkey and modular) provided to local authorities will enable them to deploy information collection systems that meet legal concerns and operational objectives, while being acceptable to all stakeholders.

The contribution of the participatory science approach to data collection allows for the concrete initiation of a negotiation process based on the objectification and qualification of the use of the site. After the first phase of data collection and the updating of observation protocols (based on feedback from the field), the documents produced will serve as standard guides and methodological tools that can be reused with marginal adaptations.

This process is envisaged from its conception and documented as being replicable for other island destinations that face the same challenges of sustainable tourism trade-offs between the need for economic spin-offs, the moral obligation of openness to tourists, and the strategy of preserving the environment and quality of life for residents.

The conceptual contributions concern the identification of the blocking points underlying participation in observation, and more broadly in the creation of barometers for measuring visitor numbers and the qualification/distinction of tourist and day-tripper numbers.

Amongst other things, it is a question of showing that the participatory science approach to the subject of data collection for tourism-related subjects implies understanding in greater detail what are the levers and motivations for participating in the collection of this data (e.g.: individual-citizenship, eco-responsibility, service to the community, etc.). It is also a question of identifying the difficulties and obstacles to this participation, to this collection, to compliance with the methodology, and to the sharing of results.

The perception of the sensitivity/intimacy of these data thus appears to be at the heart of possible blockages or refusals to participate on the part of the actors. If these individual stakeholders are reluctant to collect and oppose the dissemination of results or their scientific interpretation, this leads the visitor measurement project to invent and develop other accounting and identification strategies

which may be less accurate (e.g. estimates based on electricity consumption) and sometimes more costly (e.g. the installation of meters). The presentation of the costs in terms of loss of efficiency of the project could be an interesting way to make them reconsider their positions.

## Références

Bourelly C. (2022), Identification, mobilisation, valorisation et régulation des compétences territoriales pour une tourisme durable au sein des PNR: le rôle des valeurs Parc sur le PNR de Brière, *9ième Conférence de l'AFMAT*, Angers, 13 et 14 mai.

Camus S., Hikkerova L., Sahut J-M., Tourisme durable : une approche systémique, *Management & Avenir*, 2010/4 (n° 34), p. 253-269. DOI : 10.3917/mav.034.0253. URL : <https://www.cairn.info/revue-management-et-avenir-2010-4-page-253.htm>

Cham, Katrin Vohland., Switzerland. 2021, *The Science of Citizen Science*. ISBN 978-3-030-58278-4. OCLC 1230459796

Couao-Zotti K. (2022) Sur fréquentation des sites touristiques du littoral varois : cartographie des acteurs touristiques autour du parc national Port-Cros, *9ième Conférence de l'AFMAT*, Angers, 13 et 14 mai.

Doyle, Cathal; David, Rodreck; Li, Yevgeniya; Luczak-Roesch, Markus; Anderson, Dayle; Pierson, Cameron M. (26 June 2019). "Using the Web for Science in the Classroom: Online Citizen Science Participation in Teaching and Learning". *Proceedings of the 10th ACM Conference on Web Science*. WebSci '19. New York, NY, USA: Association for Computing Machinery: 71–80. doi:10.1145/3292522.3326022. ISBN 978-1-4503-6202-3. S2CID 195777103.

Falduto J-B. (2022), L'OGD Intercommunal : un acteur Stratégique des destinations touristiques durable ? Étude comparative : Le cas de Dracénie Provence Verdon Agglomération et Méditerranée Porte des Maures, *9ième Conférence de l'AFMAT*, Angers, 13 et 14 mai.

Favier R. & Frochot I. (2022) Vers une meilleure compréhension de l'échange social et des interactions résidents-touristes : une application à la destination du Lac d'Annecy en proie au tourisme de masse, Colloque annuel de l'AFMAT, Angers.

François-Lecompte A., Gentric M. (2013), L'engagement environnemental du secteur hôtelier : proposition d'un modèle conceptuel, *Management & Avenir*, 66(8), 31-50.

François-Lecompte A., I. Prim-Allaz, F. Durif (2013), Le tourisme durable : les sept clés du succès, ans *Gestion*, 38(3), 84-96. 6

Freeman, R. E., & Reed, D. L. (1983). Stockholders and Stakeholders: A New Perspective on Corporate Governance, *California Management Review*, 25(3), 88–106. <https://doi.org/10.2307/41165018>

Friedman M., (13 septembre 1970), « The Social Responsibility of Business is to Increase its Profits », *The New York Times Magazine*, New York.

Holmes, M. R., Dodds, R., & Frochot, I. (2019) At Home or Abroad, Does Our Behavior Change? Examining How Everyday Behavior Influences Sustainable Travel Behavior and Tourist Clusters. *Journal of Travel Research*:1-15.

Kosmala Margaret; Wiggins Andrea; Swanson Alexandra; Simmons Brooke (1 December

Extended Abstract proposal for Sc69 ESRA Alicante - Participatory sciences to measure tourist flows : involving islanders and visitors in the creation and use of digital counting solutions

2016). "Assessing Data Quality in Citizen Science". *Frontiers in Ecology and the Environment*. **14** (10): 551–560. doi:10.1002/fee.1436. S2CID 89571951.)

Kullenberg, Christopher; Kasperowski, Dick (14 January 2016). Dorta-González, Pablo (ed.). "What Is Citizen Science? – A Scientometric Meta-Analysis". *PLOS ONE*. **11** (1): e0147152. Bibcode:2016PLoSO..1147152K. doi:10.1371/journal.pone.0147152. ISSN 1932-6203. PMC 4713078. PMID 26766577.)

Irwin, Alan (1995). *Citizen Science: A Study of People, Expertise and Sustainable Development*. Routledge. ISBN 9780415130103.

Muzy J. et J-M Furt (2022), la gouvernance des organismes de gestion de sites, une approche par la théorie des parties prenantes, *9ième Conférence de l'AFMAT*, Angers, 13 et 14 mai.

Pendlebury J, Short M, While A. (2009), Urban World Heritage Sites and the problem of authenticity, *Cities*, 26 6 349-358

Pupion P-C (2010), Tourisme durable et valorisation de l'environnement du littoral aquitain : diversité et stratégies des acteurs, *Management & Avenir*, 34(4), 289 à 305.

Swarbrooke, J. (1999) *Sustainable Tourism Management*. Cabi, New York.  
<https://doi.org/10.1079/9780851993140.0000>

UNWTO (2016), *Tourisme de Développement Durable*, <https://www.unwto.org/fr/sustainable-development>

UNWTO (2018) *Overtourism'? – Understanding and Managing Urban Tourism Growth beyond Perceptions*. 2018. doi:10.18111/9789284419999. ISBN 978-92-844-1999-9. S2CID 169221525