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Review Paper

Development of Information Systems and Technologies in the Field of Hotels and Tourism

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ABSTRACT

It has been empirically established that information systems in the hotel industry exhibit economic viability and effectiveness when they generate additional income for the hotel, confer competitive advantages in the market, augment market share, curtail costs, enhance the service process, and improve the efficiency of individual departments as well as the hotel as a whole. Furthermore, the implementation of such systems can fundamentally transform the methodological, informational, and technological components of management processes, elevating them to a qualitatively new and more efficient level, thereby significantly enhancing the quality of service within the hotel. Statistical data indicates that Ukraine lags leading developed nations in terms of information technology implementation and automation of hotel management. Nevertheless, the Ukrainian market holds promising potential for further advancements in this domain, owing to the existence of more than ten high-quality, modern hotel management automation systems. Moreover, some of those systems are originally developed by Ukrainian companies rather than adapted from foreign systems. Consequently, these systems are better tailored to the unique conditions prevalent in Ukraine. The integration of such systems will exert a substantial positive impact on the competitiveness of hotels in Ukraine. Consequently, it can be deduced that the adoption of new technologies by society holds the potential to significantly enhance the outcomes of human endeavors. These technological advancements offer effective solutions to various challenges encountered by institutions, including hotels. The primary objectives of a hotel encompass accommodating guests, delivering a range of services, managing room reservations, and more. Through the utilization of these technologies, these tasks can be accomplished not only with utmost quality but also expeditiously and at reduced resource costs. The hospitality and tourism industry operates on a global scale, encompassing major airlines, hotel networks, and travel corporations worldwide.

HIGHLIGHTS

⊙ The integration of information and communication technologies (ICT) within the tourism industry is imperative for prosperity, enabling accessibility, data visibility, product diversification, and customer satisfaction.

⊙ The utilization of modern automation tools, including specialized software products and Internet portals, is crucial for enhancing the efficiency and competitiveness of tourism enterprises in the service economy.

Technological advancements within the hospitality industry are undergoing rapid development. This can be attributed to the primary challenges faced by hotel owners, namely, maximizing customer acquisition through optimal sales strategies and fostering guest loyalty to ensure repeat business. Without innovative solutions, these objectives are unattainable. Particularly during times of crisis, the competition for each guest necessitates the modernization of hotels, both in terms of technology and mindset. The indispensable role of computer software systems in the seamless functioning of hotels, resorts, motels, travel agencies, and other related enterprises is difficult to envision in contemporary times. Computer technology significantly contributes to the prosperous evolution of the tourism and hospitality industry. Hospitality, as a fundamental concept of civilization, has flourished into a formidable industry employing millions of professionals dedicated to providing the finest services to consumers, i.e., tourists. The hospitality industry encompasses diverse spheres of human activity, encompassing tourism, leisure, entertainment, hotel and restaurant management, catering, excursions, and the organization of exhibitions and scientific conferences. Given that information technology stands as one of the pivotal factors propelling the growth of the hospitality industry, the investigation of this issue remains highly pertinent.

Tourism in Ukraine stands as one of the most promising industries, characterized by considerable potential for growth. The nation possesses objective prerequisites that facilitate the rapid expansion of both domestic and international tourism. These prerequisites include:

- favorable geographical location,
- favorable climate,
- rich natural, historical and cultural, tourist, and recreational potentials.

The hindered progress and superior quality advancement of tourism in our country can be attributed to low levels of information literacy and inadequate communication practices. These factors impede the growth of tourism in Ukraine and hamper its profitability.

The influential role of information technology in shaping the dynamics of domestic and international tourist influx has initiated a paradigm shift within the tourism industry. The industry has transitioned from predominantly catering to organized tourist groups to encompassing a multidisciplinary field that aims to meet the diverse needs of millions of individual tourists.

The primary objective of this article is to elucidate the essence and substantive nature of the advancement of information systems and technologies within the domain of hotels and tourism.

Methods and Theoretical Background

The research conducted for this study employed a range of general scientific methods, including comparative analysis, contrastive analysis, analytical examination, historical investigation, and others.

