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## Reservation systems as a tool of tourist services marketing

**Abstract.** The study of modern reservation systems was conducted to determine their role in the tourism industry and to improve understanding of the basics of marketing activities of tourism enterprises. The article aims to analyze the functioning of modern reservation systems in the market of tourist services, to structure the existing reservation systems according to the operation levels and according to the distribution channels of the tourist product. The main methods of scientific research were: chronological, systematic research, logical analysis, statistical and structural analysis, which made it possible to logically and systematically investigate the modern reservation systems of and determine their hierarchy. The result of the study was the substantiation and construction of a hierarchy of connections in the world market of tourist service reservation systems, based on the scale of coverage of the tourism sector and the distribution channels of tourist services. In total, there are 5 levels of travel reservation systems in the world. The authors came to the conclusion that modern reservation systems are a marketing tool for travel companies that contribute to the distribution and promotion of travel services

**Keywords:** global distribution systems; online travel agencies; travel services; distribution channels; ratings

### INTRODUCTION

Any company in the tourism market must improve its activities if it wants to remain relevant in this market, keeping in mind the fierce competition and constantly growing customer requirements. In order to permanently have up-to-date information about the market situation, customer needs, and their preferences, companies need to invest in reliable multifunctional reservation systems. This will attract additional customers, expand existing distribution channels, and enable active and high-quality promotion of the tourist service on the market. The study of the current state of the reservation system market requires a permanent approach and processing of the latest analytical and statistical information, in particular, reports/ratings

published by leading companies in the tourism and information spheres.

On the other hand, when travelers book a hotel, flight, cruise or car, they expect an efficient, seamless process, or they may decide to choose another place or company. For today's tourism market companies, meeting the expectations of tourists means abandoning manual processes and investing in reservation systems that will allow tourists to make reservations when they want, on the channel of their choice, with a profitable form of payment.

However, the rapid development of reservation technologies causes a permanent need to study their interaction and mutual agreement, rating, classification, determination

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of their role in the tourism, in particular to attract new tourists, determination of their impact on the competitiveness of companies in the tourism market, on the promotion of their tourism products and the provision of tourism services.

Reservation systems play an extremely important marketing role in the tourism industry, attracting more and more tourists thanks to free access to the choice of a hotel, restaurant or flight, their reservation and simplified payment and, if necessary, to the cancellation of order.

Taking into account the rapid development of reservation technologies and rapid changes in the market of tourist services, there is a need to conduct a study of modern reservation systems in the world. The relevance of the research topic is determined by the need to study the place and role of modern reservation systems in the tourism, their interaction and mutual coordination, their impact on attracting new tourists, on the competitiveness of companies in the tourism market, on the promotion of their tourist products and the provision of tourist services.

Leading Ukrainian and foreign scientists pay considerable attention to information technologies in the field of tourism and, in particular, reservation systems.

Thus, S. Melnychenko (2010) considered IT in the activities of tourist enterprises to ensure effective implementation of marketing functions. However, the distribution channels of tourism services have not been investigated.

M. Skopenia (2015) studied information systems and technologies in the hotel, restaurant and tourism business and paid special attention to the study of specialized software (Orega Enterprise Solution, Moi Otel, 1C: Podpriemstvo 8.2), global reservation distribution systems (Amadeus, Galileo) and online reservation systems (Viliana), as well as other systems (TITBIT) in modern operating conditions of hotel-restaurant and tourist business enterprises.

M. Opalko & T. Primak (2016) investigated the automation of the management of a tourist enterprise through the improvement of the efficiency of its activity. Scientists have summarized and characterized the main software products for automating the work of enterprises, studied global computer reservation systems (GDS), integrated communication networks, multimedia systems, Smart Cards, management information systems and others.

E.A. Falko (2016) reviewed GDS from the point of view of transport reservations, mostly in airlines. The author investigated the activities of the largest GDSs – Amadeus, Saber and Travelport and came to the conclusion that the globalization of the tourism market creates prerequisites for strengthening economic relationships between countries and increasing tourist flows.

Yu.V. Sinyavina & N.M. Protsenko (2018), during the study of information technologies in the modern tourism industry determined their impact on meeting the growing demands of customers and increasing the competitiveness of the tourism business. Special attention was paid to the analysis of the Internet tourist segment and the use of global distribution systems (GDS).

T. Tkachenko & E. Kozlovsky (2018) focused on the study of the peculiarities of the work of global distribution systems (GDS), and also revealed the possibilities and prospects for their further development.

I.V. Bezugliy (2019) analyzed the use of information technologies in tourism in the most extensive way. The scientist's research covered global distribution systems, online booking in tourism, internet portals and computer programs for business automation, mobile applications. The scientist also described the world's largest global distribution systems and the most common booking services.

