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TOURISM AND HOSPITALITY IN CONDITIONS OF DIGITAL ECONOMY: PROBLEMS AND PERSPECTIVES

Monograph

Under the general editorship of DSc in Economics, Professor K. Naumik-Gladka

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The issues of the tourism and hospitality industry growth prospects in the digital economy, the features and specifics of digitalization of business processes, the relationship between the travel and tourism competitiveness index and world digital competitiveness ranking, the use of modern information systems and technologies as well as quality management, internet marketing and advertising in the tourism and hospitality businesses have been considered.

For employees and specialists of the tourism and hospitality industry, lecturers, university and PhD students.

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Section 4. The use of modern information systems and technologies to improve the competitiveness of tourism and hospitality businesses

Under current conditions, it is difficult to imagine a business that would not use a variety of software products whose main purpose is to improve selected business processes. Standard software programs have already become commonplace, where every movement of a potential consumer takes its life cycle from registration on a website to the desired effect, specifically – the purchase of a product or service. The tourism and hospitality business is no exception, they are rather those areas of activity where information systems and technologies are leading both in quantitative diversity and qualitative content. Information systems help to optimize the interaction of all participants in the tourism market, effectively combining the tourists' desires, the capabilities of tourism industry players and market opportunities.

The electronic space is expanding and is being updated rapidly, online platforms, e-guides and services (cars, delivery, concierge service, etc.), online reservations, self-registration desks, chat bots, blogs and channels are becoming integral elements of doing business.

The use of modern information systems stimulates the development of an enterprise, increases its competitiveness and allows it to qualitatively stand out from its competitors. Domestic tourism and hospitality businesses are leaders in this area of innovation as far as the market is dynamic and, accordingly, it is necessary to adapt quickly and effectively both to changes in the environment and to the consumers' preferences directly. According to the competitiveness and innovation data of the world rankings in 2021, Ukraine occupies the following positions. In particular, according to the world competitiveness rankings, Ukraine takes 54th place among 64 countries represented in the ranking. The Ukraine's ranking dynamics during 2016 – 2021 is presented in Fig. 4.1.

Moreover, innovation, digitalisation, supportive policies and social cohesion are identified as key factors.

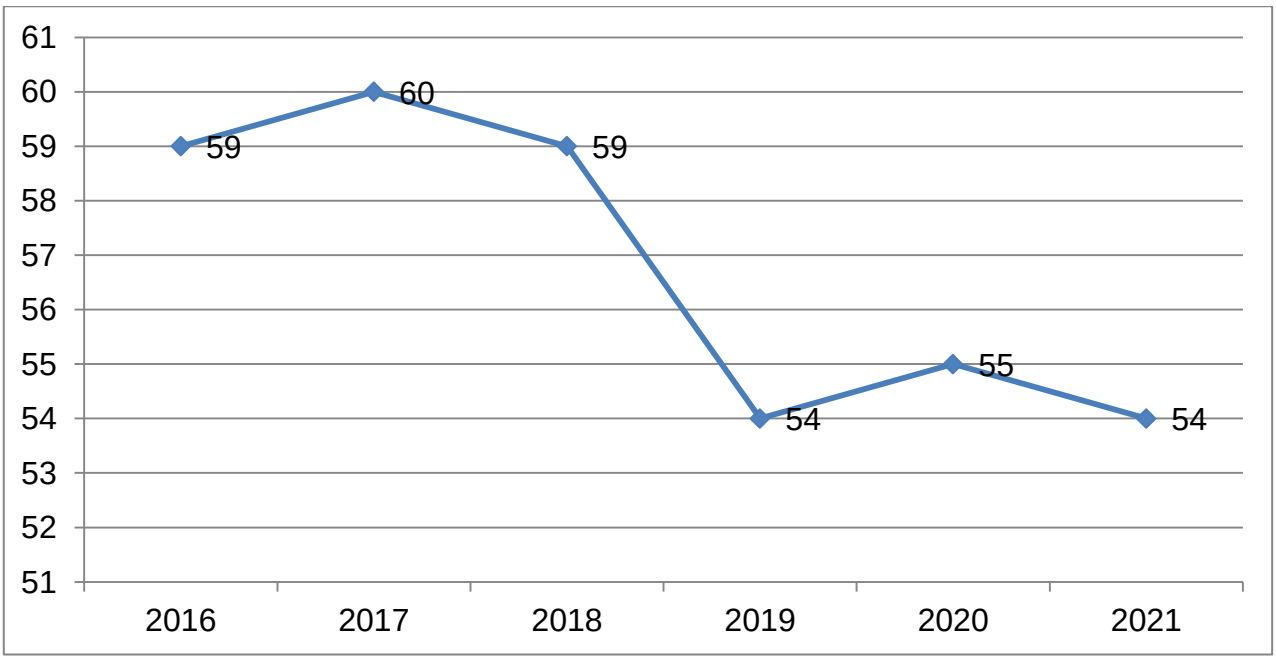

Fig. 4.1. **Ukraine's place in the world competitiveness rankings**
(compiled by the author based on [198])

Besides, the human resource capacity and digitalisation are ranked in the study separately with Ukraine ranked 42nd and 58th respectively. The competitiveness analysis demonstrates an improvement of Ukraine's position in the global rankings during this period, in particular, in terms of innovation activity as well as in the Technology and Knowledge blocks.

In 2021 the Global Innovation Index (GII) ranks Ukraine 49th among 132 countries [200]. For this rating an analysis of almost 80 indicators, aimed at assessing innovation resources and results, is carried out to measure the country's innovation activity. Thus, for comparison, the country's position was better in 2020 and was determined as 45th while in 2019 it was 47th. According to the study of the World Intellectual Property Organization [200], there is a link between income (GDP per capita) and innovation development, and the stronger the link, the stronger the country's position in this field. In particular, Fig. 4.2 shows a positive correlation between innovation and income levels (the X-axis represents GDP per capita, the Y-axis shows GII Score). What is more, if the country's economy is higher than the trend line, it shows a better position than expected, and if it is lower, the expected results from innovation are lower than the corresponding income level.