The effective functioning of contemporary travel agencies and social-cultural service enterprises necessitates the utilization of specialized software resources for automation purposes, alongside the utilization of global and local computer networks. Within this context, the focal point for the creation, marketing, and sale of a tourist product lies within a travel office. The level of automation within the travel office plays a crucial role in determining the quality and cost of the product, as well as shaping the survival prospects of a travel agency within a fiercely competitive market landscape. Extensive research conducted by prominent domestic and foreign scholars has been dedicated to the exploration of these pertinent matters (Shkola, 2003), (Myronov, 2007), (Liubitseva, 2012), (Katrenko, 2006), (Hliebova, 2012), (Havrylov, 2014), (Neuhofer, 2012, 2013), (McLeod, 2010), (Lugosi, 2010), (Law, 2010), (Kalbaska, 2014), (Damianos, 2014), (Cantoni, 2010), (Buhalis, 2013), (Adil Khan, 2013) and others.

RESULTS AND DISCUSSION

Tourism stands as one of the most financially rewarding sectors within the global economy, with its influence on the global economic landscape steadily expanding each year. In recent times, the progression of Internet technologies has profoundly shaped the development of the tourism industry. The worldwide web has evolved into a comprehensive media system, serving as both an interactive platform for societal interactions and a medium for information transmission and

dissemination. Moreover, it has emerged as one of the paramount instruments for business growth and commercial endeavors.

Information and communication technologies (ICT) occupy a pivotal position within the tourism sector, exerting a profound influence on its operations. The integration of ICT into the fabric of the tourism industry is imperative for the prosperity of tourism enterprises. By leveraging ICT, access to information about tourism products becomes readily available at any time and from any location. Additionally, tourism companies can effectively reach their target customers across the globe with a mere click, thanks to the advent of mobile computers, web technologies, and other related advancements (Akimov *et al.* 2021).

The strategic objective entails the integration of information and communication technologies (ICT) within the realm of tourism, thereby augmenting accessibility, data visibility, product diversification, and customer satisfaction. ICT empowers consumers to contribute to the globalization of the industry by furnishing tools for identifying, personalizing, and procuring tourism products, as well as crafting, managing, and disseminating offers. Increasingly, ICT assumes a crucial role in shaping the competitiveness of tourism organizations and destinations. As a key determinant, information, and communication technology wields substantial influence in the competitive positioning of organizations. Its potent capabilities serve to advance and fortify tourism strategies and operations. Within the global economy, the tourism industry stands as one of the fastest expanding sectors, surpassing others, and accounting for over a third of economic activity. Within the tourism and hospitality industry, the presence of efficient and high-speed information and communication technology (ICT) infrastructure and software holds paramount importance for tourism development. ICT enables the consolidation of customer relations and supply chain management into a unified source, facilitating a range of operations such as product selection, ordering, fulfillment, tracking, payment, and reporting through a single, user-friendly tool. Through the utilization of emerging technologies and socio-economic platforms (e.g., social networks like Facebook, Twitter, and blogs), customers can share information and ratings on research,

service quality at hotels and restaurants, and environmental and social aspects, thereby enabling robust information scanning capabilities. Prominent hotel chains such as Marriott Hotels and Resorts, Ritz Carlton Hotels, and Hyatt Hotels and Resorts have leveraged these platforms to fortify their brand image and directly engage with customers through links to press releases or the promotion of new packages via Twitter (Dzhyhora *et al.* 2022). Furthermore, consumers now expect enhanced ICT capabilities within their rooms, with features such as internet access through televisions and data ports becoming standard in upscale hotels. The advent of the Internet has significantly improved hotel application and booking processes, offering greater convenience and efficiency. There are currently four global distribution systems (GDS) in the world:

- Amadeus,
- Galileo,
- Sabre,
- Worldspan.

Encompassing over 90% of the comprehensive hotel market and boasting installations above 400,000 travel agencies worldwide, these systems have earned the designation of the "golden quartet" for good reason. It is not a mere coincidence that the remaining fraction of the global hotel market pertains to systems that align with regional booking practices and seek integration with the aforementioned systems (Levytska *et al.* 2020).

Such circumstances warrant the perception of tourism as a highly interconnected service, rendering it particularly responsive to the utilization of information technology in its organization and management. Unlike tangible goods, the foundation of communication within the tourism industry revolves around information flows rather than the physical transmission of services and payments. The transmission solely encompasses information on the services and payments, rather than the actual services and financial transactions themselves.