So, quite a large number of domestic scientists researched the automation and computerization of the tourist business, including reservation systems. The main attention in the works is paid to GRS, their effectiveness, impact on customer satisfaction, development prospects. However, other reservation systems in the travel business are either overlooked or neglected. In particular, the distribution channels of tourist services have not been investigated.

Foreign scientists investigate the problems of reservation systems in tourism in more detail, usually based on statistical data from primary sources of marketing information: surveys, questionnaires, field studies, etc. Such a research methodology makes it possible to obtain complex, substantiated results, which are relevant for practical use in the field of tourism. Consider several scientific studies.

A. Hartini (2018) investigated of the process change that occurs in GRS and web systems process change based on the case study of Agadar Travel. The scientists developed a mind mapping and substantiated its results in a description table. This made it possible to prove that the implementation of web processes in the reservation system increased the effectiveness of interaction with customers, will ensure business sustainability and increase the competitiveness of the travel company.

H. Byun, J. Kim & L. Byeongcheol (2020) analyzed the competitive advantages of leading GDSs in the tourism industry using niche theory. Based on a questionnaire, the authors measured the satisfaction level of travel agencies with the use of GDS. The study suggested directions for improving marketing strategies for selected GDSs.

C. Halkiopoulos & H. Antonopoulou (2020) showed how development of the Internet has changed the operating conditions of tourism companies and created new tools for tourism marketing. The authors argue that technological innovations facilitate communication and interaction between providers of tourism services and with customers.

J. Jović, P. Radovanović & C. Andreeski (2021) studied the impact of GDS on the development of tourism business using the example of travel agencies in Serbia. The authors came to the conclusion that modern information technologies prompted the emergence of electronic distribution channels, which increased the efficiency of activities in the market of tourist services

A.R.C. Perinotto & S.M Araújo (2022) investigated the impact of online reservations on the development of

the hospitality industry. For this purpose, the authors used the conceptual model “social influence” and “price” of the unified theory of acceptance and use of technology 2 (UTAUT2). The results of the survey made it possible to understand the profile of respondents and to determine the factors influence decisions when booking online.

Y. Zhao & H. Wang (2022) used the example of China to investigate online tourist attraction reservation intentions and factors affecting them. In particular, scientists singled out the effect on the reservation of government policy, usefulness and perceived risk. The findings of the study improved the understanding of reservations and the TAM (technology acceptance model) theory.

The analysis of scientific works allowed us to come to the conclusion that the problems of researching various aspects of modern reservation systems in tourism are quite broad. Scientists successfully find new niches for study, which makes it possible to implement new practical tools for tourism marketing. However, despite the versatility of the study of reservation systems, a comprehensive view of the modern world structure of reservations in tourism, the relationships between individual reservation systems and the formation of distribution channels of tourist services with their help is also necessary.

The purpose of the article is to analyze the functioning of modern reservation systems on the market of tourist services, to get acquainted with the ratings of reservation systems to determine the best and most effective reservation systems; to structure the existing reservation systems according to the levels of operation and according to the distribution channels of the tourist product.

## MATERIALS AND METHODS

The research was conducted on the basis of international ratings of GDS (Hotel Tech Report, 2022b; How to choose..., 2021), OTA (Top 10 online..., 2022; Andrews, 2022; Hotel Tech Report, 2022d) and CRS (Hotel Tech Report, 2022a; Top 14 airline..., 2021), statistical information on the activities of the world's largest reservation systems (Distribution of sales channels..., 2022) and leading online travel agencies (Online travel market..., 2022; Revenue of leading online..., 2022), reports of leading reservation systems (Hotel Tech Report, 2022c; Hotel Tech Report, 2022b; Amadeus Altea Suite, 2021) scientific publications of foreign and Ukrainian scientists.

Descriptive research method became basic in this work. This method, with the help of qualitative and quantitative data, made it possible to formulate the essence of the research, to describe the reservation systems operating in the market of tourist services in retrospect and in current trends, to analyze the connections between various elements of the reservation system, and to summarize the results. Together with the descriptive method, others were also used, depending on the stage of the research execution sequence.

The search-analytical method was used to collect the necessary primary information and study literary sources.

With its help, necessary information for further processing was selected.

Based on the critical analysis, the literary sources were worked out and the author's opinion on the directions of scientific research on the selected issues was formulated. This made it possible to single out a segment of the research that has not been sufficiently developed in the scientific literature.

A retrospective study of the main foundations of the development of reservation systems, in particular global distribution systems and online travel agencies, was carried out using a chronological method.

The next stage of the research was the analysis of the current state and statistical data in terms of reservation systems in the field of tourist services. The authors used the system research method, which made it possible to determine the state of the research objects, their internal structure, and the relationships between reservation systems. At the same time, the method of statistical analysis made it possible to analyze the indicators published in the reports of GDSs, OTAs, CRSs and make a ranking within the limits of the selected reservation systems.

