

INNOVATIVE INFORMATION SYSTEMS AND TECHNOLOGIES IN THE FIELD OF HOTEL AND TOURISM BUSINESS

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Abstract: Today, the tourism industry, which includes hotels, resorts, health resorts, and travel companies, is gaining increasing importance for the economic and social development of many countries worldwide. Information and computer technologies form the basis of the globalization process. The implementation of new information technologies in the hospitality industry contributes to the improvement of guest service quality. Tour operators in the international market utilize modern information technologies. They include global distribution systems (GDS), online reservation systems, network information systems, information management systems, mobile communication networks, and Internet services. This article aims to explore the peculiarities of using information systems and technologies in the hotel and tourism industries. Also, it assesses the impact of applying modern information tools on the development of tourist companies and the hotel business. **Methodology.** The research employs analytical, inductive, deductive, and information analysis methods and a systematic-structural method for evaluating theoretical and statistical data. The information-analytical basis of the study consists of analytical-statistical materials from the UNWTO regarding the trends in the development of global distribution systems used in the hotel and tourism sectors. Results. The research has identified the main critical theoretical aspects of applying information technology tools in the hotel and tourism industries. The significance of the influence of information instruments on the tourism sector has been substantiated. Also, the vectors for implementing electronic commerce in the tourism market have been outlined. Additionally, statistical indicators on the use of information systems in international hotel and tourism markets have been analyzed.

Keywords: processes automation, information technology, tourism industry, resource access, automated information systems

1 Introduction

The primary importance of developing the tourism industry lies in ensuring sufficient automation in enterprise departments, enabling managers to make timely and informed decisions and take appropriate management actions to improve company operations. In this context, the use of modern computer technologies in the business activities of enterprises, especially in accounting, marketing, and management, is becoming increasingly relevant. Such specialists as accountants, economists, managers, etc., constantly have to solve the problems of using office technologies to process economic information in various areas of economic activity of a travel organization.

Information technology's impact on tourism development is significant, as it directly contributes to enhancing the efficiency of individual tour operators and the tourism business as a whole. Furthermore, it directly affects a company's ability to compete in the modern market. Therefore, utilizing computer networks, the Internet, internet technologies, and software products for end-to-end automation of all business processes in the tourism industry is now not only a matter of leadership and competitive advantage but also survival shortly.

The theoretical part of this study justifies the relevance and primary directions of utilizing information resources in the tourism industry. The practical part of the research includes:

- A statistical overview of booking information systems in the international tourism market.

- Changes in internet sales indicators for tourism companies.
- The dynamics of internet searches for hotels in different countries worldwide.

Based on the research findings, conclusions have been drawn regarding the discussed topics. Specifically, it has been established that online sales of tourism services have been snowballing in recent years, particularly in the United States. However, starting in 2020, there has been a significant decrease in internet searches for hotel locations, especially in Southeast Asia and Northern European countries.

This study aims to identify the main tendencies and directions of development for certain types of information systems and technologies related to information and technical support of the hotel and tourism industries.

2 Literature review

Over the past years, the modern tourism industry has undergone significant changes due to implementation of new computer technologies. As a result, the success of any company in the tourism market is practically only possible by using modern information tools.

In a highly uncertain and stochastic external environment, a tourism company's adaptability is a necessary characteristic. High reliability and ensuring stability are among the fundamental principles of any organization's operations. The specific conditions of each tourism enterprise require developing and implementing complex automated systems that combine organizational, regulatory, technical, and other tasks. These tasks help to achieve a sufficient level of efficiency and operational safety.

The rapid development of information technologies has led to the establishment of various information technology solutions in the economy's service sector in recent years. Consequently, information management is closely associated with rapidly developing technologies that provide fast and efficient information transmission, processing, storage, and retrieval methods.

Automation of various processes is achieved through the integration of diverse information technologies. It aims to enhance the efficiency and productivity of employees in the tourism company and offers significant potential to improve organizational management efficiency in the tourism sector.

