
BIG DATA – A NEW TOOL SHAPING THE FUTURE OF THE TOURISM INDUSTRY

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Abstract

The Internet has fundamentally changed the world of business and, thus, the world of tourism, so that the search and information processes, the means of payment, the mode of tourism products/services consumption are completely different. All these changes induced the need to know as much as possible about the wishes, needs and consumption behavior of tourists. Currently, providers in the tourism industry can better understand their customers, but, at the same time, their competition due to the existing huge volume of data, but especially due to the multiple possibilities for analyzing such data. The Big Data phenomenon has taken more and more shape during recent years and continues to evolve, representing a real opportunity for companies in tourism and offering them the chance to use their creativity effectively to design not only new, unusual products and services, but products and services which directly meet tourists' expectations. Thus, through literature review and several case studies, this article aims at identifying how Big Data currently changes the tourism industry, helping it to perform better and, therefore, sustaining the overall economic development.

Keywords

Big Data, information and communication technology, innovation, tourism development, performance

JEL Classification

L83, L86, M15, O31, O33, Z32

Introduction

The tourism industry, currently recognized as the fastest growing sector, continues to contribute significantly to the development of the world economy. Thus, in 2015, its contribution to the Gross Domestic Product (GDP) formation was of 9.8% (7,170.3 billion USD), with an estimated growth of 3.5% for 2016 and a 4% annual increase by 2026 (up to 10,986.5 billion USD – 10.8% of the Gross Domestic Product). Currently, about 1 in 10 jobs belongs to tourism, 9.5% of the worldwide labor market standing for this industry

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(283.578 million jobs). In this respect, an increase of 2.2% (to 289.756 million jobs) is expected for 2016, and, for subsequent years, until 2026, a 2.5% annual increase (up to 370.204 million jobs – 11% of total worldwide employment). In terms of investment in tourism, in 2015, their value amounted 774.6 billion USD (4.3% of total investment globally), with an estimated growth of 4.7% for 2016 and 4.5% annually during the next decade (up to 1,254.2 billion USD in 2026 – 4.7% of total investment). (WTTC Travel & Tourism Economic Impact 2016 – World, p. 1)

As a proof of the continuous expansion of the tourism industry, 2015 was the sixth consecutive year with recorded above the average growth; the number of international tourist arrivals increased by 4.4% up to 1.184 billion. Thus, this positive development of the sector drives economic growth and the creation of jobs worldwide. (UNWTO World Tourism Barometer, 2016, p. 1)

In general, the demand for tourism products and services was great, even if there were differences according to the destination, differences resulting from currency fluctuations, the decline in oil prices and other commodities that have resulted in increased disposable income for importing countries and lower demand in exporting countries or an increased attention for security issues. The increase recorded in developed countries (5% growth) surpassed the one recorded on emerging markets (4% growth), mainly following the results recorded for Europe (5% growth). Regionally, in 2015, America and Asia-Pacific each recorded an increase of 5%, Middle East an increase of 3%, while the number of arrivals in Africa decreased by 3%, due to poor results recorded in the North of the continent, which represents more than one third of tourist arrivals in the region. (UNWTO World Tourism Barometer, 2016, p. 1)

Tourism involves flows of goods, services and people on a global scale, so that it becomes an expression of the globalization phenomenon, which currently marks the world. Globalization transforms specific processes, intensifying competition, the demand for information regarding the market, the need to protect cultural resources and turns into a strategic development option from the companies in the industry's point of view. All these changes represent a real challenge, especially since consumers, the center of the tourism industry's existence, have an increasing purchasing power, an increasing desire to travel, but, the most important, are increasingly informed. However, globalization offers tourism many opportunities, the most important aspects being the more accessible and faster transport, the multiple information possibilities regarding the organization of a trip or the stimulation of the desire for cultural exchange.

Along with the rapid evolution of the information and communication technology, but also with the increase of its applicability in tourism, the efficiency and quality of services increased considerably. New technologies, such as Big Data, represent real challenges, providing more and more evolution opportunities for actors in this sector.