The logical analysis method served as a basis for determining the impact of reservation systems on the competitiveness of travel service providers and travel agencies. At this stage of the research, the authors focused on the need to use innovative automated reservation systems in the operational activities of travel service providers and to demonstrate a direct connection between the growth of the company's competitiveness, the increase in the number of involved customers and the use of modern reservation systems.

The last stage of the scientific research was based on the method of structural analysis, which was used to build a hierarchy of the world's tourist service reservation systems and the possibility of booking for tourists. At the same time, the structural analysis made it possible to identify the distribution channels of tourist services in the world hierarchy of reservation systems.

## RESULTS

A reservation system is an automated program of travel market companies that is used to receive and store information regarding operations related to air travel, hotels, car rentals or other activities.

Modern reservation systems make it possible to establish a direct connection between:

- a tourist – a travel service vendor (hotel, airline, restaurant, etc.);

- a travel service vendor – a travel agency;

- a travel agency – a travel agency.

Modern reservation systems include:

- Global Distribution Systems (GDSs);

- Central Reservation Systems (CRSs);

- OTA reservation systems;

- booking through websites;

- booking via call centers.

GDSs are global network systems, the history of which

began in the 1960s, when American Airlines with the assistance of IBM created an electronic reservation system called “Semi-automated Business Research Environment” (SABRE) (Cloudbeds, 2022). Since then, reservation system technology has changed significantly.

Today global distribution system (GDS) is an information-communications system used for selling of services in tourism (Jović *et al.*, 2021). GDSs represent the electronic market that connects travelers, travel agencies, airlines, hotels, etc., and they have functioned as platforms for e-commerce in the travel industry to provide virtual real-time connections among thousands of travel inventory providers and several hundred thousand of travel product retailers (Byun *et al.*, 2020).

GDS contributes to the positioning and promotion of travel companies and their services, and attracts an ever-increasing number of tourists (How to choose..., 2021).

A GDS differs from the on-premises computerized reservation system used by travel service vendors in terms of scope and operational principles. The GDS functions as an intermediary between the travel agent and the Central Reservation System (CRS).

This means that the main clients of GDS are travel agencies that make reservations in systems managed by travel service providers. The GDS has real-time communication with the provider’s database (for example, the number of able hotel rooms or able seats on airplane). GDS does not build inventory: availability (rooms/cars etc.) is checked against the vendors’ own reservation system (CRS) (What is a computer..., 2022)

In this way, a GDS can link services, fares and reservations, consolidating products and services across all three travel sectors: for example, flight reservations, hotel reservations, car rentals.

In other words, the GDS is like a “window” into the hotel’s CRS system, for example, which shows available rooms, prices and restrictions. When a travel agency makes a room reservation, the GDS transmits the reservation information to the hotel system and removes the room from the hotel system’s reserve. A travel agent can complete the booking with just a few clicks instead of calling each vendor. And in this way, through GDS, travel agents can book not only flights or hotels, but also car rentals, cruises, train tickets and tours. GDS provides time saving, equal access of all travel agents to huge databases of travel vendors and offers huge marketing potential for all travel companies.

The largest Global distribution systems are:

1. Amadeus – the world’s largest GDS and exceptionally popular in Europe.
2. Sabre is the second largest GDS. Most popular in North America.
3. Travelport GDS owns Galileo, Worldspan and Apollo systems.

It is worth noting that all three companies are present in Ukraine and work under the brands Amadeus Ukraine, Travelport UA and Sabre Ukraine, spreading the standards of quality travel booking in our country.

There are also a number of regional GDSs operating in the market, such as KIU, which is popular in Latin America, and Travelsky, which is a state-owned GDS in China (Hotel Tech Report, 2022b).

In 2021, the global distribution system market was valued at roughly 6.1 billion U.S. dollars. This industry was forecast to more than double in size by 2028, reaching 14.6 billion U.S. dollars (Hotel Tech Report, 2022a).

A comparison of the industry coverage of the largest GDSs: Amadeus, Sabre and Travelport is presented in the Table 1.

**Table 1.** Leading GDS systems in number in 2021

GDS	Airlines	Hotels	Car rentals	Cruise and ferries (lines)	Railways (companies)
Amadeus	490	770 000+	42 000 locations (69 brands)	21	43
Sabre	420+	1 000 000+	40 000 locations (37 brands)	20	50
Travelport	400+	650 000	36 000 locations	50	19

**Source:** How to choose a GDS (2021)

So, the determining role in the formation of the GDS rating belongs to the airlines, 490 of which cooperate with Amadeus. At the same time, Sabre has the widest network of hotels for cooperation – more than 1,000,000, and Travelport – the most specialized in booking cruises – more than 50. That is, each of the leading GDSs has certain characteristics and occupies a unique niche in the market of booking tourist services. The largest GDSs make it possible

to reserve the services of the main components of the tourism infrastructure and form a common information system for the entire tourism industry.