An important element that determines the reliable functioning of a company's operating system is an information center, which ensures the integration of supply, consumption, and production processes into a unified and highly efficient system. It allows for quick and flexible adaptation of the operational system (working, informational, material, and financial flows) to the individual needs of different segments in the face of rapidly changing demands and desires of consumers in the tourism service market. Additionally, it can minimize service provision costs, significantly reduce service and delivery times, accelerate the process of obtaining information about various services, and improve the level of customer service (Baloch et al., 2022), (Rasoolimanesh et al., 2019), (Buhalis, Leung & Lin, 2023).

The specificity of the development and implementation of a tourist product requires the following:

- The presence of systems that provide information about the availability of transportation
- The possibility of accommodating tourists in the shortest possible time,
- Allow for quick reservations, and automate handling of additional tasks in providing tourist services (parallel

processing of documents such as tickets, invoices, travel guides, providing reference information on payment, etc.).

It can be achieved through the extensive use of modern computer processing and information transmission technologies in tourism (Verhun, 2022), (Isaac & Dodeen, 2023).

The tourism industry is so diverse that it requires the use of all types of information technologies, ranging from developing specialized software that automates the operations of a single travel agency or hotel to using global computer networks (Lee, Hunter & Chung, 2020), (Aamir & Atsan, 2020).

Today, the formation of a tourist product requires the use of Global Distribution Systems (GDS), which allow for quick and convenient booking of train tickets, hotel reservations, car rentals, currency exchange, ticketing for entertainment events, and more (Krasovska, 2018).

Modern information technologies, systems, and networks enable the effective implementation of functional activities in the tourism and hospitality industry. These activities include information and reference services, image policies, tourism promotion, and other opportunities for the country (regions, towns, zones, and facilities), marketing of tourism products and services, ordering and selling tourism products, monitoring, analysis, and planning of tourism activities, development of tourism products, and more (Buhalis, 2020).

The development of computer information systems and telecommunications technologies has led to the emergence of a range of IT systems already actively used in tourism and are spreading noticeably across all tourism enterprises.

Information systems are intended to increase efficiency, reduce the error rate in performing the same tasks, and improve employee comfort by automating information acquisition and processing processes. For example, in recent years, domestic tour operators typically offered real-time tour packages based on GDS, significantly simplifying and expanding the company's tourism offerings without significant costs (Chen, Gozgor & Koo, 2021).

The key feature of information technologies in the tourism industry is automating planning, accounting, and management processes for core activities. Thus, they can be considered an integrated set of the following main subsystems: financial management, resource management, service management, quality, human resources, sales, financial analysis, expense accounting, operating assets, marketing management, and so on (Chen & Yao, 2022).

Distribution management systems for the tourism sector are a modern approach to controlling the distribution of goods and

services and addressing tasks related to organizing and conducting events in a tourism agency. These systems effectively manage the activities of the company's commercial department, analyze the profitability of incoming requests, determine pricing policies, create contracts, and monitor their execution. All this contributes to increased sales and significant savings of resources and time (Bec et al., 2021), (Chang & Sokol, 2022).

3 Materials and Methods

The practical study of modern trends in the information provision of the hotel and tourism industries is carried out using the method of statistical estimates. Also, the authors used comparative, logical, and linguistic approaches, abstraction, and idealization for evaluating and processing statistical data on the research topic.

3 Results

Modern tourism can only be imagined with information technologies, particularly the Internet. It provides numerous advantages for business development, which include:

- The ability to quickly post and search the Internet for information about "hot" tours, hotel rooms, tickets, and the possibility of booking them;
- Large-scale, round-the-clock, effective, and relatively cheap advertising;
- Significant cost savings due to the use of e-mail in cooperation with foreign partners, tour operators, hotels, transportation companies, etc.;
- The ability to receive timely information about new tours, discounts, political and economic situations in different countries, news on tourism legislation in these countries, etc.