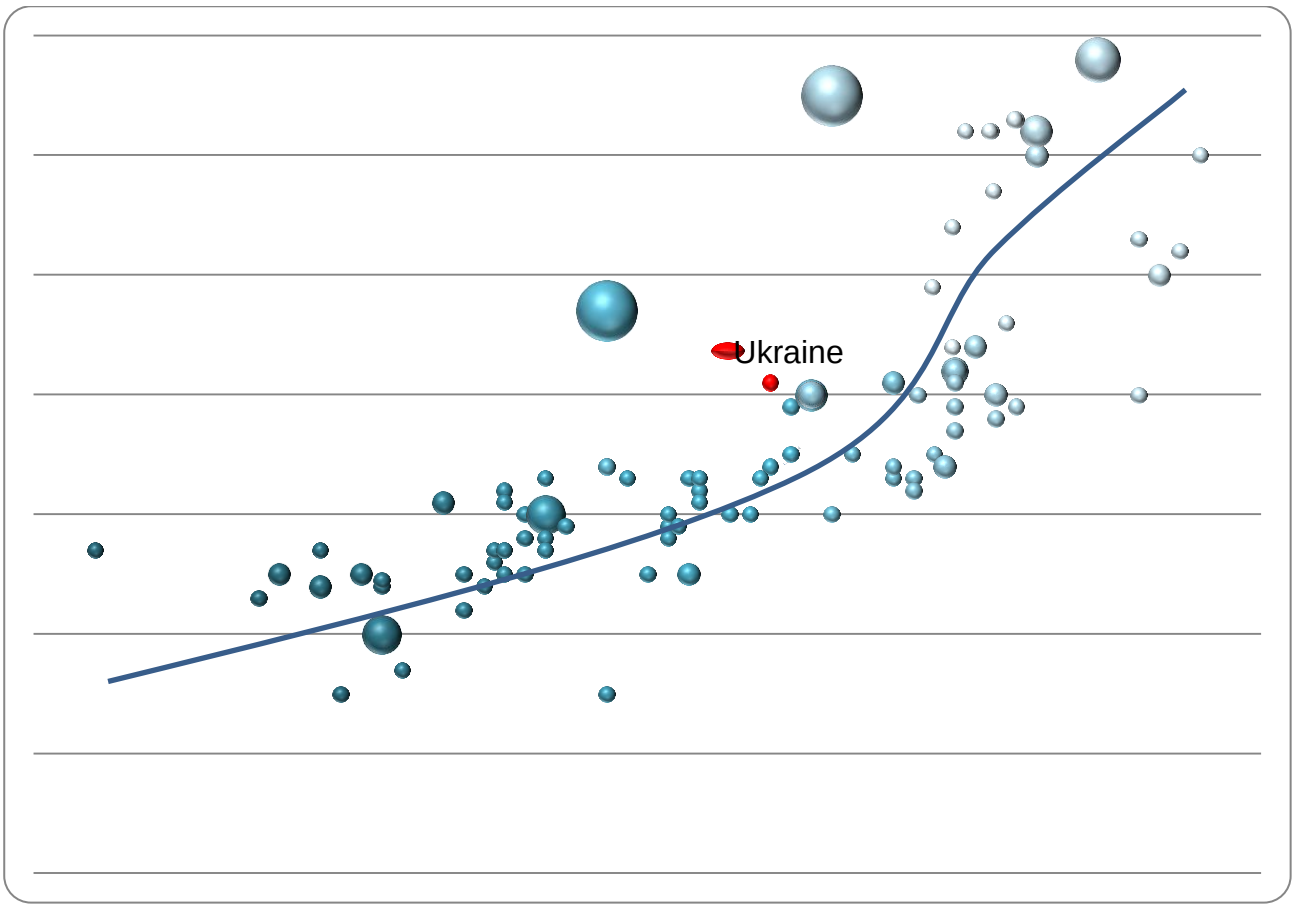

Fig. 4.2. **The relationship between innovation and development**
(compiled by the author based on [200])

When assessing innovation performance in relation to the level of investment in these innovations, there is an excess over investment. Therefore, it is necessary for investment policy to encourage investments in innovation for economic development to grow. The use of innovations, in particular the creation of domestic competitive information systems, should be an important component in order to increase the competitiveness of the country and, consequently, of the enterprises themselves.

The last ten years have seen a qualitative leap in the development of information technology which has encompassed all areas of the economy. And the events of 2020 have stimulated development even more rapidly when an active combination of the so-called online and offline formats has begun. It is only natural that the tourism and hospitality businesses have used information systems and technologies intensively prior to these events but in contemporary conditions the software products have been modified and the

functionality of the programmes has considerably expanded. Moreover, services that do not require direct contact with the company's staff have been introduced or further expanded. Thanks to special applications that do not require additional skills, it is possible not only to book a tour or a room, but to fully check in or to make a payment. And the list of such services is expanding in every information system.

The consumers have also begun to refocus from the conventional mode of visiting a travel agency office to online mode, where, starting with chatbots, it is possible to obtain all the necessary information, view relevant videos, read real reviews and make payments. The latter, however, is still questionable for a customer especially if an agency or hotel services are used for the first time. Nowadays, there are numerous ways to pay securely which has become commonplace for consumers aged under 40 – 45. As for the older age group, the percentage of information programmes usage compared to the previous age group is much lower, and, consequently, the level of distrust of online payments is high. As a rule, consumers who frequently use booking services such as hotels or airline tickets, do not have any problems with the process. Those who are not quite confident in buying online deal with agencies specialising in these activities or take advantage of the relatives' help.

When considering this area scientifically, there are many works devoted to the use of information systems and technologies both among foreign scholars and domestic ones. Of particular attention is the study carried out by I. Khatri [45] where the author conducted a detailed analysis of key researches illustrating the use of information systems and technologies in tourism. The study focuses, first of all, on the importance of introduction of information technologies into activities of the tourism industry enterprises as well as on the resulting competitive benefits for these enterprises. Secondly, the analysis of more than 60 scientific papers allowed the researcher to come to the generalizing conclusions that the use of information technologies in the work of service sector enterprises is caused by the study of information needs, consumer behaviour at various stages and formation of competitive advantages for the enterprise.

Z. Xiang' research [54] draws attention to the peculiarities of the Internet technologies use while planning the travel, as does the work of E. No and J. Kim [52] which aims to study the use of travel resources through smartphones.

In S. Ivanov's study [44] devoted to the impact of information technologies on the tourism industry, it is emphasized that information technologies can have both a positive impact on the enterprise development in this sphere and a negative one. In the future the result of the new technology introduction is viewed as a division of tourism and hospitality enterprises into high-tech ones, which will offer automated but cheaper standard services, and companies with a high level of service quality where personnel will play a significant role.

There are many works devoted to this direction of scientific research by domestic researchers, among them are S. Melnychenko [16], M. Benko [2], M. Skopen [29], O. Rudkivsky [82].

It is worth emphasising that in the literature there is a simultaneous use of both concepts – information systems and information technologies in tourism. Since these concepts are not synonymous, therefore, it is important to distinguish them on the basis of scientific research. Thus, it is necessary to analyse the essence and main differences between them.

In particular, an information system is considered to be a set of elements that collect, process, transmit, store and provide data that are united by a common objective [12]. M. Benko provides a detailed analysis of the various approaches to defining an information system [2]. The author notes that the main objectives of an information system include:

identifying sources of information;

collecting, recording, processing and issuing information concerning the state of the object of study;

disseminating information among the relevant system participants.

Availability of a direct database is another important element of the information system. At the same time, M. Benko also considers different approaches to the interpretation of information technology, which is understood as transformation of source information into result information.

That is, information technology is a part of the system, thus, it is narrower, but a mandatory element of the use of technical means. Therefore, in the practical activities of tourism and hospitality enterprises information systems are used when within them a significant place is given to the technology application.

Quite often, information products emerge as start-ups which then continue to gain popularity and become the unchanging totalizer of the

service sector. In the tourism and hospitality sector this is evidenced by the large number of start-ups that have been growing in recent years.

Businesses are trying to be the first to find such products in order to improve their own competitiveness further enabling them to distinguish significantly from the competitors and, more importantly, to become market leaders with a large number of competitive advantages.

Thus, every year the European Union promotes the best travel start-ups and publishes a ranking of "100 Best European Startups". In particular, the "EU – Startups Summit" is a global event to present, promote and capitalize on Europe's most popular startups [128].

For example, in 2021 representatives of different countries attended this event and the finalists were represented by participants from Poland, Romania, Greece, Cyprus, Croatia, Italy, Spain, Hungary, Ireland, Ukraine and Belgium and they presented their startups in 18 categories [178].

In the "Tourism" category, "Live Electric Tours", which was also the winner of the "World's Best Startup" in the "Sustainability" category of the "Tourism Startup Competition" organised by the UNWTO, took the lead.

Besides, according to Crunchbase research [183], 2021 began to revive in both the number of start-ups and their funding. In 2021, the event combined two years at once – 2020 and 2021 due to relevant events. Therefore, the previous year for startups consideration was 2019.

As reported by Crunchbase research, in 2019 the total startup market was estimated to be worth more than $1 trillion. Moreover, the largest and most frequent investors are from the EU and the US.

In the Travel & Tourism category, the most profitable startups were [133]:

Airbuy, a service that optimizes the process of purchasing in the duty-free zone [103];

Heycars, a service for corporate clients and travellers for professional chauffeur-driven service around the world [139];

Timeshifter, a mobile app that helps tourists prepare for jet lag and reduces the difficulties of flying [186].

Startups in tourism growing in popularity are:

KLOOK (a tour booking platform) [147];

OYO (a platform for selecting budget hotels) [161];

Evaneos (personalized travel management) [129];

Omio (first known as GoEuro (a search for air and train tickets in Europe)) [158];

Traveloka (an online travel agency) [189];

TripActions (a business travel service) [193];

Adara (analytics of metabase for airlines and hotels) [101].

The innovators of international tourism development in the 5 last years are considered to be [83]:

Flio (Hamburg), whose the main purpose is to optimise the consumer's time who is waiting for the flight at the airport [134];

Medigo (Berlin), providing online search and communication of tourists with doctors worldwide [153]. This service brings together more than 1,000 leading doctors in the field of medical tourism. The platform is free and available in five languages: English, German, Spanish, Italian and French;

HotelChamp (Amsterdam), a service offering hoteliers a set of data collection and processing tools that increase direct revenue of hotels [141]. This service operates in more than 1200 hotels in more than 40 countries;

Comtravo (Berlin), an artificial intelligence platform that uses speech recognition and provides support by travel specialists to book tours [117];

MindSay (rebranded Destygo (Paris), a chatbot for travellers) [155]. The service allows artificial intelligence to create chatbots and voice communications between tourists.