However, despite the scale and industry coverage of the largest GDSs, each year the hospitality innovation platform Hotel Tech Report identifies the best distribution systems for hotels. The best GDSs for hotels in 2022 are presented in the Table 2.

**Table 2.** The best GDS providers for hotels in 2022

	GDS	The year of foundation	Company affiliation (headquarters)	Number of employees
1	HotelREZ - GDS Distribution	2004	Manchester, United Kingdom	34
2	DerbySoft	2002	Shanghai, China	201
3	Katanox	2020	Amsterdam, Netherlands	8
4	Travelport Digital Media Solutions	1971	Liverpool, Great Britain	4129
5	Sabre GDS Media	1960	Southlake, USA	7910

**Source:** Hotel Tech Report (2022c)

Unfortunately, contrary to the scale of activity and a significant share of the GDS market, Travelpor Digital Media Solutions and Saber GDS Media occupy only 4 and 5 places in the ranking, giving way to much “younger” companies. That is, the competition on the GDS market is quite fierce and efforts must be made to keep consumer demand.

The success of global distribution systems (GDS) is directly related to the functioning of central reservation systems (CRS) of tourism companies. CRS is an internal corporate reservation system that ensures coordinated work with the external environment. The most common CRSs are in hotels, restaurants, and airlines, although other travel companies may also use them.

A central reservations system (CRS) is software used in the hotel industry to manage room inventory, rates, bookings, distributions and revenue. It may be housed within the hotel's property management system (PMS) or may be standalone software connected to the PMS (Cloudbeds, 2022).

First of all, the hotel manager masses the hotel tariffs, available room stock and limitations into the CRS. The information is then distributed to the hotel's booking

channels, which include the hotel's website reservation system, OTAs, GDSs, and metasearch sites.

After a tourist books a hotel room on one of these channels, the information is sent back to the CRS, where it is stored until the guest is check in. Information about the availability of free numbers is updated on all distribution channels. This ensures economic efficiency of distribution.

Thus, the authors concluded that CRS of hotels provides an opportunity to expand distribution by reaching different types of sellers (OTAs, travel agents, etc.) in the markets of many countries around the world. CRS gives hotel finance managers insight into the market situation – managers can view prices and room bookings across all distribution channels, allowing them to quickly adapt to the market. In fact, CRS is an effective hub for marketing activities that stores booking information from all distribution channels, enabling hotel managers to receive current market information, adjust prices quickly and be an active player in the hotel business.

The advantages of using CRS in hotels are presented in Figure 1.

**Figure 1.** Advantages of using CRS in hotels

**Source:** developed by the authors based on Cloudbeds (2022)

Hotels' use of a digital reservation system, as opposed to "manual" reservation processes (mostly via call centers), puts them at a significant competitive advantage due to innovative technology compared to hotels with outdated or non-existent reservation software.

Every year, hospitality platform Hotel Tech Report publishes the Central Reservations Systems Guide, which identifies the leading companies in the hotel reservation systems market. The best hotel reservation systems (CRS) in 2022, according to the Guide'22 (Hotel Tech Report, 2022b) are presented in Table 3.

**Table 3.** 10 Best Hotel Reservations Systems (CRS) in 2022

Nº	CRS	The year of foundation	Company affiliation (headquarters)	Number of employees
1	Pegasus CRS & Distribution (Cendyn)	1996	Boca Raton, USA	570
2	Windsurfer CRS by SHR	1987	Houston, USA	111
3	Vertical Booking (CRS)	1999	Bergamo, Italy	28
4	GuestCentric CRS	2006	San Diego, USA	59
5	Busy Rooms	2008	Tal Pieta, Malta	52
6	Hotel-Spider	2002	Nyon, Switzerland	9
7	Djubo (CRS)	2003	Noida, India	82
8	Amadeus (iHotelier® Reservations & Booking Engine)	1987	Madrid, Spain	14190
9	RateTiger CRS (by eRevMax)	2001	London, Great Britain	199
10	Inntopia (CRS)	1998	Stow, Vermont USA	85

**Source:** Hotel Tech Report (2022b)

It's worth noting that 4 of the top 10 CRS companies are located in the USA, and 5 are located in Europe. This indicates the active development of software for hotels in these regions, and, accordingly, the demand for CRS in the hotel business market of these countries.

Airlines, together with hotels, also occupy an important place among vendors of tourist services. Airline reservation systems are extremely important and in demand for both airlines and travelers who want to book flight tickets.

The airline reservation system is a web-based reservation solution that allows the airline to sell its inventory (vacant seats on flights). Tourists can see the availability of free seats on the flight, their price. The system interacts with the GDS and coordinates the distribution channels of interested travel service providers.

