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Quantitative characterization of chaordic tourist destination

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HIGHLIGHTS

- We propose the consideration of tourism as a complex adaptive system.
- We introduce the concept of chaordic system as a step forward to work in mixed environments that mix order and complexity.
- We introduce five quantitative measures that characterize a system as chaordic.
- We apply these measures to characterize chaordic Majorca as a tourist destination.
- We discuss the implications of this characterization in practice.

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ABSTRACT

This paper highlights the new horizons opening with the applications of concepts from the application of the complexity science to tourism data, which are traditionally treated from an intradisciplinar point of view. From this new point of view, tourism is considered as a complex adaptive system. Complexity theory is rooted in the hard sciences, and social sciences have adopted it in recent times. Going a step further, we introduce the concept of chaordic system in tourism. This new thinking has appeared in the social sciences as a response to the current need to cope with contradictions and inconsistencies, adapting evolution without losing essence. We propose considering tourism as a chaordic system and analyzing the resulting managerial consequences. We propose the use of a set of measures to quantify a system as chaordic. Finally, we empirically analyze tourist arrivals to Majorca (Spain) to verify the existence of a chaordic system.

1. Introduction

Tourism is one of the most important economic activities for many countries and regions around the word, particularly in those countries and regions characterized by a strong economic dependence on tourism such as Spain and Majorca. Indeed, according to Instituto Nacional de Estadística, tourism represented in 2012 11% of the GDP and 12% of employment in Spain. Knowing the true dynamics of tourism demand is of crucial importance to managers of diverse business to adopt adequate entrepreneurial policies and strategies and for policymakers to plan required tourism infrastructures, formulate appropriate strategies and anticipate economic and unemployment problems (Alvarez-Díaz and Mateu-Sbert, 2011).

Nevertheless, tourism research has generally taken a reductionist approach, with tourism not effectively understood as a complex phenomenon (McDonald, 2009). In fact, the study of tourism has been developed during the 20th century from the perspective of different disciplines (Echtner and Jamal, 1997). These include the institutional approach, which considers the intermediaries and institutions that perform tourism activities; the product approach, which considers the production, marketing and consumption of tourism products; the historical approach, which analyzes tourism activities and institutions evolution over time; the managerial approach, which is focused in managerial activities in tourism enterprises; the economic approach, where economists analyze tourism as an economic activity, using the tools provided by economic theory; the anthropological approach, which considers tourism as an element of human culture; sociological approach, which considers tourism as a social activity; and the geographical approach, which focuses on the spatial features of tourism.

McKercher (1999) argues the study of tourism and tourism research, despite being considered a "new" discipline (Jennings, 2001), has been locked in an intellectual time that is up to 30

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Table 1
Characteristic figures of simplification paradigm versus complexity paradigm.

Simplification paradigm	Complexity paradigm
Independence between observer and observed	Dependence between observer and observed
Closed systems: systems are considered isolated structures	Open systems and connectivity: systems are considered structures related to their environments
Energy conservation, as a consequence of being closed systems	Energy dissipation during relations with environment
Equilibrium: systems are considered structures in equilibrium	Disequilibrium: systems move between order and disorder
Linearity: the whole is approximately the sum of constituting parts	Nonlinearity: the whole is more than the sum of their parts
Reversibility: time is exogenous and external to the system	Irreversibility: time is endogenous and internal to the system
Order	Disorder

years old, and it is time for a new framework for guide and add to the discussion of tourism. The great majority of the classical models used for tourist research are based on the idea of a simplified, linearized version of the tourism system. Therefore they have a fair amount of limitations, boundaries, and restrictions (Baggio, 2008).

In recent years a new approach has emerged. This approach uses complexity science and the associated chaos theory to offer an alternative paradigm for viewing and understanding tourism phenomena. Complexity science is a multidisciplinary emerging science, compounded by different interrelated blocks and, as Schneider and Somers (2006) point out, there are three interrelated building blocks of complexity science: nonlinear dynamics, chaos theory, and adaptation/evolution. Complexity science is concerned with complex dynamic systems with interdependent and interrelated parts, which evolve unpredictably over time, generating new properties and spontaneously self-organizing into new structures.

