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The Role of Advanced Information Technology in Tourism

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Abstract. *The integration of advanced information technologies (IT) into the tourism industry has transformed how tourism products are created, marketed, and managed. Innovations within the industry are increasingly focused on developing new tourism offerings, implementing modern marketing strategies, and utilizing cutting-edge management techniques supported by IT. A practice-based approach, like the ten types of innovation framework designed by innovation expert Larry Keeley, provides a valuable structure for understanding these advancements. By carefully assessing each innovation type, leaders in tourism can evaluate available resources, consider external and internal factors, and determine the ultimate goal of their innovative efforts. Once the goal is clear, the appropriate technological tools can be selected to achieve it. IT, in this context, emerges as one of the most accessible and versatile resources. Keeley's model emphasizes the need to consider three key aspects of any company's operations, each of which can be enhanced through innovative technologies.*

Keywords: *tourism, advanced information technology, innovation framework, mobile technologies, management strategies.*

Introduction. The development of telecommunication networks and information technologies has fundamentally changed the activities of tourist enterprises: many processes have become automated and can be controlled remotely, a huge amount of data is stored in digital form, the time for processing requests and performing operations is minimized. However, the issue of innovative development for each enterprise remains relevant, as intense competition in this area forces participants in the tourism market to seek, develop and introduce innovations in their work.

Main part. Innovations in the tourism industry are mainly aimed at the formation of a new tourism product, new approaches in marketing activities, as well as the application of new management methods using information technology[1]. Innovative activities in this area can also be aimed at changing an existing product, improving transport, hotel and other services, developing new markets [2]. Information technology plays a key role in such activities. they are able to radically change the methodological, informational and technological components of management processes and implement them at a qualitatively new, more effective level [3].

Innovation, the science of innovation, identifies different reasons for their classification. Special attention should be paid to the practice-oriented classification, which includes ten types of innovations, developed by the innovative consulting specialist Larry Keely [4]. The essence of his approach is that three aspects are considered in the activities of any company, for each of which they determine the object of innovative impact (Table 1).

The first four types of innovation concern the structure of production. One of them is a profit model. The following types of innovations involve cooperation with other companies, changing the structure of the company and introducing new working methods.

Two more types of innovation involve making changes to the product manufactured by the company.

The product must be unique and functional, and a package of additional goods and services must be attached to it in order to maintain customer loyalty.

The other four types of innovation, according to Keely's typology, should be introduced in the field of relations with the consumer. This includes updating the service and distribution channels, brand promotion and involving the client in interaction with the company [4].

Table I. Classification of innovation L. Keely

Innovative activity enterprises	
Class	Object of Innovation
Production structure	Profit Model
	Collaboration with other companies
	The structure of the company
	Workflows (business procedures)
Product Offered	Product Features
	Complementary or related products
An experience	Service
	Sales channel
	The brand
	Customer engagement

Thus, the leaders of tourism organizations have the opportunity, having analyzed each of the aspects, taking into account the available resources, external and internal factors, decide what will become the ultimate goal of innovation. If the goal is defined, then the next step is the choice of means to achieve it. IT in this regard is perhaps the most affordable and universal tool. Many companies have already appreciated the prospects of building an innovative company strategy with a focus on the use of IT resources. Their experience shows how IT innovation can change the tourism industry. Consider some of the areas of IT development.

Mobile applications and technologies. Mobile applications, which have become widespread due to the technological improvement of mobile devices and the availability of the Internet, are becoming an effective tool for implementing innovation in any of these types. Most often, airline's mobile applications are used to book tickets, but Aeroflot's experience proves that their innovative potential is much higher. In 2017, Aeroflot launched the Aero Games mobile application. The company's customers, playing it, get a valuable opportunity to additionally accumulate award miles and subsequently exchange them for tickets. It can be assumed that this approach will allow the company to earn extra points for its brand in the eyes of consumers.

Catering enterprises use mobile applications mainly for marketing their products. So, to attract customers, the network restaurant "Tanuki" sets an additional discount on orders issued through the mobile application. Another trend closely associated with mobile technology is the introduction of QR codes. A QR code is a matrix code that contains a large amount of information. This system appeared due to the development of the Japanese company Denso-Wave in 1994.

Unlike other codes, it has a number of advantages: encoded information can be textual (in any language), URL and other data; holds a huge amount of information (4296 numbers and letters or 7089 numbers); occupies a small area. Such a code has a high recognition rate. Its recognition is carried out using a special application installed on a mobile device. After reading the QR code, the user can go to the restaurant's website, view the menu, leave his review of the restaurant on the Internet, and also book a table or order food at home.

Travel guides are also actively moving into the format of mobile applications. And in this case, the mobile application becomes multifunctional, which means it is more convenient for users in comparison with printed counterparts. We list in more detail the features of such an application as the Vienna Vienna interactive travel guide PASS Travel App. This product allows you to:

- work with the city map offline (which is extremely important for tourists from other countries);

- get access to a detailed description of tourist attractions offline;
- purchase tickets for access to tourist attractions or book organized tours;
- determine your own location using the "You are here" function
- purchase an electronic tourist card Vienna PASS, which allows you to access 60 properties.

This innovation is interesting in that it combines several types described above. Firstly, the profit model in it is not a standard “commodity-money”, but the so-called freemium, i.e. the product itself is free, and the additional product or service is for money. Secondly, it shows mutually beneficial cooperation with companies (tourist attractions), access to which a tourist gets when buying an electronic card. Thirdly, the multifunctionality of the mobile application makes it more attractive to consumers in comparison with individual analogues: navigators and Internet sites of individual attractions.