The airline reservation system (CRS) use provides significant benefits to airlines, including (What is a computer..., 2022):

- all the services-related customer information such as Passenger Name Record (PNR) or Guest Name Record (GNR) are recorded;
- invoicing, accounting, customer and quota management is possible;
- high speed network of information infrastructure;
- fare quote, ticketing and voucher generating process;
- system can also store customer related information such as all the services provided to a certain customer, type of payment, service information etc;
- CRS are web-based applications which saves a lot of time on administration work;
- interfaces with technologies such as Amadeus, Travelport and APIs/XMLs;

- suitable for B2B and B2C business models;
- includes a comprehensive admin console;
- offers custom reporting.

Here are some of the major players in this field are: Aircore an Airline PSS Powered by Microsoft Azure, Avantik PSS, Abacus, ACCELaero, Axess, KIU, MARS, Radixx.

Of course, every company in this industry is trying to develop and present its own reservation software products to airlines. Therefore, in the CRS market for airlines, there is a quite large list of CRS programs and high competition between developers and providers.

In 2022, the best airline reservation systems were: Amadeus Altea Suite, Videcom, Rusada, Crane PAX, Merlot. aero, AeroCRS, ACCELaero, Radixx Galaxy, Navitaire, Zenith, KUI, SITA Horizont (Top 14 airline..., 2021).

Amadeus Altea Suite became the leader of reservation systems for airlines in 2022. It is a comprehensive passenger service system that provides departure and inventory capabilities, full reservation and delivering unique and integrated solutions to ensure the protection of the airline's key business functions at every stage (Amadeus Altea Suite, 2021).

The features of this program are (Top 14 airline..., 2021):

- reservation;
- inventory;
- departure control system;
- Amadeus EMD Server;
- Amadeus ticketing platform;
- Amadeus ticketing changer;
- Amadeus ticketing changer disruption.

That is, airline CRSs provide not only ticket reservations, but also the solution of various management tasks that satisfy the needs of passengers from the beginning of

the reservation to the end of the flight. With CRS, an airline or hotel management system integrates with a GDS or OTA and provides inventory access to a wide network of distribution channels. CRS provides quality customer support, analyzes company operation by creating detailed analytics and reports, and can advise on revenue and pricing strategies. CRS technology has reached a point where travel agencies cannot do their jobs without it.

CRS is one of the most important tools of any travel agencies to generate more profit and to achieve total guest satisfaction and ensure customer retention (Vizconde & Felicen, 2013).

Conversely, the lack of a reliable and accessible CRS leads to huge losses for the company: a long or complicated order process leads to the refusal of potential customers to complete it. The totality of unearned income can become critical for the company and lead to a loss of competitiveness in the market. This necessitates the constant search for more flexible and fast-acting reservation systems, which would accept different forms of payment, be available in different parts of the world, which would ensure higher conversion rates.

It is worth noting that in 2021, 66% of worldwide sales in tourism and travel were made online, only 34% were offline sales. According to forecasts, this trend will continue increasing the share of online sales to 74% by 2026 (Distribution of sales channels..., 2022). The market size of the global online travel sector was estimated to increase

in 2021 over the previous year. Overall, the online travel market worldwide was expected to be worth roughly 433 billion U.S. dollars in 2021, rising from around 396 billion U.S. dollars in 2020. This market is forecast to amount to approximately 691 billion U.S. dollars by 2026 (Online travel market ..., 2022). This means that the current distribution of travel sales is and will continue to be dominated by online sales, and accordingly, online travel agencies (OTAs) will be actively developing. Therefore, it is appropriate to investigate reservation system technologies in OTAs, especially since they are directly related to GDS and CRS reservation systems of hotels and airlines as consumers of their services.

An online travel agency (OTA) is a web-based marketplace that allows consumers to research and book travel products and services, including hotels, flights, cars, tours, cruises, activities and more, directly with travel suppliers. Every day, millions of travelers around the world use OTAs to plan leisure and business travel (Why do you need ..., 2019).

OTAs give travel vendors (primarily hotels) access to potential guests in locations and volumes that they would have difficulty accessing through their own marketing efforts. In addition, OTAs provide market intelligence and targeting tools to engage with travelers, process reservations, engage with guests, and manage reviews.

OTAs work on a commission basis: they receive a commission after a guest stays at a hotel booked through their service. The best online travel agencies (OTA) in 2022 are presented in the Table 4.

**Table 4.** The best online travel agencies (OTAs) in 2022

No	OTAs	The year of foundation	Company affiliation (headquarters)	Number of employees
1	Booking.com	1996	Amsterdam, Netherlands	More than 200 countries
2	Expedia	2001	Bellevue, Washington, USA	Over 40 countries
3	Agoda	2005	Singapore	Specializes in the Asian market. Popular in Europe and America
4	Airbnb	2008	San Francisco, California, USA	Worldwide
5	Trip.com (Ctrip)	1996	China	More than 200 countries

**Source:** developed by the authors based on Top 10 online... (2022)

The top OTAs most popular with travelers are Booking Holdings and Expedia Group. Therefore, the largest number of online bookings are made through these two companies. With many brands spanning different categories and regions, Expedia and Booking cover all corners of the globe and all travel niches.

