INTRODUCTION

Management greatly depends on knowledge, and its detection, creation, transmission, and number of intangibles play a fundamental role in success.

In tourism, information systems must work on immaterial concepts and take steps to satisfy the expectations of multiple potential customers. These systems require complex models of reality and suitable conceptual tools to work out strategies.

This article expounds the use of different mathematical and management techniques that can be applied to the modeling, application, and control of strategic and operative management.

BACKGROUND

Data, Information, and Knowledge

These three concepts, which are frequently used as synonyms, are different representation stages of reality and its apprehension enables us in different ways.

Data, as simple representations, do not tell us much about themselves unless they are related to other data. It is from this relation that we get information.

Information is useful because of the possibility of intervention (e.g., cause–effect relationships), which is provided by knowledge.

What is knowledge? Knowledge can be understood as representation, production or estate...
(Marakas, 1999). In relation to this definition, any of the aforementioned concepts are, generically, knowledge. The definition of knowledge will depend on the usage and application of the term.

If we consider knowledge as “behavior support” (Lopez, 1999)—sharing perceptions in a socioeconomic system by means of the knowledge of goals, means, and evaluation of accomplishments—it will be easier to accomplish it effectively and efficiently.

If we consider knowledge taxonomically, we could derive, by means of appropriate processes, a linguistic and assimilative level of conceptualization and shared understanding from a primary level (descriptive, procedural, and rational). Hence, the possibilities of organization management success will be improved. Concepts such as “mission” are hard to explain, as its vagueness facilitates a certain mission to be attractive to many people who, at the same time, give their own meaning to it that does not always coincide with that of the others. The same happens with the comprehension of different functions, qualities, or behaviors, which must be shared by numerous actors.

The information systems meant to communicate knowledge vary according to what we want to transmit. However, it is always necessary to reduce ambiguity and unify concepts.

The following four types of formal systems can be distinguished (Simon, 1995):

a. of beliefs
b. of limit setting
c. of diagnosis control
d. of interactive control

In any of these, knowledge can be represented, generated, or established in different states, according to its usage, relationship, and application. For example, a certain number of guests in a hotel may be rather meaningless, but if we add the capacity, the date, and the category of the hotel to the number of people, it will have different meanings for the owner, the competitor or a new guest. These meanings will be influenced by, among other factors, the vision, the knowledge, and the expectations of the people involved. In this way, we will build up representation models, whose complexity will favor or damage our decisions according to our ability to deal with them.

**Knowledge as Representation: The Indicators**

If we take the concept “intellectual capital” to mean useful knowledge, which we develop “increasing the human capital” (Olve, Roy, & Wetter, 2000), it is obvious that people’s knowledge varies from individual to individual. It is necessary to “translate the vision and the strategy into goals and indicators, through a well-balanced set of perspectives” (Kaplan & Norton, 1999). The indicators will give the necessary homogeneity to the perceptions of those who have to make decisions in relation to the reality given by the indicator as well as its interpretation (i.e., people’s subjective judgment).

**Knowledge as Production**

The occurrence of events, their measuring by means of indicators, and their processing provide elements of judgments, references, parameters, and interpretation of the reality on which decisions are made. In the dynamic of measuring and evaluating reality, we will “produce” new knowledge that will modify the evaluation as well as our behavior. A clear example is to study the environmental impact produced by tourist activity through intensity measures, and its extension and importance over the socioeconomical system (Coccossis & Parpairis, 1992).

**Knowledge as State**

According to its relevance, knowledge can be perceived in different ways: data, information, structured information, perceptions, judgments,