Consequently, the operation and advancement of a tourism enterprise in the contemporary landscape pose distinct demands on the quality of communication and information services. The swiftness of data transfer assumes paramount importance, wherein the quality, reliability, and

timely delivery of information to end-users hold significant sway. The ability to make sound and effective managerial decisions stands as a distinguishing factor, enabling companies to achieve superior outcomes and proficiently leverage supplementary functionalities and modern computer technologies within the realm of tourism. This underscores the near-complete reliance of the tourism market on the opportunities presented by information technology (Kostiukevych *et al.* 2020).

Within tourism enterprises and organizations, automated management systems occupy a pivotal role in overseeing the production of tourism services. These systems aid in the creation of an efficient tourism structure that fosters conducive working conditions through the professional growth of employees and the astute management of their career trajectories.

The proper functioning of these systems necessitates the seamless input, editing, and storage of pertinent information encompassing tour status, hotel details, client records, and applications. Additionally, they must facilitate the generation of data in diverse document formats, calculate tour costs while considering exchange rates and discounts, oversee excursion payments, generate financial statements, and enable the export and import of data to other software applications such as Word, Excel, and accounting software. Such a distributed system operates within a network of interconnected computers, wherein all data resides within a unified database (Bartosova *et al.* 2023). Each manager is granted exclusive access to information about their respective applications, with oversight provided by the director or senior management. This ensures data integrity and centralization within the database.

There are the following examples of such systems:

- SAMO-Tour (SAMO),
- Leader-Tour (FRANCE),
- TourManager (Center for Tourism Technologies),
- Master tour (Megatech),
- TurWin,
- Charter,
- Ovir (Arim-Soft),
- Intur-Soft,
- ANT-Group,

- Edelweiss,
- Barsum,
- Reconline (Rec-Soft)
- Information systems,
- Global systems of general use
- Internet Satellite navigation system,
- Mobile phone network
- Electronic payment systems,
- Automated tourist management systems,
- Customer relationship management systems,
- Multimedia systems,
- Geographical information systems,
- Computer reservation systems,
- International booking systems, etc.

The most popular of these systems are the global distribution systems (GDS), namely:

- Amadeus,
- Galileo,
- Sabre,
- Worldspan.

Initially, these systems were primarily devised for airline ticket bookings. However, their utilization expanded to encompass other domains such as hotels, cruises, and car rentals, and eventually incorporated the functionality for booking various rentals.

A satellite navigation system refers to a comprehensive assemblage of ground and space equipment expressly designed to ascertain the precise positioning of terrestrial, aquatic, and aerial entities, encompassing geographical coordinates, altitudes, and movement characteristics such as speed and direction. It represents an electronic and technical system with the capacity to facilitate such determinations (Kocherov *et al.* 2023).

Presently, two prominent satellite navigation systems are operational worldwide: GPS (Global Positioning System) and GLONASS (Global Navigation Satellite System). The Global Positioning System (GPS) offers the capability to determine the precise location and velocity of objects across the globe, functioning reliably even in adverse weather conditions. It has garnered substantial

popularity among travelers, individuals embracing an active lifestyle, fishing enthusiasts, and motorists alike. On the other hand, GLONASS represents a comprehensive assemblage of distinct technologies borne out of the extensive efforts of designers and scientists over numerous years. Comprising a constellation of 24 satellites, GLONASS serves as a remarkable accomplishment in the field of satellite navigation.

Prominent examples of programs falling within this category include TourManager, My Documents Tourism, Master-Tour, Self-Tour, and several others. The level of automation achieved by these programs necessitates comprehensive training and expertise among the employees of the respective companies. This level of automation has enabled a substantial increase in customer service capacity, surpassing a monthly threshold of over 100 customers.

One notable technology platform in this realm is TourBook, which serves as a contemporary solution for tour search and booking.

Additionally, the search engine TourIndex facilitates the presentation of specialized travel offers from agencies, catering to both travel agencies and individual tourists. Furthermore, the Integrated Information Management System (AMS) represents another significant contribution to the field, offering comprehensive functionality for effective information management.

In the context of travel companies, regardless of their scale, the availability of an Internet connection should be regarded as an indispensable requirement.