Amadeus, a global distribution service provider that is actively involved in the startups development in the field of tourism and hospitality. In particular, the company initiates new projects in this area through access to the database and the possibility of testing startups with customers. The company has a special division dedicated to startups – Startup Universe Amadeus [109].

Amadeus for Startups consists of the following units:

Amadeus Ventures, which is an investment launch program;

Amadeus Nexwave, a business incubator that works with startups to identify and develop transformational ideas;

Amadeus for developers, that aims to discover, connect and create new solutions through APIs;

Amadeus Startup Launchpad, a global startup launch and growth program.

In 2021, the company has identified the top 14 most promising tourism startups:

Airalo, an electronic SIM card shop providing reliable communication in over 190 countries of the world [102];

Airobot, an automated platform offering online booking and after-sales services [34];

Airside (a project of Amadeus Ventures investment), offering a privacy service which gives people full control over their digital identity [104];

Atza, a service that provides simulators for corporate training in the aviation industry using Extended Reality (XR) [112];

CitizenPlane, a service that resells the remaining tickets on competing routes to increase occupancy. It integrates free seats of airlines, tour operators and charters in around 120 distribution channels [116];

Gamitee, a platform that integrates with the travel booking company's website and turns customers into real consumers by creating groups [135];

Journera (a project of Amadeus Ventures investment), a platform that uses data during the journey to obtain a holistic view of its customers [145];

Local Measure, a service that provides tools and data for creating a personalized visitor experience which increases guest satisfaction and encourages guest loyalty [150];

Questo, an application for gamified tours which enables tourists to discover new places [165];

Sion, a cloud web application for the tourism industry [175];

TakeMe, a service that connects various international payment brands to each seller using a QR code [180];

Travaxy, a platform that provides accurate accessibility information for people with disabilities and the elderly [188];

Trip Ninja, a platform that allows creating complex itineraries in seconds, thereby offering more competitive offers [192];

Troop, a service that helps groups planning corporate routes by finding the optimal meeting places taking into account various factors [194].

These are the key projects that are perspective and of great interest to both consumers and tourism businesses.

For comparison, only 8 key startups were selected by the company in 2020 [110], in particular:

AirPortr, baggage check-in and delivery;

ClimaCell, the analysis of meteorological data;

Dawex, about data exchange in ecosystems;

GeoSure, that concerns travellers' personal security;

Pana, an organisation of corporate trips;

Refundit, VAT refund;

Smartvel, which is about tourists' impressions;

Volantio, maximising airline profits.

2019 was also fruitful for quality startups, with 18 start-ups identified in particular: 30K (bonus mileage calculation), Applango (increases call centre productivity), Assaia (information on cross-flight aircraft preparation), Avuxi (destination popularity assessment), Betterez (a global platform for carriers), BookingPal (integrated marketing solution), Civic (personal identification), Crowdvision (passenger traffic flow analysis for airlines), Fluo (insurance services), FLYR (evaluation of real airline offers), Koddi (matching hotel marketing strategy to different meta search channels), Lumo (optimizing actions in case of flight delays), MyLittleAdventure (finding things to do while travelling), Relay42 (online travel management), Sherpa (e-visa facilitation), Situm (tourist environment information), StubHub (selling tickets for concerts and entertainment events), Yapta (quick flight and accommodation price comparison tool) [108].

As for Ukrainian tourism startups, Tripmydream is the world-famous and globally recognized [75]. It can truly be considered an innovative domestic competitive product that allows online search for the most profitable travel products of airline and hotel services according to a given budget. Having topped the first position in 2016 at the Seedstars Summit 2016 international competition, the startup received a reward of 500 thousand USD. The key idea behind the startup, and now a successful business, is that travel should be easy and enjoyable. Besides, the service also has its own travel blog providing quality information on travelling, peculiarities of visiting a certain country and assistance in solving travel-related issues.

The main destinations offered to the consumer by the company are given in Fig. 4.3.

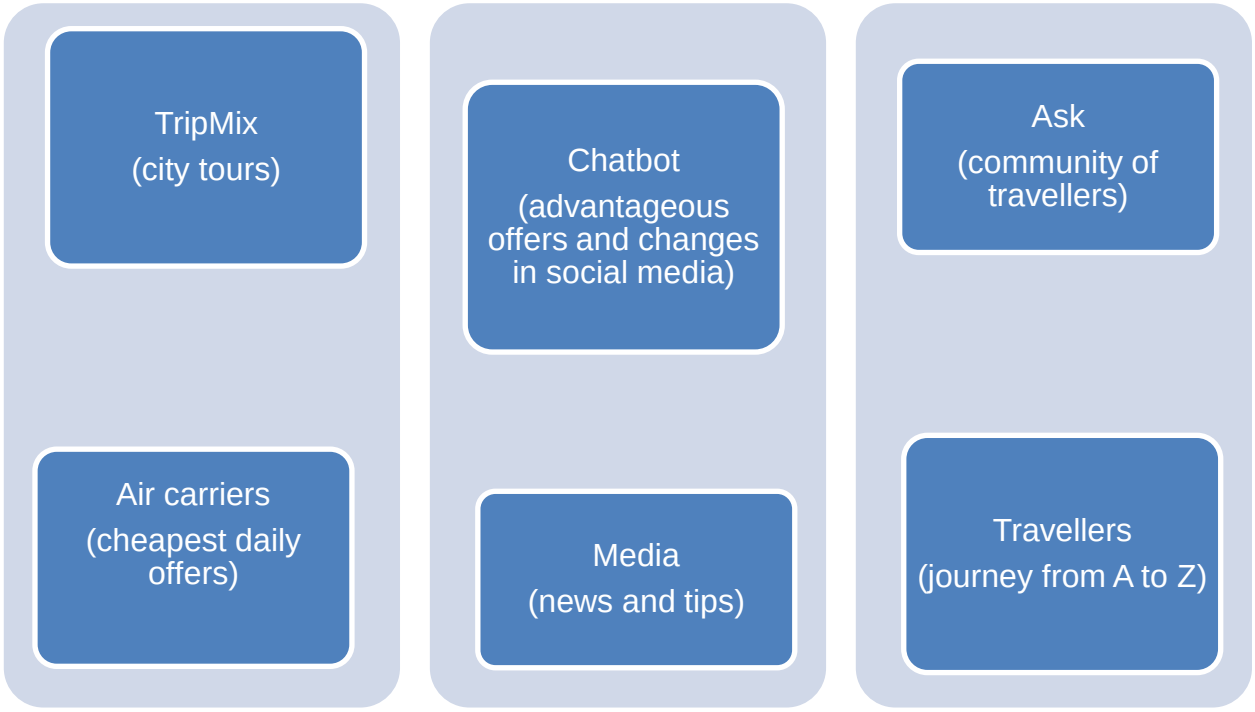

Fig. 4.3. **The key products of Tripmydream**
(compiled by the author based on [75])

In Ukraine, the Ukrainian Startup Fund deals with startups at the state level in addition to global contests and funds [96]. Based on the results of the thirteenth Pitch Day, three winners at the seed-stage were determined:

Outloud. Ai, a platform that automates voice communication with consumers through artificial intelligence;

Esper Bionics, a project that creates a prosthetic arm and a cloud platform that teaches the prosthetic arm the necessary skills;

IGnation, an application that develops and monetizes social media profiles.

The number of startups in Ukraine has increased significantly over the last 3 years, which, in turn, has ensured an increase in the ranking position by 5 points. It is worth noting that the highest startup activity is observed in Israel and Sweden. Analysis of the ecosystem according to 2020 results shows positive trends in both the number of key investments and rankings in Ukraine [96]. As to the Ukrainian regional distribution, the leader in the number of startups in 2020 was Kyiv (Fig. 4.4).

Despite the significant number of startups, which is growing every year, there are a few problems that are further solved.

