











“Digitalization: Implementation in the tourism business of Ukraine”

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DIGITALIZATION: IMPLEMENTATION IN THE TOURISM BUSINESS OF UKRAINE¹

Abstract

Global digitalization has led to the formation of a new contour of the economic environment in tourism due to the inevitable and pervasive transformation of socio-economic systems. All this is happening against the background of the synergy of digital and service economies. Therefore, the study analyzes the genesis and world experience of digitalization to determine the areas and advantages of using digital technologies in the tourism business of Ukraine. Systematization, generalization, and surveying were used. Since the main players of the tourism business are tour operators and hotels, and digital technologies are used by entities located in big cities, a survey was conducted among 57 managers of leading tour operators and hotels in Kyiv, Lviv, Kharkiv, and Odesa. The survey was conducted in July 2020–2021 and concerned digital technologies in the business processes. The results showed a dynamic increase in digital technologies, in particular, by an average of 72.2% per year, which reflects their efficiency and dynamics. The leading digital technologies include contactless payments, chatbots, mobile applications, mobile registration, and VR technologies. The data on their 34.6% use as sources of information search, 78.7% as travel planning and organization instruments, and 59.5% as destination orientation instruments are evidence of the large-scale use of digital technologies by foreign tourists. The essence of marketing, economic, innovation, environmental, service, and configuration priorities of digitalization as interdependent drivers for the initiation of the innovation process in tourism has been determined considering the uneven development and fluctuating dynamics of digital technologies.

Keywords

tourism business, digitalization, digital technologies, development priorities, business processes, hotel business, potential

JEL Classification

L83, M31

INTRODUCTION

Tourism is an integral component of the global economic system, a social phenomenon of a global scale, which consolidates the activities of entities in more than 30 spheres and types of economic activity, forming up to 7% of the world GDP (1.4 trillion dollars a year), giving it an annual growth of 3.8-5.0% (WTO, 2018, 2019). Tourism has changed and suffered considerably compared to other sectors of the economy due to the global pandemic. Unprecedented crisis phenomena became decisive factors of negative trends in tourism, which caused a noticeable reduction in consumer demand. A global change in the market conditions of tourist services and the inefficiency of existing business models revealed new economic risks and shortened planning time horizons. As an unforeseen event, the COVID-19 pandemic changed the market situation of tourist ser-

1 This paper presents the research results on the digitalization of the tourism and hotel business in the pre-war period, namely until February 24, 2022. Research in this field was suspended after Russia invaded Ukraine. After the victory of Ukraine, the study on digitalization peculiarities in the tourism sphere of Ukraine, which is suffering from military actions, will be continued.

vices. It opened new opportunities for tourism development concepts based on the comprehensive implementation of digital technologies as a condition for consolidated access to global resources – intellectual, service, financial, labor, and technological ones.

Hekmat (2022) stated that this crisis might represent an opportunity for recovery for some segments of tourism markets. In this context, it should be noted that one of the successful examples of the implementation of digital technologies is the Ukrainian platform “Diia,” which functions as an online service of public services within the “Digital State” project (Diia, 2022). As of the end of 2021, more than 12 million people have been already using the application and portal, i.e., 25.5% of Ukraine’s population. The functioning and large-scale use of this portal testify to the effectiveness of digital technologies and significant prospects for their wide application in other spheres. Furthermore, the ROI for digital technologies is 6.7 times higher than for traditional ones: every dollar invested in digital technologies leads to an increase in GDP by 20 dollars, i.e., the investment multiplier is 20 (for comparison: the traditional investment multiplier is 2-8) (Adams, 2017).

The implementation of digital technologies in the tourism business ensures the formation of an open information environment. Furthermore, it is an innovative basis for developing entities within the available resource potential, maximally personalized and omnichannel interaction with potential consumers and partners in remote work, and predictive analytics mechanisms for implementing creative marketing solutions. Moreover, such technologies support the convergence of individual businesses that participate in the formation and implementation of a complex tourist product and the creation of new types of tourist services. Undoubtedly, the effects mentioned above clearly define the multiplicative nature of positive content for developing the tourism business.

1. LITERATURE REVIEW

During globalization and the pandemic crisis, the study on digitization as a condition for the development of economic systems is a trend in assessing its impact on business processes and determining the trajectories of innovative development of socio-economic systems. The advantages of various digitization tools are, in particular, that “digital technologies facilitate communications and bring together people, organizations, and resources to facilitate essential interactions between businesses and consumers, as well as enhance increased business management efficiency” (Ruggieri et al., 2018, p. 1210). According to Sarmiento et al. (2021), “the dynamic development of digitization and the use of new technological tools for more effective interaction with consumers/tourists contribute to better opportunities for business development.”

The pandemic crisis triggered active implementation of digital technologies in tourism. The benefits of digital transformation to the industry are increasingly apparent, particularly during a significant change brought on by COVID-19 (Skift,

2020, p. 9). The digitalization of the tourism industry makes it more flexible and increases competitiveness within the industry based on digital technologies. It delivers excellent convenience to tourists and creates conditions that allow tourism companies to gain increased revenues (Pardayev et al., 2021, p. 590). In addition, the organizational challenges related to efficiency and effectiveness fade away with the digital transformation of organizations (Heavin & Power, 2018).