The environment of the tourist organizations and therefore tourist organization itself has evolved throughout time. Economic globalization, fast changing customer behavior, development of transportation, and information technologies all strongly influence tourism (Baggio, 2008). As a consequence, we could speak about an evolution of strategic management, too. Organizations have evolved from a rigid state to a flexible one. The new organizations are an open system and have a new dynamics, characterized by adaptation and emergence. Tourism is an open, dynamic and complex system, consisting of many components that interact in a complex and unpredictable way (Butler 1991; Gunn 1994; Leiper 1990). Tourism researchers have to evolve to cope with this new environment, applying the new concepts developed by complexity science.

Surprisingly, only few papers have applied these new concepts to tourism research. We can outline the seminal papers from Faulkner and Valerio (1995) and Parry and Drost (1995). These papers mark the beginning of a series of studies that use the concepts of complexity theory to characterize tourism systems from a qualitative point of view. We can cite the works by Faulkner and Russell (1997), Russell and Faulkner (1999), McKercher (1999), Faulkner (2000 and 2002), Scott and Laws (2005), Russell (2006), Zahra and Ryan (2007), Farrell and Twining-Ward (2004), Baggio, Scott, and Cooper (2010a), and Tinsley and Lynch (2001).

Some studies discuss the effects of crises or disasters, such us Faulkner and Russell (2000), Faulkner and Vikulov (2001) and Speakman and Sharpley (2012). Others apply complexity concepts to management (Russell (2006) and Russell and Faulkner (1999 and 2004), Ritchie (2004), Richards (2011)) or sustainability tourism (Schianetz and Kavanagh (2008), McDonald (2009)).

Despite the importance of quantifying tourist complexity in modeling and forecasting, we have found only two papers that are quantitatively focused: Baggio (2008) and Baggio and Sainagui (2011).

Going a step further, this paper intends to consider tourism as a chaordic system. Chaordic systems harness a unifying approach to deal with systems where chaos and complexity on the one hand and on the other by simultaneously coexist (Hock, 1996). Complex systems are actually considered chaordic systems because they are based on the same principles. The advantage of this new way of approaching reality is that it provides a unifying vision, through which you can design systems chaordic way to know address the inconsistencies present in the order-chaos dichotomy.

This article proposes an alternative way to explain tourism systems through chaordic systems thinking, and to provide some quantitative evidence in support of the complex nature of tourist phenomena. The chaordic view of an organization studies the balance and flow between the firm's structures and frameworks (order) and the emergent creative self-organizing among employees (chaos) (Nixon & Rieple, 2010).

The paper is divided in three sections. In the first section, we outline the alternative understanding of tourism systems proposed by complexity science. Under this new focus, tourism systems are seen as chaordic systems, and management is a process to design organizations as adaptive systems, reinforcing emergence and self-management to adapt to complex environment. In the second section, we analyze empirically the tourism arrivals to Majorca to quantify their chaordic properties. We outline conclusions and discuss some implications of adopting complex adaptive systems framework for management in the third section.

2. Complexity and chaos

2.1. Complexity and chaos in tourism

Complexity science tries to study, describe, and explain the behavior of complex adaptive systems. This is not a unique theory, but rather a multidisciplinary science, a set of ideas, concerned with nonlinear dynamic systems which are unpredictable and, at the same time, generate new properties and spontaneously self-organize into new structures (Schneider & Somers, 2006). These systems are capable of showing unpredictable behavior but limited in a quasi-stable pattern named strange attractor.

The current world is characterized by the complexity of the problems it must face and solve. We have to make a distinction between complex and merely complicated. Complicated systems have a large number of components with well-defined relationships and roles, which are linear and fixed over time. Complex systems have usually a large number of components with nonlinear relationships and roles that evolve over time. There is no agreement in the definition of complexity (Rosser, 1999) but there are some characteristic figures (Edmonds, 1995) such as diversity, change, large number of elements, and interrelations between them, impossibility of perfect knowledge related to imperfect information and the co-existence of order and disorder simultaneously so we can compare the key concepts involved in the complexity paradigm versus the traditional ones in simplification paradigm (see Olmedo, 2010) in Table 1.