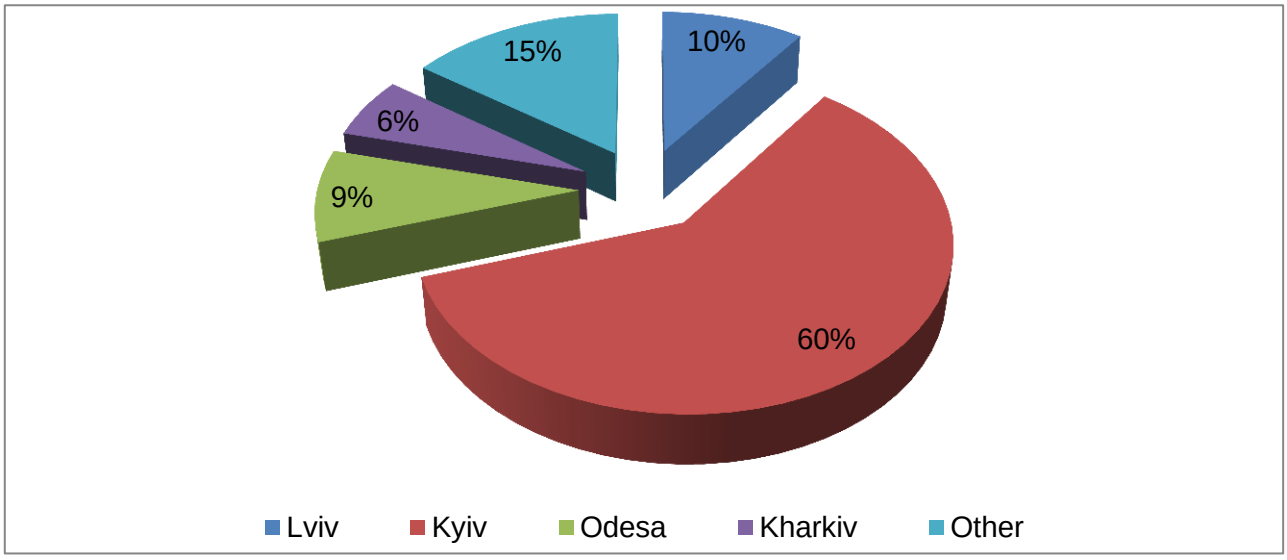

Fig. 4.4. **The number of startups across regions, 2020**
(compiled by the author based on [96])

In particular, M. Rutynsky [83] identified key challenges that are specific to domestic tourism and hospitality startups. Firstly, domestic tourists prefer vacations abroad and choose English-language services, therefore, Ukrainian startups are not in great demand. Secondly, lack of favourable conditions and appropriate organizations that help to develop startups specifically in Ukraine. Thirdly, investment attractiveness is very low for platforms in this field. Fourthly, and this is the point that is closely related to the previous one, promotion of both the country and regions as tourist destinations is insufficient. Lack of demand hinders the development of startups as well as tourism itself. Fifthly, insufficient government support for both the service sector and IT service providers.

At the same time, if tourism and hospitality startups are viewed as a whole, despite various obstacles, a positive trend is traced and, consequently, the desire to rest, conquer unexplored heights, discover new places, savour local food and drinks, recuperate and expand the lists of the already visited countries, encourage online platform and service developers to realize the desire of every tourist.

Not every startup becomes a successful business but with the right promotion and support it can become a leader in the travel services market. The mentioned online services are primarily aimed at direct use by tourists but also by representatives of the tourism business.

If the information systems and technologies used in the activities of tour operators and travel agents, hotels and restaurants, airlines or liners are

considered in detail, there is also a great variety that differs according to the specific nature of each business entity and the tasks that one or another system must perform.

According to the Tourism Act [80], a tourism product is defined as a pre-designed set of tourism services that combines at least two such services and is sold or offered for sale at a certain price, comprising transportation services, accommodation services and other tourism services not related to transportation and accommodation. Thus, it is appropriate to start by considering the information systems that provide transportation services.

Global Distribution Systems (GDS) are globally recognised, competitive and they enable air services to be booked anywhere in the world and to the customer's desired destination. Of course, it is also possible to use the airline services directly, for example through the booking module on the website or directly at the specialised offices, or by contacting a travel agency which provides this type of service, or using websites which compile information and enable bookings to be made, but not all of these channels are simple and, most importantly, effective.

For a customer it is possible to make reservations on an airline's website without much difficulty but the first complication is the lack of trust on the consumer's part and the possibility of incorrect data being entered; secondly, if the consumer wants to continue travelling with another airline, it is necessary to use the website of another airline and so on. Besides, when purchasing tickets through different airlines, one should not forget about the necessity of connecting time between flights which is not taken into consideration when this option is chosen. One can use search engines like Skyscanner [177], which allows searching online for relevant airline tickets, hotels or car rentals, but the main drawback of this search is that one can only read this information while for making a reservation it is necessary to go back to the airline's website. It should be also kept in mind that the information on these resources is not updated very quickly and, therefore, there may be a price discrepancy.

Alternatively, aggregator sites such as Tickets.ua [185], which compensate for the disadvantage of search engine sites, can be considered, i.e. bookings can be made there as well. Apart from air tickets, it is also possible to book hotel, railway or bus tickets, car rent and insurance services, but the main disadvantages are related to price. First of all, the final price is indicated only when paying for the ticket and, secondly, there is the possibility of hidden fees as well as problems with returns and exchanges.

Therefore, buying through an agent who uses the Global Distribution System (GDS) in his activity will help avoid these problems.

There are four GDS used around the world:

Sabre [173];

Amadeus [107];

Galileo [191];

Worldspan [191].

Globally, the share of GDS is somewhat uneven, as presented in Fig. 4.5.

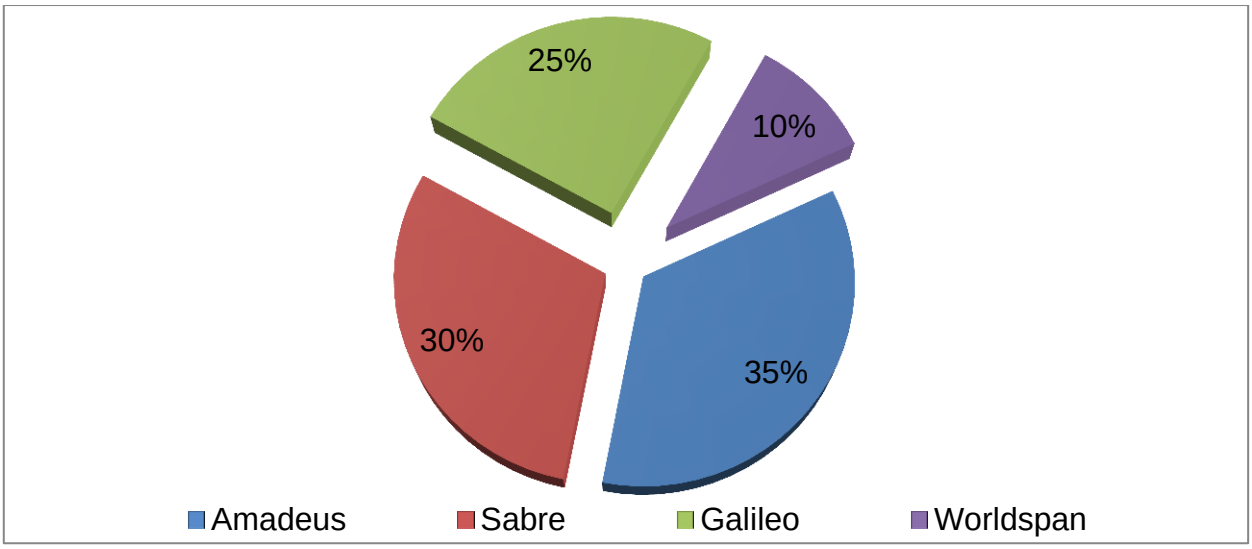

Fig. 4.5. **The share of global distribution systems in the world**
(compiled by the author based on [6])

In addition to the global distribution systems, there are regional systems such as Abacus, Sirena, Fantasia, Axcess and Sita that specialise in specific regions.

These 4 GDS are used in Ukraine but Amadeus is the leader. With reference to official data, the company has been operating for more than 30 years, with more than 19 thousand people employed and services provided in 190 countries. Reservation system make it possible to book air tickets to any destination, hotel or car rental, ferry, airliner or directly a tour.

The services offered by the company are divided into four groups:

Distribution & Content;

Sales & e-Commerce;

Business Management;

Services & Consulting [85].