Specifically for Ukrainian hotels, an affordable and pragmatic solution exists, comprising a suite of systems aimed at automating various aspects of hotel operations. These encompass the Hotel 2000 system for hotel service automation, the Restaurant 2000 system for bar and restaurant automation, the Stock 2000 system for automated management of restaurant inventory, as well as automated interfaces with accounting systems, internal PBX, and access control systems employing electronic locks (Klochan *et al.* 2021).

The Hotel 2000 system represents a classic front office program specifically designed to automate key hotel services such as reservations, front desk operations, cashier functions, and housekeeping tasks. This comprehensive system facilitates both individual and group room bookings, as well as the reservation of room blocks by companies and tour operators, with efficient monitoring of allocated quotas for each organization (Drobyazko *et al.* 2019).

In the highly competitive landscape of the tourism industry, the effective promotion of services and the attraction of new customers necessitate the utilization of diverse tools. Among these tools, the global network, including social media platforms, plays a pivotal role in facilitating communication between clients and travel companies. The pervasive influence of modern information technologies extends to virtually all aspects of life, with the tourism sector being no exception. As a result, information technology continues to evolve, offering a constant stream of innovative products, including software solutions, that cater to the evolving needs of the industry.

The aforementioned automation systems enable the consolidation of management processes and operational procedures within an enterprise, integrating disparate operations and individual application packages into a unified, integrated workflow. In practical terms, tourism enterprises can gradually automate specific functional groups of processes to enhance operational efficiency. The unique nature of production processes in tourism enterprises lies in the creation and design of routes and tours.

The software solutions utilized by tourism entities can be classified into standard and specialized categories. These software products facilitate data processing within a unified information system, ensuring prompt processing and transmission of data. Moreover, they employ standardized technological methods for executing specific operations and contribute to a significant reduction in decision-making time.

CONCLUSION

In conclusion, it can be deduced that the adoption of new technologies by society holds significant potential for enhancing the outcomes of human activities. These technologies provide effective solutions to numerous challenges faced by various institutions, including hotels. The primary objectives of a hotel encompass customer accommodation, service provision, room reservations, and more. The utilization of such technologies enables the

fulfillment of these tasks not only with superior quality but also with heightened speed and minimized resource expenditure. Hospitality and tourism constitute a globalized computerized industry, encompassing major airlines, hotel systems, and travel corporations worldwide. The modern travel product is transforming increased flexibility and personalization, rendering it more appealing and accessible to consumers. At the heart of any analytical system lies a robust database. With the rapid growth of the travel business and the escalating integration of information technology within this sector, challenges have emerged concerning the use of database systems. During the early stages of the hotel and tourism industry, database management systems (DBMS) played a central role and were well-suited for hotels. However, the utilization of databases has become increasingly challenging for modern hotel and tourism companies. Attempts to construct decision-making systems that directly access online transaction processing (OLTP) databases have largely been unsuccessful. Firstly, analytical queries often contend with operational transactions, resulting in data blocks and resource shortages. Secondly, the structure of operational data is designed to efficiently support brief and frequent transactions, rendering it overly complex for end users to comprehend and incapable of providing the required speed for analytical queries. Thirdly, organizations typically possess multiple operational systems, each equipped with its database. These databases employ distinct data structures, units of measurement, coding methods, and so forth. For the end user, such as an analyst, constructing a consolidated query across several databases becomes an almost insurmountable task. By considering the issue of data processing, it becomes possible to determine the preferable system for enhancing the reliability and dependability of information, thereby augmenting the efficacy of decision-making processes within the system.

The conducted analysis of contemporary information technologies and their application in the operations of tourism enterprises substantiates their practical value and relevance. The effectiveness of management and the enhancement of competitiveness within the tourism sector are directly contingent upon the proactive implementation and utilization of diverse modern automation tools (such as specialized software products, tourist Internet portals, CRM systems, etc.). Drawing from the study, the following primary avenues for improving the efficiency of tourism enterprises within the service economy through the active utilization of information technologies can be identified: heightening the efficiency of information dissemination and retrieval, intensifying promotional and marketing endeavors for tourism services, augmenting the profitability of customer interactions, and elevating the standard of customer service quality.

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