Currently, the tourism industry utilizes Global Distribution Systems (GDS) for fast and convenient ticket booking, hotel reservations, car rentals, currency exchange, and ticket orders for sports and cultural events.

The largest GDS in the international market for tourism services are Amadeus, Worldspan, Galileo, and Sabre. These terminal systems are installed in hotels worldwide, occupying over 90% of the market. No wonder they are called the "Big Four." The regional reservation systems and systems merging with one of the aforementioned ones occupy the remaining 10%. Despite being global, each GDS has its distribution arsenal. Europe is the primary market for Amadeus and Galileo, while Sabre and Worldspan focus on America. Interestingly, the Galileo system is used in 116 countries worldwide and serves over 45,000 agencies. The most famous computer reservation systems in the international tourism market are Amadeus, Galileo, Sabre, and Worldspan (Figure 1).

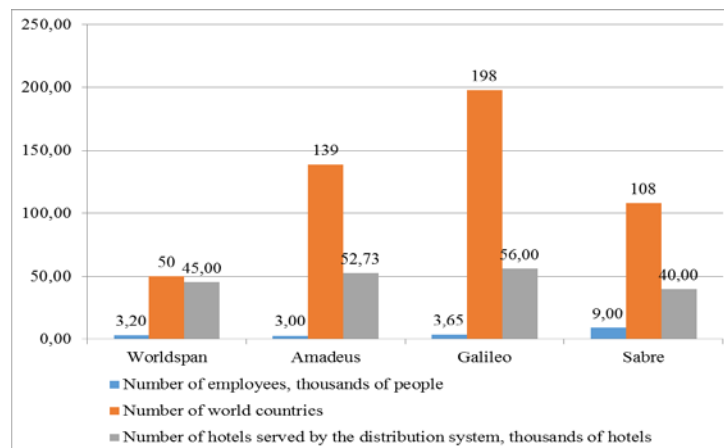


Figure 1: Comparative characteristics of global computer reservation systems in the international tourism market. Source: compiled by the authors based on Krasovska (2018).

The systems depicted in Figure 1 encompass approximately 500,000 terminals installed in travel agencies worldwide.

Amadeus is a leading global distribution system that provides real-time access to resources from tourism service providers such as airlines, hotels, car rental companies, insurance companies, and more. It distributes these resources among travel agencies in 139 countries worldwide. The Amadeus system grants access to resources from 513 airlines, representing over 95% of the global scheduled passenger air travel market. It also includes 52,731 hotels grouped in 322 hotel chains and 46 car rental companies and enables working with tour operator products, railways, cruise lines, and insurance companies. As an undeniable leader in the European and South American markets, the Amadeus system holds strong positions in the American market, as well as in Africa and Asia.

The Galileo system is a comprehensive suite of integrated subsystems, each designed to provide complete information and easy access to resources from 527 airlines, 202 hotel chains, car rental companies in 14,500 cities, and more. It allows for booking cruises, tours, and theater tickets, as well as providing information on fares, weather, visas, vaccinations, credit cards, and much more.

Worldspan is one of the world's top four global computer reservation systems. Currently, the Worldspan system enables 18,500 agencies worldwide to book 492 airlines, 45 car rental companies, 25 tour operators, and 191 hotel companies, representing approximately 45,000 hotels.

Sabre is one of the top four global booking systems. Currently, Sabre is used in over 40,000 agencies in 108 countries worldwide. The system is most widely used in the United States. It offers access to booking 420 airlines, over 40,000 hotels, and 50 car rental companies (Krasovska, 2018).

The efficiency of information technology implementation in tourism on a global level is assessed by determining the number of Internet users worldwide, global volumes of online travel sales, and the number of bookings made through global distribution systems. According to the World Tourism Organization, the countries with the highest number of Internet users are the United States (200 million people), China (111 million people), and Japan (85,29 million people). In Western Europe, there are approximately 205,5 million Internet users.