If we consider the museum sphere, then in it mobile applications are becoming more widespread. Large museums, such as the Hermitage, are developing audio guides for their exhibits, and this, in turn, is qualitatively changing the workflow. Paid audio excursions for a mobile application allow the museum, firstly, to receive additional income, and secondly, to optimize its costs for the maintenance of traditional technical means (their repair, charging, etc.).

Placement tools are actively mastering mobile applications using NFC technology (from the English Near field communication - near field communication or near contactless communication) is a short-range wireless data transmission technology that enables the exchange of data between devices located at a distance of about 10 centimeters. The first hotel to showcase innovation was the Clarion Hotel Stockholm. NFC technology changes the traditional check-in arrangements for hotel guests. At the appointed time before arrival at the hotel or already there, the guest receives a notification that his room is ready to move in and that he can go through the registration process. After completing online registration in the mobile application, the key to the number is activated. By attaching a mobile device to the electronic lock, the guest gains access to the room. Thus, the workflow is changing at the hotel, which is becoming more advanced in terms of safety and reliability, as well as convenient for guests and staff.

Geographic Information Systems (GIS) and Technology. Given the spatial aspect of tourism and the active development of geographic information technologies, applied geographic information systems (GIS) are of particular interest, allowing to solve such problems of the tourism sector as:

- construction of tourist routes for different target audiences (active tourism, extreme tourism, recreational tourism; family tourism, etc.);
- analysis of tourist flows;
- assessment of the degree of accessibility of leisure and cultural facilities for people with limited mobility;
- identification of environmentally hazardous and adverse zones and sites;
- the formation of a warning system for the population and tourists about security threats;
- reflection of schemes of railways and roads;
- formation of climate zoning schemes;
- identification of the current and planned recreational load and its comparison with the recreational capacity and sustainability of landscapes and tracts;
- formation of schemes of beaches and places of rest on the coasts of rivers and reservoirs;
- planning the development of territories of reserves, wildlife reserves, national parks;
- compilation of maps, atlases, guides, information materials for tourists.
- design of engineering and transport infrastructure of tourist areas;
- management and monitoring of tourist areas, emergency management and security;

- inventory and certification of park facilities.

In general terms, GIS is an automated system that has a large number of graphical and thematic databases, coupled with model and calculation functions for manipulating them and converting them into spatial cartographic information for making various decisions on its basis. The information component of the GIS of the tourism sector consists of geographical data and tourist sites (architectural monuments, historical monuments, art objects, objects and territories of the nature reserve fund, hotels, food outlets, transport network, hospitals, drugstores, administration, etc.), tied to spatial cartographic representation [5].

The mobile guide "Personal Guide to the Curonian Spit National Park" is able to guide the user along the routes of the Curonian Spit National Park and conduct outdoor excursions based on GLONASS or GPS signals. In rooms, museums for excursions, the application uses QR codes or a manual selection of exhibits. The guidebook is equipped with a cartography system, photographic information about attractions, video and text information. In addition, the guide provides a full voice tour.

Another project is a multimedia interactive resource "Live Map" 4. In addition to a variety of tourist sites (anthropological, scientific, natural, recreational, etc.) presented in layers on the map, the user can use the function of forming, describing and displaying a tourist route.

Hotel reservation systems, catering and transport services. Online booking systems have been available to independent travelers for more than 15 years, and there are dozens, if not hundreds, of companies in this niche. According to some reports, in 2017, the share of online transactions in the United States in the tourism market amounted to 30% of the volume of tourism product sales [6]. Given the growing demand for independent reservations, the price is far from always the determining factor when choosing a system, as the decisive factor may be the loyalty program, booking conditions or reviews of other travelers. Naturally, the user has to compare and study many proposals before making the final choice. The selection process becomes time consuming and time consuming. This circumstance is the reason for the appearance of technological innovation in tourism - services that carry out meta-search (they are also called crawler sites). Such services allow you to quickly identify the cheapest offer for a given accommodation facility in the hotel services market.

A striking example of such a service is the site www.trivago.ru, which not only searches for the lowest price, but also displays their rating ratings put by guests on other information resources.

Another innovation that is closely related to room reservation is the Roomer Internet reservation system (www.roomertravel.com). This innovation has a consumer value that makes it unique and in demand: it allows users to resell rooms booked at a non-refundable rate (i.e. without the right to refuse the reservation without losing the prepayment made) to those who are looking for a room with a significant discount. The advantages of this approach are obvious, it is no coincidence that the company's motto is: "Our vision is to make travel exchangeable and tradable".

The innovative potential of the GoOpti transfer reservation service, created in Slovenia in 2011, deserves special attention. Its developers were able to recognize the demand for a budget collective transfer for certain destinations and offer in response not only a transport service, but also a service for booking it. The model of this service is based on the "flexibility interval", i.e. the user himself assigns the necessary transfer time, while determining the possibility of changing the departure time. Algorithms for processing large volumes of structured and unstructured data, pricing policies and methods for optimizing logistics determine the price based on the probability of the appearance of third-party travel companions [7]. In this case, the departure time is set as close as possible to the one set by the user.

A separate direction for introducing innovations into the business process of tourism enterprises is visualization of the booking object. So catering companies are actively introducing 3D booking service. For example, the website of the national gourmet search engine Resto.ru presents three-dimensional models of the halls of leading Russian restaurants.

Conclusion. In modern research, much attention is paid to theoretical issues related to innovation and

innovation processes in tourism. The considered areas of IT innovation are of applied importance and do not exhaust all the possibilities of using IT in tourism and hospitality. The wide range of applications of IT to create innovations of various types - from process to product - makes them attractive for investment. Moreover, we can assume that the implementation of ready-made IT solutions that have proven their effectiveness will be the best option for those travel industry companies that are only going to intensify their innovation.

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