With this system travel agencies can make use of services of more than 750 airlines, more than 100 thousand accommodation facilities with the

guaranteed reservation confirmation, price stability, 50 car rental companies, almost 30 ferry and cruise companies. Unlike other GDS, the Amadeus booking system also enables travel insurance, trains staff to work in the system and additionally informs about weather conditions, visas, exchange rates and medical requirements.

Sabre is the world's first GDS and also the market leader in booking and reservation systems. America is the main market where the company operates. Along with the airfare booking services, it is also possible to make hotel or car reservations and select excursion services. At the same time, the system, which is popular on the American continent, is beginning to conquer other markets, including Ukraine. Compared to GDS Amadeus, which has more than 220 thousand terminals and 65 thousand travel agencies that use it, GDS Sabre has more than 210 thousand terminals, and it is used by more than 55 thousand agencies in 108 countries. At the same time, it is worth mentioning that the company has become active in other world regions as well, thereby increasing competition in regional markets.

In Ukraine Travelport company provides two GDS services, namely Galileo and Worldspan, the latter is the least common in the world. Galileo is actively represented in Europe and the USA, while Worldspan is represented in America. In addition to the flight reservation services, these systems offer car rental, hotel and travel agency interactions as well as supplementary services for sports or cultural events.

The main differences between the GDS are the geographical representation of one or another system and a variety of additional services, which are the most widely provided by Amadeus. Galileo services are used in Ukraine by more than 40 companies which have more than 2 terminals. In this system the total number of terminals reaches 120 thousand, while Worldspan has almost 48 thousand terminals.

While comparing the pricing policy of each GDS, some differences can be traced which is explained both by the modules used by the enterprise, and the number of segments. These systems provide a monthly payment which can be compensated by a certain number of active segments (as a rule the deposit starts from $200, the price of the segment from $1.5). Details of the terms and conditions and the corresponding cost can be found on the official websites of these systems.

Moreover, in contemporary conditions, Ukrainian tour operators also offer such a service as GDS tour, which is commonly understood as a dynamic tour

packaging. This tour is a package tour on regular flights in the online mode. The main difference is that the booking is made for regular flights, not for charter ones. The advantage of these tours is a wide range, the ability to choose different flight options and appropriate rates. That is, these tours allow the consumer to discover any destination, to create a unique tour and choose the appropriate route.

An analysis of GDS tours among the offers of domestic tour operators showed that the commission for such tours ranges from 7 to 20 %.

As for the accommodation service, it can be booked using both GDS and hotel websites, applications, OTA-channels, search engines and aggregator websites.

The analysis of the hotel services market demonstrates that the number of accommodation facilities in Ukraine [85] (the legal entities directly, separate units) in 2020 amounted to 1337 units, including hotels and similar accommodation facilities – 728 units. For comparison, there were 1626 units in 2019 and 1591 units in 2018. Kyiv is the leader as to the number of hotels and similar accommodation facilities (Fig. 4.6).

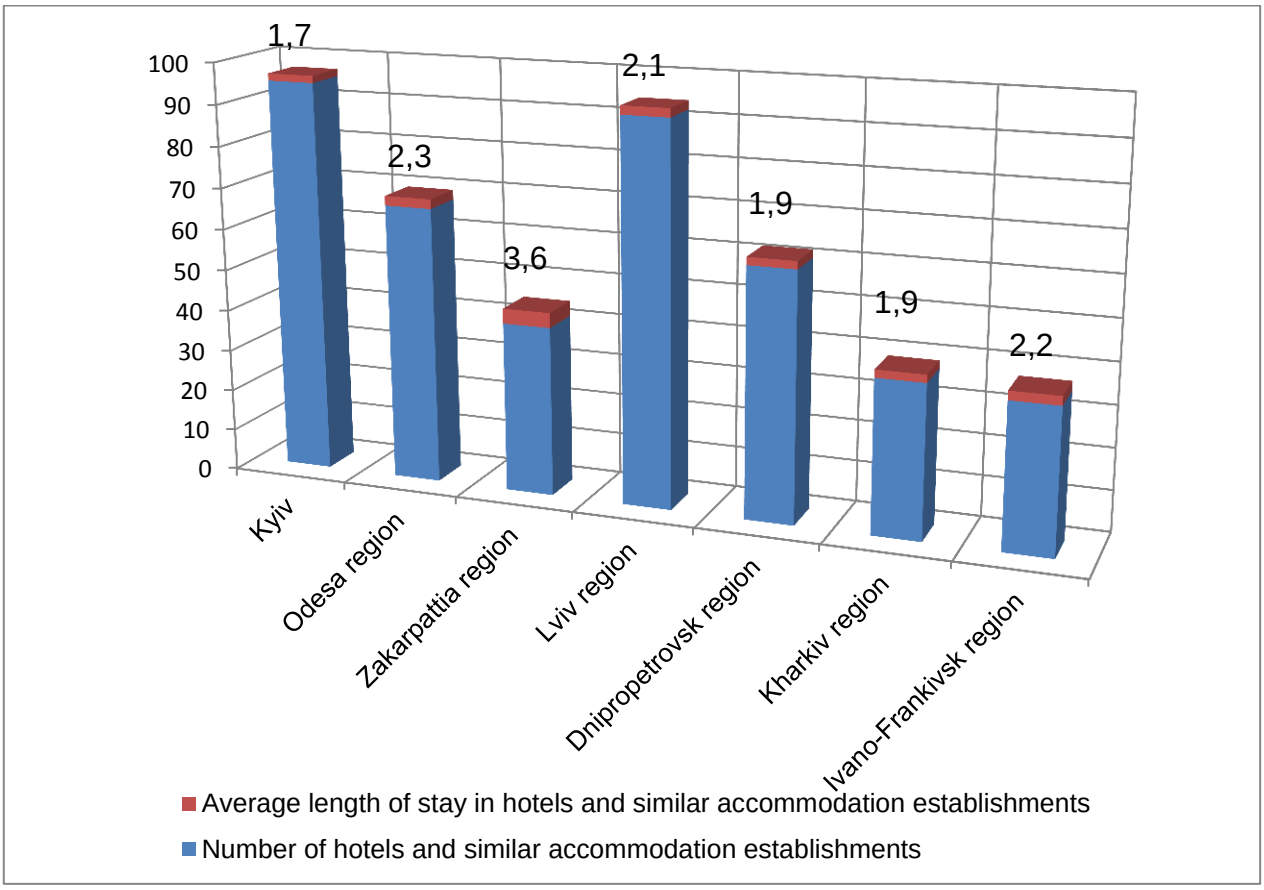

Fig. 4.6. **Top 7 Ukrainian regions as to number of hotels and similar accommodation establishments, 2020**
(compiled by the author based on [85])

In Ukraine, both international and domestic hotel chains operate in the hotel services market. This market is characterized by a high level of competition among both foreign and domestic businesses.

In particular, the Radisson Hotel Group has hotels in three Ukrainian cities: Kyiv (3 hotels), Odesa (1 hotel) and Bukovel (1 hotel) [166], Hyatt hotels corporation (one hotel in Kyiv) [143], Hilton Worldwide (one hotel in Kyiv) [140], InterContinental Hotels Group (two hotels in Kyiv) [144], Marriott International (two hotels in Kyiv), Wyndham hotel group (one hotel in Kyiv, one hotel in Lviv) [203] and Accor Hotels (four hotels in Kyiv, two hotels in Lviv, one hotel in Odesa) [100].

In other words, the domestic market of hotel services is attractive for investors and demonstrated the dynamics to increase the presence of various global chains. It is clear that the events of 2020 introduced certain adjustments in prospective projects, and their recovery is possible only when the situation stabilizes, the tourist flows increase and if there is a demand for services in this price segment.

As for the national and regional hotel chains, the best known of them are:

Reikartz Hotel Group, the most dynamic national chain that covers various parts of Ukraine. The network unites more than 55 hotels and resorts from 3 to 4 stars [168];

Premier Hotels and Resorts, which includes 15 hotels from 3 to 5 stars in 11 cities of Ukraine [163];

Royal Hospitality Group, which includes 9 hotels in Kyiv and Truskavets [171];

Ribas Hotels Group with 8 hotels in Odesa, Bukovel, Kherson and Hrybovka [169];

Sion Tour, a regional chain that focuses on the Western Ukraine, owns 8 hotels that are mainly situated in the ski resorts [176];

Black Sea Hotel Group, a regional hotel chain located in the south of Ukraine and having 6 hotels [114].

