Business Intelligence Applied to Tourism

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INTRODUCTION

In today's society, ICT is used to support several kinds of activities in general. However, tourism activity is one that must be influenced by the use of innovative technologies. Therefore, ICT is used in all tourism travel phases, from the beginning (before the trip), where the travelers dream, make a decision and purchase tourism products during the trip and to support and contribute to a positive travel experience, until after the trip, where the main activity is sharing personal histories, and contributing to the creation of digital memories.

At the same time, at tourism destinations, with the use of innovative technologies it starts to be possible to develop an environment associated with smart tourism destinations that could gain insights about customers' actual needs and preferences, where suppliers develop smart experiences and smart business ecosystems and regions start to become smart destinations, where it is possible to collect, exchange and process data (Gretzel et al., 2015). This contributes to offering the best tourism experience in accordance with the tourist profile and at the same time to identifying and developing products and services personalized to tourism customers.

In this technological environment, what differentiates a tourism organization from its competitor is, in many cases, the quality and opportunity of its information, which makes it possible to acquire knowledge about the tourists, allows it to make more appropriate decisions in the definition of new products or services, contributes to the adaptability to new markets, increases competitive capacity and can guarantee survival, even in times of crisis. If it is possible to collect, exchange and process data in a smart environment, then knowing the context becomes information. Information, knowing the meaning, becomes knowledge. Knowledge, knowing the vision, becomes wisdom (intelligence). Finally, wisdom, when combined with an effect (decision), results in big decisions and strategic plans for the smart destination and for supporting the DMO (destination management organizations) (Femenia-Serra et al., 2022), as well as the concept of the DIKWM model (data, information, knowledge, wisdom).

The areas for improving the quantity and quality of information available for decision making are knowledge management and business intelligence. Knowledge management should increase an organization's intellectual capital and includes a set of intangible assets or competencies fundamental to obtaining a competitive advantage for the tourist company. Business intelligence systems combine data with analytical tools to provide information relevant to decision making to improve the quality and availability of this information (Castillo-Clavero et al., 2022).

The knowledge management area helps to: improve the decision-making process, increase the organization's ability to solve problems, increase the organization's capacity to innovate, for example, in terms of differentiation, and offer services and products according to customer preferences. In specific reference to tourism, the activity can contribute toward innovations in this economic sector, such as facial recognition at airports, sites that aggregate and monitor prices for accommodation, organize trips

inspired by Netflix or sponsor those who write about travel, hotel booking via voice assistant on Google, a robot that welcomes the customer to the hotel, check-in by the guest entrance to a hotel (NFC – near field communications) or check-in by smartphone, as long as the passenger enters the airport at the start, and is tracked to the place where it is located.

Business intelligence is a set of tools, technologies, and operations that enable a company to collect and then present valuable data for a tourism organization in dashboards or reports with insightful information, complementing data mining algorithms to produce insights about the business.

In summary, why should the tourism industry invest in business intelligence? To achieve answers to several questions, such as: which destinations are most sought after, how long reservations are made for, which hotels/restaurants/agencies generate the most revenue, and which products/events/dishes/museums provide more profit. In addition, business intelligence can help to compare homologated periods and see if the variation is positive or negative, to achieve knowledge about the customer, to identify consumption patterns and to forecast tourism demand, among other tasks (Choi et al., 2020; Höpken et al., 2015; Li et al., 2021; Mariani et al., 2018; Vajirakachorn & Chongwatpol, 2017; Valeri, 2020; Xiang et al., 2021; Wang, 2022).

BACKGROUND

In the tourism industry, what differentiates an organization from its competitor is, in many cases, the quality and opportunity of its information. This information contributes to the knowledge acquisition about tourists, allowing a business to make more appropriate decisions when defining new products or services, providing the adaptability to new markets, increasing competitive capacity and guaranteeing survival, even in times of economic or pandemic crisis (Yiu et al., 2020).

Information management is important for all levels of an organization related to tourism, as well as for any other belonging to any economic sector, as it supports the decision-making process and provides decision makers with timely, relevant data to reduce uncertainty in the decision process, and at the same time, controls and corrects deviations through a shared vision of the future, which includes the decisions of the decision maker, such as the elaboration of scenarios (Yiu et al., 2020).

To create value for an organization, it is necessary to manage information like any other economic resource through information systems to support the decision process, also called decision support systems (DSS). Every day, companies have to make decisions related to the allocation of their resources based on forecasts about the future. The DSS should have characteristics to support the process of making a decision, which consists of choosing a way of acting, among several possible alternatives, with the intention of reaching a goal (Santos & Ramos, 2009). The environment associated with this kind of IS should allow the processing and visualization of information interactively, be friendly enough to be used by decision makers, present information in a format and terminology appropriate to its users and be selective in the amount of information it presents (Yiu et al., 2020).

The management of tourist information systems is currently going through a maturity process that implies the need to look at organizations in order to capitalize and develop their intellectual capital, through the application of concepts associated with knowledge management (Vasconcelos & Barão, 2017).

Knowledge management and engineering considers the development of the analytical capacity of information systems, which includes the use of business intelligence tools applied to the data warehouse of the tourism company, in order to generate knowledge about the tourism business, which contributes to innovation, creativity, intelligence and learning from the activity (Santos & Ramos, 2009), and meet

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