Big Data – performance for the tourism industry

The evolution of the information and communication technology is becoming more and more pronounced, and this is felt every day, in all activities. Each web browser, each search engine, each smartphone, each tablet, each Internet provider, each sensor generates data so that now, according to an IBM study, 2.5 quintillion bytes of data are created daily, which means that approximately 90% of existing data has emerged during the past two years. Although any action has always generated significant amounts of data, only recently it was

found that their use could bring huge benefits. Thus, the Big Data phenomenon was born, which includes not only the impressive volume of data available worldwide, but especially the new methods of capturing, storing, searching, sharing and analyzing data. In 2012, the Big Data market was estimated at 11 billion USD and it is estimated that this will rise to about 50 billion USD by the end of 2017. (McNulty, Moreira, Magliaro and Reid, 2014)

Tourism companies are usually working with two data categories – structured data (25% of total data) and unstructured data (75% of total data). Structured data comes mainly from Property Management Systems (PMS), blogs, websites, while unstructured data includes everything that means postings on social networks (e.g. Facebook), microblogs (e.g. Twitter), specialized review sites (e.g. TripAdvisor, Yelp), forums, e-mail, videos, photos and any other content that may affect the company's online reputation. Currently, the real challenge lies in the integration of unstructured data and their analysis in order to obtain relevant information.

The online environment is increasingly important for the tourism industry – impressions are posted online on specialized sites, there are ratings, actions on social networks etc. Data is generated at a faster pace than traditional structured data, so that, in order to understand tourists' travel experiences, companies must adopt a different approach. Traditional databases still used by many of the companies in the tourism industry prove to be not efficient enough, and the strategies used before can not be maintained in the context of Big Data. Next-generation processing tools, storage devices, servers and intelligent software are required to manage the new situation. However, to reap the benefits of the Big Data phenomenon, the simple implementation of technology is not enough, but organizations need to make changes regarding the business and operational processes, the decision-making system, the organizational culture and the relationship with employees. (Akerkar, 2012, p. 8)

The continuous trend of reducing storage costs, along with the evolution of technical platforms fundamentally transform storage, collection and use of data processes, which enable the delivery of more personalized and timely tourism experiences. Those companies that are able to see these opportunities and develop new products/services accordingly will benefit from an important competitive advantage.

Tourism is an extremely complex sector, involving, for proper functioning, the interaction between many actors and systems. Thus, Big Data can help streamline the activity in several directions: forecasting demand and sales, optimizing promotion campaigns, increasing trust and customer loyalty, revenue management, travel management, distribution. (Henry, 2015)

In the tourism industry, each search, online booking, payment or electronic transaction creates data that arrives in a database. Companies in this sector are already receiving information through online reservation systems, payment systems, providers systems or travel management companies, but Big Data provides new opportunities, allowing data collection from Social Media, review websites or data generated from various online interactions with the consumer and, especially, their correlation with external sources and a proper analysis. (McNulty, Moreira, Magliaro and Reid, 2014)

Data analysis turns into a real competitive advantage for companies, the amount of information currently flowing in the online environment providing important clues about customers' expectations. Data regarding tourists' preferences and their consumption behavior provides companies in the tourism industry with valuable information about their expectations, making it possible to increasingly personalize the tourism experience and

encouraging innovation. Moreover, it is well known that products and services centered on individual preferences increase satisfaction, which means, implicitly, improving the relationship with consumers. Simple data analysis is not, however, enough, the speed at which information is obtained and actions taken afterwards being extremely important. More and more companies in the tourism industry realize the importance of taking into account data provided by the online environment, this representing the basis for deep analyses, designed to streamline the operations of any company and, moreover, of the entire sector.

Optimizing marketing and sales actions, a key element in the development of any business, requires consolidation of data from multiple sources and their analysis using different parameters. Although most of the data is produced internally, the external environment is extremely important, the combination with data from travel agencies, travel portals, suppliers, Social Media contributing to increasing their value and providing new insights regarding the study of tourists' consumption behavior. All this information helps organizations analyze market trends and consumer preferences and this can turn into a real strategic tool for identifying opportunities, but also risks that exist on different market segments. Currently, Social Media is one of the most valuable sources of information for companies in the travel industry and beyond, being extremely helpful in predictive analytics. Tourism companies can improve their offer according to customers' expectations, following the analysis of historical data regarding their options, their location, the preferred destinations and means of transport or any other important factors that could provide clues on the consumption behavior. It should be borne in mind that the huge amount of generated data also contains irrelevant information, but taking advantage of the technological progress, these can be analyzed through specific Big Data methods and turned into meaningful information.