Accordingly, in order to take advantage of an accommodation service, the customer may choose to phone directly to the respective hotels, to leave an application on the hotel's website or to make a reservation directly through the website by entering the hotel's name in the search engines. The use of a corporate website is characteristic for chain hotels where a customer can book any hotel within the chain. In this case, the website has a specially built-in module, which is usually a component of the Property Management System (PMS).

A variety of both global and domestic information systems and technologies can be used for private booking of the relevant services in hotels or similar accommodation facilities. It should be noted that a feature of chain hotels is the use of specific software products that are generally the same for all chain hotels. This can be explained by the typical reporting and calculation forms; the use of national forms is undoubtedly encouraged as well, but a requirement is to use identical software. As an example, it can serve not only identical software, but also the use of the same coffee or tea suppliers, so that the guest could feel a familiar taste no matter where the hotel is located. In addition, PMS allow accessing all the hotels in the chain, comparing similar performance and business efficiency. Besides, the hotel chains that take care of staff development consider the possibility to be employed in the various regions where the chain's hotels are represented as an important part of the career path. Therefore, the use of the same information systems does not cause any difficulties or requires some adaptation to changing the region. It is obvious that global hotel chains use systems that are popular and effective around the world. However, there are also PMS specifically designed for hotel chains or individual hotels that are used exclusively by these hotels.

A PMS is a hotel management system that allows for efficient automation of operations, thereby integrating the work of all departments into a single system. Typically, these systems manage the following: reservations, room stock, rates and tariffs, customer relations, billing, financial and management reporting. There are many similarities between PMS components, although they are offered by different systems, at the same time there are certain differences which determine the use of a particular system.

The most popular PMS used for accommodation services in Ukraine are:

Fidelio (for example, Hotel Kharkov);

Opera (for example, Hilton Kyiv, Accor Hotels);

Servio (e.g. Reikartz Hotel Group, Ribas Hotels Group [56]);

Roomswizard (for example, Premier Hotels and Resorts) [86].

There are many hotels that are not part of a network but use PMS or separate modules in the same way. All details as to which hotels or similar accommodation establishments use which definite hotel management systems can be found on the service provider's website in the "Our clients" section.

There are other PMS, such as Hotelogic, LightSpeed, eZee, and modern cloud-based PMS, the use of which is determined by the customers' wishes

and financial capabilities, and by the variety of functionality offered by each PMS. Moreover, these PMS can be stored both on the server and in the cloud.

It should be immediately noted that very often the software product developers for hotels or similar accommodation establishments also offer a Restaurant Management System (RMS) that is an automated management system for a restaurant or other catering establishments. If there is a restaurant in a hotel or if this is a hotel-restaurant complex, an automated management system for the whole establishment is offered for implementation immediately which combines the work of different departments into a single system. For example, when a hotel has a restaurant, a gym, a spa and a swimming pool, the modern information systems combine the work of all departments effectively without any difficulties.

In Ukraine R-keeper [170] (prohibited software in Ukraine), Servio POS [56], RARUS [167] and Poster-POS [162] are common restaurant or catering establishment management systems. Each of these systems can be supplemented with food delivery modules, additional kitchen functionality, and are effectively integrated with automated systems of hotels or similar accommodation facilities, fitness studios or bowling alleys.

The pricing policy depends on the type of establishment and the functionality, modules and wishes of the deputy. Let's compare the main proposals based on the example of two companies: Servio POS and Poster-POS (Table 4.1).

Table 4.1

Comparison of the price based on key metrics of restaurant / catering establishment management systems, UAH

(compiled by the author based on [56, 162])

RMS	Servio	Poster
Server	Purchase or rent, price from 1,300 UAH per month	Not required
Workplace in the back office	12 000	included in the subscription price
Installation and configuration	9600	free
Mobile POS terminal	600	free
Automation	48 000	1020 per month

For example, Servio POS is a software product which easily customizes the requirements of small catering outlets, as well as large chains, or restaurant establishment with a large number of points of sale. It is a workplace for maintenance personnel. All the necessary equipment is connected to it and integrations with other software modules of the automation system are configured. It allows a manager to keep records and control of sales, services, helps optimally allocate resources, minimizes costs, increases the level of service, as well as it allows personnel to organize a loyalty program and monitor its effectiveness [56].

The analysis of Poster POS demonstrates that one POS system closes all issues: from online cash register to finance and analytics. The basic proposals of Poster POS are given in Table 4.2.

Table 4.2

Tariff plans, UAH (compiled by the author based on [158])

Plan (in case of payment for the year) per month	Start-up (Food truck)	Mini (Coffee house)	Business (Cafe)	Pro (Restaurant)
Price	360	720	1020	1620
Goods according to the technical card	50	100	300	1500
Number of warehouses	1	unlimited	unlimited	unlimited
Reporting and analytics, warehousing and financial accounting, loyalty system and smartphone sales control	*	*	*	*
Promotions	–	–	*	*
Table reservation	–	–	–	*

Typically, an automated management system for a catering establishment includes the following management modules, namely: ordering, kitchen, warehouse, hall operations, billing, accounting and operations control, and the like.

The analysis of modern hospitality management systems used by domestic hotels has demonstrated that domestic Servio software products are in high demand and their range is constantly expanding. The competitiveness of the domestic enterprise is ensured not only by a wide range of information systems but also by their high quality and appropriate service. Therefore, as an example, a closer look has been taken at the PMS Servio system, which can comprehensively ensure the operation of an accommodation establishment.

First of all, when comparing it with foreign PMS, it should be noted that the pricing policy of the well-known Opera or Fidelio, for example, is much higher, which also makes PMS Servio system more attractive for the domestic consumer. As far as the developers are also from Ukraine, they are well acquainted with and take into account the features of doing business, the specifics of certain types of services, along with financial and management accounting. The unified management system of the hotel complex combines the following modules:

SERVIO HMS, an automation system for hotels or similar accommodation establishments, which enables room reservations (for both single guests and groups), customer service (check-in, charges, check-out, etc.), CRM for housekeeping, efficient tools for conference or banqueting, working with tariffs, integration with various software products, working with differentiated sales channels, a flexible system of special conditions that allows taking into account both seasonality factor and different holidays, financial and managerial accounting, generating more than 130 reports, staff performance records and synchronization with special equipment. The system can be used by hotels of any size and can be integrated with the necessary modules;

Servio HMS Reservation, a module that integrates into the website of the respective accommodation establishment and receives orders directly from its own website and works as a website component rather than as a separate page. This module enables to quickly make not only reservations in real time, but also to pay for the selected additional services, avoid overbooking and simplify the guest's check-in procedure. The system works in such a way that once the reservation is made, the guest's details are immediately displayed in the hotel management system. Once a reservation has been made and the corresponding amount calculated, the

payment is handled online in a completely secure manner. The advantages of this system are also the immediate allocation of a tourist tax for the relevant categories of citizens, adaptation to the mobile version of the website, authorisation of contractors, possibility of partial payment, bookings without participation of personnel, operation in different languages;

Channel Manager, a software module that automates the management of hotel sales via online channels acting as an intermediary between PMS and Online Travel Agencies (OTA). The main functionalities of this program are integration with SERVIO HMS, customization to individual hotel desires, variety of sales channels, price policy and special rates settings, setting of appropriate exchange rates, online sales management control. The system makes it possible to reduce costs, to obtain information on customer demand and competitor pricing policies and to formulate effective strategies. The advantages are that the information is immediately entered into the hotel management system, there is the possibility of setting special rates for these channels and their validity period.

Online Travel Agencies (also known as Internet Distribution Systems (IDS) or Alternative Distribution Systems (ADS) are systems that allow making reservations without intermediaries. It is obvious that a reservation can also be made via the website of the respective accommodation establishment, but this requires the guest to be aware of the hotel in question. The use of OTA channels is therefore a way to overcome uncertainty about the availability of these particular accommodation establishments.