The vast majority of bookings made through Booking Holdings are overnight hotel stays. In 2020, guests made almost 355 million reservations of this type, in 2021 – about 653 million reservations (Revenue of leading online..., 2022). In 2020, the global tourism industry has been severely impacted by the COVID-19 pandemic. Only in 2021 did tourism slowly begin to recover and return to normal operating conditions (Bhuiyan *et al.*, 2021).

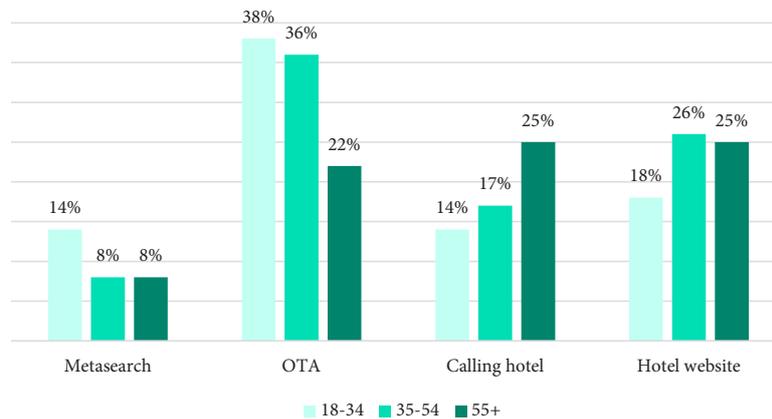
Booking Holdings also offers transportation bookings, with around 31 million car rental days and 6 million airline tickets booked through the company in 2021, although flights are the least popular segment. Overall, Booking Holdings' gross bookings in 2021 reached more than \$76 billion, with the agency model delivering the most value (Revenue of leading online..., 2022).

The ranking of the best global online travel agencies (OTAs) of 2022 also included: HRS, TripAdvisor, VRBO, eDreams ODIGEO, Hotels.com., each of them occupies a certain niche of the travel market and covers significant geographical distribution areas. HRS.com was founded in 1972 and focuses on business travelers eDreams ODIGEO is the largest online travel agency in Europe, offering cheap

flights, travel packages and hotel reservations. Hotels.com is famous for its loyalty programs (Top 10 online..., 2022).

OTAs have become a convenient and fast tool for tourists. Planning each trip is no longer difficult and doesn't require excessive effort. OTAs offer a wide range of services, including online hotel reservations, air tickets and car rentals, which is constantly increasing their popularity among tourists. However, the disadvantage of OTA is controlling a large percentage of hotel bookings and charging high commissions in the process.

According to the authors, it is important that hotels provide travelers with the option to book without a commission, for example, through the hotel's website. Hotel owners can implement a "complex" booking mechanism to cover all categories of tourists and give them the opportunity to choose the best booking system. The expediency of the "complex" approach to the organization of the reservation system in hotels is also confirmed by statistical data published by the Hotel Tech Report (Fig. 2).



**Figure 2.** The structure of hotel reservation channels, divided by age of guests

**Source:** The 20 Best online... (2022)

Thus (Fig. 2), OTA reservation systems are the most popular. The importance of hotel reservations through direct distribution channels – call centers and websites – is also evidenced by the data in the chart. These hotel booking methods are especially in demand among older people – over 55 years old, who prefer direct communication with hotel managers.

Direct hotel booking channels (call centers or web sites) introduced to facilitate booking or to establish direct marketing of hotel services. This diverts traffic away from OTAs to generate more revenue for hotels and ensures a seamless booking process for guests. At the same time, direct booking makes it possible to reach all age groups of guests and not lose them due to "over-computerization".

It is worth noting that the preferences of tourists for the types of reservations have become the subject of research by a number of scientists (Boto-García D *et al.*, 2021; Murphy *et al.*, 2016; Stangl, *et al.*, 2016). The researchers concluded that despite the growing number of online bookings, traditional channels such as the telephone are still important for tourists. And a small proportion of tourists continue to book via offline channels This is relevant for practical use by hotel managers and travel agencies.

So, in order to meet the needs of tourists and reach more and more of them, it is advisable in the hospitality industry to use different booking systems – to implement CRS to cooperate with OTAs, to develop direct booking channels and to cooperate with metasearch engines. That is, to introduce "complex" booking of tourist services. At

the same time, hospitality establishments should remember that the ideal booking system for the guest is one that works flawlessly on mobile devices and is compatible with the social media websites that host the hotel. In addition, the system should allow for flexible payment methods such as Apple Pay, Google Pay, Amazon Pay, Stripe and Paypal to ensure fast and easy booking. This will increase the conversion rate and increase the hotel's income (PSD2 in real life, 2019).