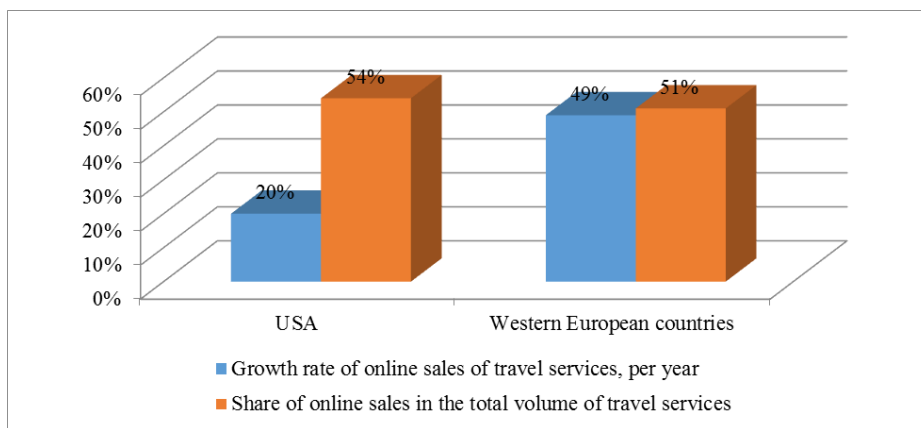


Figure 2: The dynamics of online sales in the tourism sector. Source: compiled by the authors based on Kucherenko (2014).

Recently, the volume of online sales of tourist services has been growing the fastest in the USA, at a rate of 19-20% annually, and in Western European countries, at a rate of 37-49%. Among the latter, France and the United Kingdom are the leaders. As a result, the share of internet sales in the total volume of tourist services amounted to 54% in the USA and 51% in Western European countries (Kucherenko, 2014).

When examining changes in hotel searches worldwide, according to data provided by the United Nations World Tourism Organization (UNWTO) as of December 2020 compared to December 2019, the largest decreases in searches for locations were in South Asia (63%), Northern Europe (61%), Africa (56-58%), Southeast Asia (57%), and Southern and Mediterranean Europe as well as Central America (56% each region) (Figure 3).

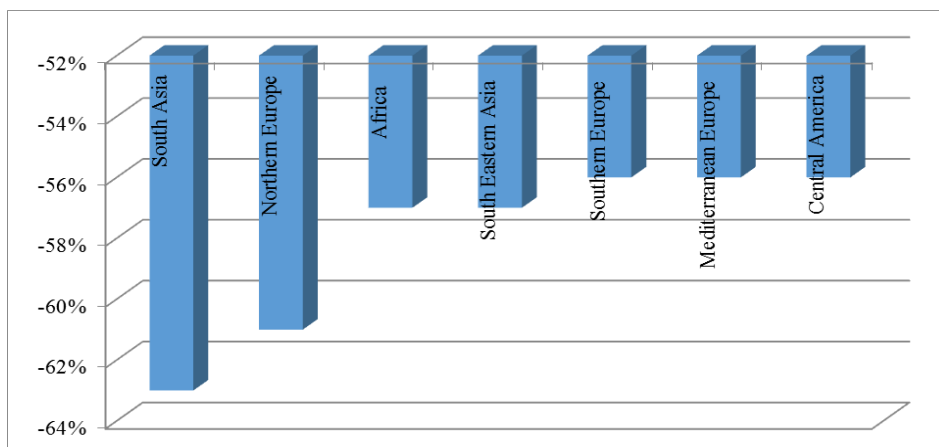


Figure 2: The dynamics of online sales in the tourism sector. Source: compiled by the authors based on Kucherenko (2014).