There are more than 400 OTA channels in the world but the best known and most popular are:

Booking (over 120,000 objects, traffic is 614,1 million visits in 2023), according to Similarweb [196] most requests are from the USA (10.9 %), Great Britain (7.56 %), Italy (7.41 %), Germany (7.0 %) and France (5.75 %). In comparison with July 2021, the top 5 countries were the same but the requests were slightly different. Specifically, from the USA (10.25 %), Italy (8.64 %), France (7.91 %), Germany (7.72 %) and Great Britain (6.75 %);

Airbnb (traffic is 108,9 million visits), top 5 requests: the USA (74.39 %), Philippines (1.31 %), Germany (0.99 %), Malaysia (0.98 %) and Mexico (0.92 %);

Expedia (traffic is 102 million visits, compared to traffic of 94 million in July 2021), top requests are from the USA (90.65 %), Canada (0.72 %), Mexico (0.41 %), Great Britain (0.35 %) and Dominican Republic (0.34 %);

Agoda (traffic is almost 83,3 million visits), the most popular channel among the citizens of India (9.06 %), Taiwan (8.72 %), Thailand (8.7 %), Republic of Korea (8.03 %) and Malaysia (7.98 %);

Hotels (traffic is 60 million visits), the most popular channel in the USA (48.47 %), Great Britain (8.46 %), Republic of Korea (4.0 %), France (3.93 %) and Canada (3.69 %).

The top 5 most popular OTA channels in the world demonstrate the consumers' regional choice which depends on the range of accommodation facilities representation in each of the channel. At the same time, the US residents lead in the number of requests for popular channels. This is also explained by the choice of OTA channels on the part of accommodation providers that creates a corresponding demand among the potential hotel service consumers.

A comparison of leaders based on key metrics is presented in Table 4.3.

Table 4.3

Comparison of key metrics of the world's top-5 OTA channels, August 2021 (compiled by the author based on [196])

OTA channel	Total visits, million people	Average duration on the website, minutes	Pages per visit	Number of refusals, %	Traffic From social networks, %
Booking	517.9	8.56	8.87	30.74	1.71
Airbnb	88.2	8.31	20.44	27.84	2.13
Expedia	73.04	5.46	5.79	37.43	0.68
Hotels	52.19	5.41	6.65	36.64	0.60
Agoda	29.39	5.43	4.62	37.36	1.31

Thus, according to the data given in Table 4.3, a conclusion can be drawn that there is a significant gap in the number of visitors between the

market leader and other channels. In addition to an extensive database of accommodation establishments, there is also a longer time duration that visitors stay on the company's official website and a flexible system of cooperation and support on behalf of a company. A peculiar difference of Booking is also the fact that reviews can be left by real visitors, thus, creating a transparent system of communication and trust on the consumers' part.

In Ukraine, Hotels 24 (with traffic over 500,000 visits as of July 2021) and Doba (with similar traffic) are the most popular after Booking [196].

For comparison, let's consider the leaders as to key metrics in winter season (Table 4.4).

Table 4.4

Comparison of key metrics of the world's top-5 OTA channels, December, 2021 (compiled by the author based on [196])

OTA channel	Total visits, million people	Average duration on the website, minutes	Pages per visit
Booking	349.63	8.03	7.70
Airbnb	72.61	8.26	20.37
Expedia	64.15	5.33	5.61
Hotels	35.81	5.27	6.43
Agoda	49.23	6.13	5.00

Table 4.4 shows the impact of seasonality, which can place great pressure on remote or isolated tourism destinations. As a result, the winter period is less popular among visitors to these online-channels:

Booking (the number of visits has dropped more than 12 % in relation to November) [196]. And the average duration on the website, as well as pages per visit have decreased. The most requests are from the USA (10.66 %), Great Britain (6.45 %), France (6.04 %), Russia (5.78 %) and Italy (5.77 %);

Airbnb (traffic is 72,61 million visits in December and 71,29 million visits in November), top 5 requests: the USA (76.44 %), Mexico (1.49 %), Philippines (1.48 %), Malaysia (1.32 %) and Spain (0.80 %);

Expedia (traffic decreased more than 6,5 %, compared to traffic of 68,85 million in November 2021);

Hotels (traffic is 40,03 million visits in November). The top requests are similar and is the most popular in the USA (53.74 %), Great Britain (6.61 %), France (4.49 %), Canada (3.11 %) and Turkey (2.52 %);

Agoda (traffic increased by 6,14 %, compared to traffic of 46,38 million visits in November 2021), the most popular among the citizens of India (13.89 %), Thailand (10.85 %), Malaysia (10.81 %), Taiwan (8.30 %), the USA (6.76 %).

The high web traffic of these sites are testimony to their popularity. According to the Top Websites Ranking for Accommodation and Hotels in the world, the 1st place belonged to Booking, 2nd to Airbnb and 3rd to Expedia in 2023. In Ukraine the most popular are Booking, Otpusk and Doba (data is updated to the beginning of 2023) [196].

A study of online booking statistics [118] found out that 76 % of bookings were made through OTA channels. The main advantages of using OTA-channels is the accuracy of work with the target audience, as the vast majority of consumers make reservations through these channels, the availability of real reviews and feedback, which is the cause of the consumers' trust and confidence, as well as the possibility of the additional hotel promotion. At the same time, the disadvantages are high commissions (15 – 20 %) and limited information about the client.

In accordance with the tariff plan (pricing policy is ranging from 10 to 90 Euros), the use of Channel Manager offers a possibility of placing information in the OTA-channels that are necessary and interesting for the hotel and using only one such module.

SERVIO BackOffice Room Management (RM) is a marketing and sales, supply and purchasing, stock and warehouse, production, payroll and staff, finance and money resources management module. This system integrates with the specific accounting and management programs, thus providing the possibility to create reports on various areas of accounting.

Integration of PMS SERVIO HMS with additional modules (Fig. 4.7).

Offers for the hotel**:**	Offers for the restaurant:	Offers for **SPA**:
• PMS for hotel SERVIO HMS; • Booking module for the site SERVIO Reservation; • Channel Manager for OTA-channels; • Mobile application for the SERVIO Loyalty program; • RFID-controller for elevators; • Mobile key; • Mobile application for statistics SERVIO Mobile Statistics; • SERVIO BackOffice; • CRM Housekeeping in PMS SERVIO HMS; • Mini-bar PolarBar; • Mobile application Mobile Access for keys VingCard; • Bathroom lock; • Electronic safe Elsafe; • Sending messages SERVIO Notify; • Chatbot: • Integration of Servio HMS with the "Diya" application	• Software SERVIO POS; • SERVIO POS Reservation; • Kitchen module SERVIO POS Order Monitor; • SERVIO POS InfoPoster; • Module for a single network base SERVIO POS StorageServer; • Integration of SERVIO POS with delivery services (for example, Glovo); • Mobile application for staff SERVIO POS Mobile; • SERVIO POS Mobile Statistics; • SERVIO POS Mobile Inventory; • SERVIO POS Workdesk; • SERVIO Loyalty; • SERVIO Notify; • Ving Card electronic locks	• SERVIO POS SPA; • Locker assignment

Fig. 4.7. **PMS Servio HMS complete solutions for hotels**
(compiled by the author based on [56])

Thus, the considered example of PMS shows that domestic service providers propose quality services in the hotel and restaurant industry, which are gaining popularity among domestic accommodation establishments every year. The choice of the management system depends primarily on the price of the system, which is much higher for foreign PMS, as well as on the

functionality required to implement all the functions of a hotel or similar accommodation establishment.

The basic information systems and technologies that provide the basic components of a tour (in accordance with the Tourism Act [80]) have been considered, therefore it is important to get acquainted with the systems that are used directly by tour operators and travel agencies.

These business entities use special systems as well as GDS and PMS, aggregator sites and search engines that have been mentioned above. It is a characteristic feature of most businesses to use Enterprise Resource Planning (ERP), the main purpose of which is business process management that integrates finance, personnel, production, accounting and related reporting. That is, unlike other enterprise management systems, this system is designed to manage all resources rather than individual parts.

For example, OneBox, MS Dynamics ERP, Perfectum, IT-Enterprise, Parus: Enterprise, DeloPro are popular ERP in Ukraine [93]. Moreover, most ERP are combined together with Customer Relationship Management (CRM), which will be discussed below. However, the specifics of tourism business necessitate the use of special systems and technologies.