And finally, will consider restaurant reservation systems, which are an integral part of the tourist infrastructure and occupy an important place in the system of providing tourist services. Recent reports have shown that over 50% of people prefer pre-booking their tables (TouchBistro, 2021). Eating out trends are growing and becoming more and more popular. That is why people want to book a table in advance, so as not to wait in line for a free table or not get into the restaurant. Therefore, booking tables in restaurants has become quite popular, and many online systems operate to facilitate it.

The most common online booking channels are direct reservations and third-party booking platforms.

Direct reservations are made by diners directly through the restaurant's website. Restaurants can fully control the reservation process. Third-party online booking is specialized online booking platforms that allow visitors to find and reserve a table in a restaurant for a pre-determined fee. This is an effective channel for a restaurant to reach more diners with minimal effort (Andrews, 2022). The best online restaurant reservation systems in 2022 are presented in the Table 6.

**Table 6.** The best online reservation systems available for restaurants in 2022

No	Online restaurant reservation systems	The year of foundation	Company affiliation (headquarters)	Reservation system coverage
1	Eat App	2015	Dubai, UAE	60 countries
2	Resy	2014	New York, USA	Over 4.000 restaurants in over 200 cities with reservations primarily in New York, Los Angeles, San Francisco and London.
3	Wisely	2013	Ann Arbor, Michigan, USA	
4	Tock	2012	Chicago, USA	North and South America. Over 50,000 restaurants.
5	OpenTable	1998	San Francisco, California, USA	26 countries, more than 200 cities
6	Yelp Reservations	2004		Over 80 countries, over 60.000 restaurants.
7	Table Agent	2015	San Francisco, California, USA	Over 11.000 restaurants

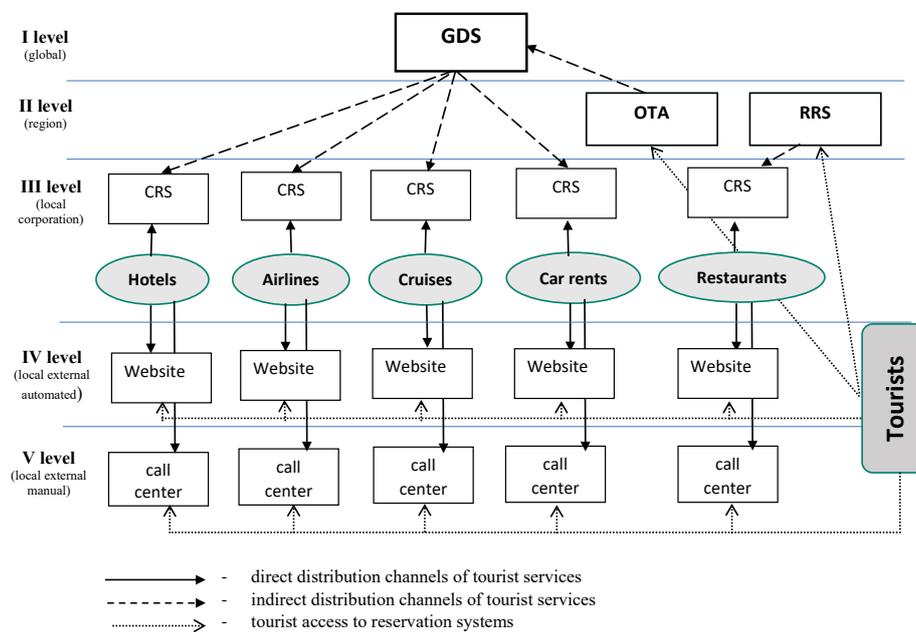
**Source:** developed by the authors based on Andrews (2022)

Thus, the online restaurant reservation system market is quite crowded. Operator companies are relatively young, but in terms of territory, reservation systems cover almost the entire world. This confirms the ultra-fast pace of development of Internet technologies, in particular, in the field of restaurant hospitality.

Of course, online restaurant reservation systems have their advantages and disadvantages, but what is undeniable is that they take a huge responsibility off the staff and greatly improve the day-to-day operations of restaurants.

On the other hand, visitors received an extremely convenient service that gave them access to reserve tables in thousands of restaurants around the world with a few clicks on their smartphones.

Consequently, the authors investigated modern reservation systems in the market of tourist services in terms of the components of the tourist infrastructure. Based on the conducted research, will present the hierarchy of relationships between the studied reservation systems and depict it in Figure 3.



**Figure 3.** Hierarchy of the world's tourist service reservation systems and reservation options for tourists

**Source:** developed by the authors

Thus, the conducted research allowed the authors to distinguish 5 levels of the hierarchy of reservation systems in the world.

Level I – global – contains global distribution systems (GDSs), which cover the largest territories and function as an intermediary between OTAs and CRSs of travel

service vendors. Indirect channels of distribution of tourist services pass through GDS.