5 Discussion

Tourism is a highly information-rich industry that is one of the economy's most dynamic sectors. Efficient collection, storage, processing, and dissemination of up-to-date information are crucial and necessary for the functioning of any tourism company. The success of specific sectors of the economy in this direction depends on the speed of information transmission and exchange, its relevance, timely delivery, adequacy, and completeness. In this regard, the successful development of the tourism business requires the widespread use of the latest technologies both in the development of tourist products and in their promotion in the service market (Fan, Buhalis & Lin, 2019), (Kan, Lyu, Huang & Yao, 2022).

The impact of information technology on tourism is felt at various stages of creating and delivering tourism products. However, they significantly influence tourism services' promotion, dissemination, and sales. First and foremost, this concerns the ability to create new marketing and distribution channels, such as advertising and selling tourism products. In the advertising sphere, the practice of sending tourism information via e-mail (direct mail) has become established. In recent years, most tourism companies have created websites and utilized banner advertising (Banga, 2022), (Ding, Zhang & Tang, 2021). The XXI century has made it possible to speed up the process of booking airline tickets and carry it out in real-time. As a result, the quality of service has improved by reducing customer service time, and there has been an increase in the volume and variety of services offered (Timchuk & Evloeva, 2020).

One of the main directions of applying information technology in tourism is the implementation of multimedia technologies, including guides and catalogs. Currently, guidebooks and catalogs are produced in printed form, videotapes, laser discs, and the Internet. Electronic catalogs enable virtual travel along proposed routes, actively view these routes, obtain information about the country, objects on the route, information about hotels, camps, motels, and other accommodation options, as well as familiarize themselves with advantages, discounts, and legislation in the tourism industry (Elia et al., 2021), (Jiang, 2021).

Thanks to the use of efficient technologies, potential customers can receive real-time information about each tour of interest to them. This information allows them to quickly and accurately choose the exact tour product they need. In this process, tour operators (travel agents) can change the trip, if necessary, or create a new exclusive sightseeing tour, reserve seats, and sell the tourism service designed during the operation.

There have been significant changes in the management of the tourism industry as well. The current level of tourism development and strong competition in this field give particular importance to the information systems of tourism companies. The functional capabilities of these systems should allow for the input, processing, and storage of information about tours, hotels, clients, and the status of applications. Moreover, they should provide informational conclusions in the form of various documents such as:

- questionnaires,
- vouchers;
- tourist lists;
- tour and hotel descriptions;
- calculate the cost of tours considering exchange rates and discounts; control tour payments;
- compile financial reports;
- export and import data into other software products (Word, Excel, accounting software) (Fan, Jiang & Deng, 2022), (Qian, Liu & Pan, 2022).

Next to the automation of activities in travel companies, similar software development is being carried out for the automation of operations in hotels, restaurants, and other companies in the tourism industry. Using information systems in this field leads to

significant changes in management and enhances service quality (Zhang, Pan, Feng & Qin, 2022), (Ercan & Samet, 2018).

An ongoing trend in the international tourism industry in recent years has been the active utilization of profit optimization systems (revenue management systems). As a result, the companies actively employing such systems gain a clear competitive advantage and achieve noticeable sales growth.

6 Conclusions

The analysis of scientific literature on the research topic and the questionnaire survey results revealed that in today's economic conditions of fierce competition and market economy, tourism enterprises could only successfully develop and operate efficiently with modern automated information technologies. The analysis of modern information technologies and their application in the activities of tourism companies confirms their practical value and feasibility. The effectiveness of management and enhancing the competitiveness of tourism companies directly depends on the active implementation and utilization of various modern automation tools, such as specialized software products, tourism websites, CRM systems, and so on. Implementing the latest information systems opens up new possibilities for effectively addressing the main problems in the tourism industry. The system's functioning allows a travel agency to implement resource-saving programs by reducing operational costs for maintaining communication systems, lowering energy consumption, avoiding peak loads, creating conditions for increased labor productivity, and improving the quality of services and the performed work.

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