In particular, the following systems are the most popular in the activities of tour operators:

Master-Tour [154] is used in more than 20 countries of the world (prohibited software in Ukraine). It was developed for tour operators engaged in outbound tourism. It is integrated with airline and hotel systems. It provides for automation of all the tour operator's operational activities: from creation of a company base to managerial accounting. The main advantages of this program are: the dynamic pricing and packaging, automatic price and quota updates, increased productivity, financial and accounting module. The tour operator ADRIA HIT, for example, uses this system;

Master-Interlook [154] is designed for host tour operators (prohibited software in Ukraine). The program provides: flexible price formation (dealing with the prices of service providers in different currencies, mechanisms of individual and group price setting, automatic price formation taking into account the trade margin), online sales (a large number of search criteria, different formats of price presentation, the possibility of changing the tour components), quotas (working with the blocks of seats, stop-sales, loading

services, selection of optimal quotas), working with reservations and vouchers, integration with Master-Tour;

SAMO-tour [174] is a comprehensive system which acts as a platform for solving absolutely all the tasks of a tour operator: product creation and management, order management, online sales optimisation (but prohibited software in Ukraine). The peculiarity of this system is an online exchange of tours between tour operators, dynamic pricing, effective system of reporting, statistics and analytics. It is supposed to manage tourist product, sales, integration with service providers, partner and consumer payments and attachment of the electronic payments. For example, the tour operators "Pegas Touristik", "Orbit" use this system;

SAMO-incoming is designed for the inbound tour operators (prohibited software in Ukraine). It combines all the necessary tools to manage this type of activity from the preparation of tour operator centres to the sale of excursions and obtaining statistical data;

Parus: Enterprise – the developer offers management systems for a travel agency, a hotel, a medical institution, management and marketing solutions [4].

Each of the systems takes into account directly the specifics of the tourist operator's work. In addition, there are special systems developed by tour operators themselves and used by the corresponding network of travel agencies (for example, the tour operator "TPG").

Pricing policy of the most popular programs among the tour operators is presented in Table 4.5.

Table 4.5

Price comparison of the main information systems of tour operators (5 work places)*, USD

System	Price
Master-Tour	from 1800
SAMO-tour	from 4770
SAMO-incoming	from 5000

* The cost depends on the tariff plan, configuration and number of modules selected. Detailed pricing information can be found on the company-producer's website

Travel agencies can use both CRM systems in their activities, as well as personal accounts on the tour operators' websites or aggregator sites (e.g. IT-Tour), or search engine sites or specialised aggregators providing information on hotel services, booking tickets or car rent, excursion organisation or insurance service provision.

CRM-systems, as a rule, makes it possible to create the enterprise's own customer base, to organise an individual approach to each customer, to improve sales efficiency, to increase conversion rate and generate reports based on various criteria.

Initially, these systems performed the functions of the client base maintenance, documents and accounting report systematization, analytics of enterprise sales.

However, it soon became clear that it was not enough and the lack of data leads to some limited actions, therefore, the functionality of CRM-systems has greatly expanded and became more qualitative. In particular, CRM makes it possible to automate the operational activities of a travel agency or a tour operator, to automate document management, to monitor all transactions, to form a clear and effective system of contractual relationships, to be in touch with the client 24/7, to increase the employees' productivity, to build a flexible and efficient system of data analysis and appropriate communication with customers. That is, the whole process of interaction with a client becomes easy and fast, controlled and more efficient, starting with the customer data formation and analysis, ending with the receiving a feedback or review.

These types of systems enable the travel agency to increase the work efficiency in the areas of sales, finance, marketing and analysis of key indicators of its work. A simplification of accounting is also an essential benefit because very often developers add special modules, which do not only direct the payment to the tour operator, but also track the debt collection or the deadlines for submission of the relevant reports.

Travel agencies in Ukraine take advantage of such systems as:

SAMO-touragent (prohibited software in Ukraine), a CRM that was designed to optimize the managers' work with the client, to make a full cycle of reservation, to manage sales and to analyse advertising efficiency, to integrate both the accounting software and the IP-telephony, which significantly affects the costs and efficiency of the enterprise, to adjust bonus programs;

Overia-Tourism [160], a flexible tourism business management system used by both tour operators and travel agencies. A wide range of services allows identifying target groups of consumers, selling tickets, generating relevant reports and adjusting the necessary mailing through the various promotion channels;

MoiTouristy [156], a system that along with the similar functionality, helps to optimize financial costs for accounting and management, to reduce costs for calls and mailing, to propose a fully automated document management, to facilitate employee interchangeability without any difficulties, to plan and monitor the activities of each employee. Besides, the system is customized in such a way that in addition to providing information on customer birthdays or mailing reminders, it allows potential customers, who have just once visited the company's website, to be added to the database;

Bitrix24 (prohibited software in Ukraine) [113], a CRM that successfully combines the classic features of these systems together with an effective integration of requests via the website and calls. It controls the work with contracts, leads and the company's customer base, and has an effective system for analytics and forecasting;

CRM OneBox [119], an effective tool for the sales department because it allows using the sales funnel when dealing with customers, mass mailings, integration with Binotel and a wide range of additional services;

Tourcontrol [187], a cloud CRM that makes it possible to generate quickly all the necessary documents, to integrate with a large number of services, thereby increasing the productivity of travel agencies (the price varies depending on the number of employees who will use it – from 40 USD (for 1 manager) to 600 USD (up to 30 employees);

Parus: travel agency – the system details information on each client, keeps records of each client, generates relevant invoices and agreements, allows keeping management accounting;

CRMTravelers [120], a system that has a mobile version and allows a travel agency not only to maintain the client base and to make reservations and payments, but also to keep a database of leads, generate tasks for the company' employees, keep effective records of each employee, create a client's personal account, provide the possibility of customizing the appearance of CRM.

The list of programmes described does not end with those considered, the sample includes the programmes which are popular among service providers.

The pricing policy of the most popular programmes for travel agencies is presented in Table 4.6.

Table 4.6

Comparison of price offers for travel agencies, USD
(based on data provided by the development companies)

System	Price
SAMO-touragent (5 – 7 working places), Server	from 1360
SAMO-touragent (5 – 7 working places), Cloud	from 600
Overia-Tourism (tour agent + CRM) (5 working places)	from 1150
Overia-Tourism (tour operator + CRM) (5 working places)	from 2450
MoiTouristy (CRM + Search for tours + website) (5 working places)	from 500
Bitrix24 (Cloud) (5 working places)	from 1760
CRM OneBox (Cloud) (5 working places)	from 1440
Tourcontrol (5 working places)	from 80
CRMTravelers (5 working places)	from 150

Most of the reviewed information systems and technologies that are used by hoteliers, tour operators or travel agencies also have cloud-based versions.

This, in turn, makes it possible to store large amounts of data, to have constant access from anywhere, to promptly obtain the necessary reports and to maintain a corresponding client base.

Other advantages of cloud-based versions include:

ease and simplicity of operation;

instantaneous exchange of information;

unified storage of data;

the ability to work remotely (especially important when there is a remote work format);

automation of operational activity;

efficient communication within the team;

easy interaction with other software products and services;

cloud telephony and CRM that increase sales and the efficiency of the entire enterprise.

The cost of cloud versions is considerably lower, which in turn, minimises the costs of the enterprise. At the same time, despite the significant number of advantages, cloud-based versions have a significant disadvantage, such as the possibility of other people accessing the data and the disappearance of the data itself. It is true that the developers of such services guarantee security and data safety but this possibility should not be ruled out.

Every year the number of information systems and technologies in tourism and hospitality industry grows, which is explained by the significant demand. World-famous software programmes that were previously more often used in the entrepreneurial activities of service enterprises in the domestic market of information products are gradually losing popularity and are being replaced by domestic systems and technologies that can fully satisfy the demanding entrepreneur. The move to an online format has also had an impact on this business, thereby accelerating the emergence or development of new types of services.

The use of cloud technologies continues to be promising (almost 60 % of CRM already have cloud versions) with certain improvements in data storage security and the availability of appropriate mobile applications to facilitate the work of both enterprise employees and customers directly (as it is becoming customary to use mobile phones as a workplace). The availability of own channels (especially for travel businesses), blogs (whose popularity is rapidly growing) and social media pages (whose use makes it possible to reach different target audiences of consumers) should not be forgotten as well. Deep personalisation will play a considerable role while developing or improving information systems and technologies, which will be aimed at creation of individual tours, will be shaped for each client and will not be offered to other customers, will provide additional services and take into account the guest's desire. That is, in order to be competitive in the market of tourism and hospitality services, companies should provide not only high-quality services, but also those that will stand out with their range of services, speed, uniqueness and innovation.