For hotel chains, Big Data is a way of improving revenue management operations and forecasts regarding the supply and demand trends on the market. An example in this regard is the Intercontinental Hotels Group (IHG), which uses information from over 90 million loyalty program members. 12 customer segments were defined based on more than 4,000 attributes in order to create relevant and effective marketing campaigns, which greatly improve the conversion rate and the relationship between offered products and consumers. (McNulty, Moreira, Magliaro and Reid, 2014)

Kayak, the well-known travel search site, is another example regarding the use of Big Data in tourism, relying largely on data analysis both in terms of internal decisions and in terms of offers for consumers. Every year, huge amounts of data are generated as a result of billions of users' searches, which allow the establishment of hierarchies. In the case of hotels, for example, further analyses are needed; unlike flight search results, which are normally listed by price, hotel rankings consider variables such as the price, existing facilities or the distance from the tourist's preferred place. Regarding flight searches, Kayak uses analytical models aimed at ensuring that prices displayed on the site are the same as those displayed on airlines' websites; sometimes there are synchronization problems among data sources. Kayak recently introduced the option of flight prediction, which shows the evolution of a particular flight's price for the next seven days. For all this, in order to effectively manage large volumes of data and to use information obtained by analyzing them, Kayak successfully uses Big Data tools. (Davenport, 2013)

Optimizing prices for perishable products offered by the tourism industry, such as in airplane seats and hotel rooms, is one of the processes that mostly rely on analysis.

Currently, the tendency is to consider a growing volume of data in order to obtain a more coherent framework for revenue management systems. In the future, revenue management specific algorithms will incorporate more and more data sources, data on the basis of which decisions can be made in real time. Such data could include external factors influencing tourism demand, including weather, consumer confidence or other goods'/services' prices. Setting tariffs will more and more frequently take into account the individual behavior of consumers, their loyalty, lifestyle, values, activity in online shopping etc.

About 25 years ago, Marriott was one of the first hotel chains to have used data analysis as revenue management. In order to streamline the process of identifying the best accommodation rates, Marriott has combined two separate systems, allowed revenue management software to be accessible on the Internet, improved its algorithms and increased the system's speed so that revenues would be optimized more frequently. In addition, they adopted an analytical approach in terms of offers to understand why tourists choose Marriott and not their competition. For several consecutive years, Marriott has experienced numerous customization options for their website's visitors, which was the main foray into the Big Data phenomenon. Big Data analysis resulting from the website was then used to design a robust marketing model, the ultimate goal being that of understanding which are the marketing and sales activities that really sell.

Distribution has always been that part of the tourism field which lists the most advanced computers, data and analyses, so that this could become the area on which Big Data has the greatest impact. A clear direction regarding the tourism products/services distribution processes is customization. A successful distribution strategy will take into account the information received directly from tourists, but especially those obtained externally.

Another area in which Big Data may be used in the tourism industry is that of streamlining internal operations. Airlines have been true pioneers in using analyses for routing, crew planning and logistics and maintenance decisions. Thus, even if the use of data and analyses in this regard is not something new, the fact that the rapid and sharp evolution of Big Data outlines new directions is undeniable.

At the management level, Big Data can help increase the financial performance of companies in the tourism industry and capital investment appraisal. The tourism industry (particularly hotels and resorts) was among the first industries to have adopted an analytical approach for evaluating elements that enhance financial performance. Even if data used for this purpose was relatively little and structured, it is obvious that Big Data sources could be successfully incorporated into existing analytical models.

Conclusions

Although the Big Data phenomenon already has a significant impact on key processes in the tourism industry, its influence is clearly still in its early stages. There are sectors and companies that are already testing or deploying Big Data on a regular basis and no one ever denied the fact that it could radically change the tourism industry, offering new development prospects.

For organizations in this sector to truly benefit from the advantages of Big Data, they should, first of all, investigate and understand the way it works, and then to devise a strategy for using data analysis. Big Data offers a wide range of information about the market and consumers, information which, if used correctly, can provide important competitive advantages. Moreover, it is known that tourists' requirements and expectations

are increasing and that, in the context of an increasingly fierce competition, simply meeting them is no longer enough. Innovation thus becomes an essential element in the design process of tourism products/services, and for this to give real results, information about tourists is needed. They want unique, unusual, but custom tailored experiences, but without necessarily expressing their preferences directly. The online environment has become more and more important, everything is different, starting from the way a trip is planned or bought, to the feedback provided after the end of the trip. Big Data is the tool that allows analysis of data thus generated, allowing the definition of a consumption behavior of tourists and providing tourism companies the opportunity to exclusively deliver products/services which please them and, thus, bring more revenue, helping to increase the performance of the entire sector.

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