Level II – regional – includes online travel agencies (OTAs) reservation systems and restaurant reservation systems (RRSs), which cover dozens of countries and thousands of hospitality establishments in different parts of the world. Although level II reservation systems have an extremely wide coverage of the travel services sector, they are distinguished from the global level by the number of companies they cooperate with.

OTAs, by forming indirect distribution channels through GDSs, enable tourists to book hotels, flights, cruises, car rentals, etc., by accessing to the companies' CRS. RRS allows visitors to reserve tables in restaurants, through access to the restaurants' CRS. RRSs also forms an indirect distribution channel for restaurant service.

Level III – local corporation – is the CRSs level of travel service vendors: hotels, airlines, cruises, car rental, restaurants. This is a direct distribution channel. This level of reservation systems is quite wide and well developed, but tourists do not have access to it. These reservation systems are for corporate use only and to communicate with higher level reservation systems – GDS, OTA or RRS.

Level VI – local external automated – is a booking system through websites of travel service vendors, which are their link with the external environment. Through websites, tourists can quickly and without intermediaries (directly) book the necessary service and get an answer immediately. The reservation system through websites is a direct distribution channel of travel companies and has many advantages for tourists.

Level V – local external manual – includes reservations made by tourists through call centers. It is also a direct channel for the distribution of tourist services. A feature of this level is the lack of computerization of the reservation process. The tourist contacts the company directly, expresses his wishes, and the operator (manager) manually enters the guest's reservation data into the system.

So, the proposed hierarchy of the world's tourist service reservation systems is quite complex and extensive, covers all vendors of tourist services and demonstrates the possibilities of tourists to book a service. Also, this hierarchy made it possible to display direct and indirect distribution channels of tourist services, which, from the marketing point of view, play a decisive role in the product promotion and make it possible to attract new consumers of tourist services every time. In this context, we agree with the statement (San-Martín *et al.*, 2020) that reservation systems in

tourism are the most important marketing channel, and understanding the reservation structure will help managers of travel companies implement more effective pricing strategies (Wen *et al.*, 2020).

## CONCLUSIONS

The tourism business is actively developing both within each country and around the world. The basis for the development of tourism is created by computer reservation systems, the emergence of which was caused by the computerization and digitalization of the service sector. Computer reservation systems simplify tourists' access to tourist services, provide ease and simplicity of their selection and reservation. Computer reservation systems show high efficiency and multifunctionality in the activities of tourism companies, demonstrate the possibility of covering large areas and attracting millions of tourists.

The study made it possible to analyze the modern world market of travel reservation systems and to determine its hierarchical structure. The scale of coverage of the tourist sphere and channels of distribution of tourist services were laid as the basis of the hierarchy of reservation systems.

Thus, global distribution systems (GDS) were assigned to the I global level; online travel agencies (OTA) and restaurant reservation systems (RRS) formed the II regional level; at the III level – local corporate level – the functioning of the central reservation systems (CRS) of companies providing tourist services is allocated; the VI level was formed by local external automated reservation systems, in particular, websites of travel companies; and level V – local external non-automated reservation systems, formed by the call centers of travel companies.

The ease of booking with the help of various computerized reservation systems makes it possible to attract an increasing number of tourists to popular and new hospitality establishments, as well as to use the services of airlines, railway transport or rental cars without problems. In fact, reservation systems have become a tool for the distribution and promotion of tourist services, and therefore comprehensively contribute to the development of travel companies marketing.

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## CONFLICT OF INTERESTS

None.

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## Системи бронювання як інструмент маркетингу туристичних послуг

**Анотація.** Дослідження сучасних систем бронювання проведене для визначення їх ролі в індустрії туризму та для покращення розуміння засад маркетингової діяльності підприємств туристичної сфери. Стаття має на меті проаналізувати функціонування сучасних систем бронювання на ринку туристичних послуг, структурувати існуючі системи бронювання за рівнями функціонування та за каналами розподілу туристичного продукту. Основними методами наукового дослідження стали: хронологічний, системного дослідження, логічного аналізу, статистичний та структурного аналізу, які дали змогу у логічній послідовності, системно та структуровано дослідити сучасні системи бронювання та визначити їх ієрархію. Результатом дослідження стало обґрунтування та побудова ієрархії зв'язків на світовому ринку систем бронювання туристичних послуг, на основі масштабу охоплення туристичної сфери та каналів розподілу туристичних послуг. Загалом виділено 5 рівнів систем бронювання туристичних послуг у світі, найвищим з яких є глобальний, а найнижчий – це рівень колл-центрів постачальників туристичних послуг. Автори дійшли висновку, що сучасні системи бронювання є інструментом маркетингу туристичних компаній, які сприяють розподілу і просуванню туристичних послуг

**Ключові слова:** глобальні системи розподілу; онлайн туристичні агенції; туристичні послуги; канали розподілу; рейтинги