Digital transformation and consequential business model innovation have fundamentally altered consumers’ expectations and behaviors. This pressured traditional firms and disrupted multiple companies (Verhoef et al., 2021). However, according to McKinsey & Company (2020), companies were able to adopt digital changes 20-25 times faster than they expected. Accordingly, the importance of digital technologies in increasing activity efficiency is substantiated in scientific papers using marketing analysis of management contexts (Lamberton & Stephen, 2016; Li, 2017; Li et al., 2018). Thus, digital transformations in tourism are caused by the widespread use of digital technologies.

Mazaraki et al. (2019) noted that the spread of innovative digital technologies is a pattern of forming a new vector in tourism development. Today, the specifics of consumption are related to digital transformation and, as a result, innovative business models have changed consumer expectations and behavior (Hojeghan & Esfangareh, 2011; Chaveesuk et al., 2021; Chomiak-Orsa & Liszczyk, 2020; Lemon & Verhoef, 2016). From the perspective of consumers and producers, the general context of the use of digital technologies in tourism is the implementation of the fundamental principle of economic policy regarding the impact of each economic activity on the formation of specific trends and economic processes (Mazaraki et al., 2019; Chaveesuk et al., 2021; Gong & Ribiere, 2021; Kolodiziev et al., 2021). In addition, it is worth noting the existence of different models of consumer and producer economic behavior (Chomiak-Orsa & Liszczyk, 2020; Kvitka et al., 2021; Morris, 2019) and understanding communication as a critical source of relationships in the global environment (Hojeghan & Esfangareh, 2011).

Critical reflections on the impact of digitalization on tourism were demonstrated by Pesonen (2020), who, elaborating Dredge et al.'s (2018) findings, identified that "the shifts in tourism resulting from digitalization are: new destination arrangements, business models, value chains, and ecosystems, changing roles of consumers, and changes in producers." Furthermore, within the research on foresight technologies in tourism development, the rapidity of digital technologies as a factor in the stable development of tourism systems has been proven (Melnychenko et al., 2020). That is why "the future of tourism worldwide, in several activities, depends on the quality purpose incorporating innovation and new communication in the industry and overcoming the new world restraints" (Sarmiento et al., 2021). Clearly, to shape and realize the demand for multifarious tourism, one needs transformations comprising modern technologies and physical and digital techniques (Amanova et al., 2021).

In the post-COVID-19 period, digitalization has an even more active and diverse use. Moreover,

virtual tourism is an excellent choice during quarantine limitations, and it can gain even more demand in the post-pandemic times (Akhtar et al., 2021). Due to the pandemic restraints, innovative digital technologies and their speedy introduction caused the growth of tourist taxes in hospitality establishments in certain regions of Ukraine (Bovsh et al., 2020, 2021).

Digital transformations have led to new trends in global tourism. First, it is worth considering the stages of ICT adoption: option, disorder, immersion, and expropriation (Gössling, 2021, p. 733). A significant amount of innovative tools are used as part of digital technologies. As for the hospitality sector, AI-based technologies have been successfully implemented. Examples of such technologies include voice assistants, smart homes, and various robots (Ivanov et al., 2019).

Furthermore, the Internet of Things and cloud computing may assist in creating necessary tools for a smart tourism destination (Boes et al., 2015, p. 401). According to Sarmiento et al. (2021), using AI technologies and robots can benefit the environment because these tools decrease waste and better manage tourist destinations; thus, tourists are more attracted to the sites that deliver such infrastructure. Moreover, Watkins et al. (2018) found e-visas and e-tickets highly engaging and demanded by tourists.

Researching the relevance of digital transformations for tourism and hospitality, Tajeddini et al. (2019) argued that digital technologies are divided into three types: adaptive, ideal, and potential. It was noted that the adaptive ones reflect the high potential of the tourism system to create more added value for services. On the other hand, ideal digital technologies introduce innovations to meet tourists' demands, focusing on probable future necessities. Therefore, one can project future innovations in tourism.

However, scientific research does not always focus on innovations, particularly in Ukraine. For example, Fisun et al. (2022, pp. 9-11) did not mention digital technologies in Ukraine either now or in the future. There is also a lack of vision of their inevitable use in the strategic development of tourism entities (Fisun et al., 2022, p. 12).

In addition, active and comprehensive use of digital technologies has created profound disputes between individuals and communities. In this manner, digitization will preserve the division of countries and communities in the social space by the capability to master new skills and digital technologies, earnings, life activities, and communication skills (Heyets, 2022). Accordingly, to remain competitive, it is necessary to use various digital technologies at all levels of economic activity: nano-, micro-, meso-, macro-, mega-, and meta-levels.

Digitization affects various spheres of life, including labor relations. This context is critical for the tourism and hospitality sectors since human aspects are decisive. Specific steps trigger the introduction of digital transformations in the economy and society: use of Industry 4.0 advancements → digitalization → creation of updated operational standards → introduction of modifications → creation of employment arrangements essential for a digital economy (Kolot & Herasymenko, 2020). All these processes alter all spheres of human life, particularly job relations. For example, new workplaces and employment arrangements have begun to appear, and there is a demand for professionals with digital mastery (Petrova et al., 2020). Such comprehensive involvement of digital technologies requires state support and stimulation. As communities want to successfully develop, improve, and adopt digital transformations, governments should assist their population, business entities, and other applicable stakeholders (Hasenzahl et al., 2019). Finally, digital technologies transform business processes into technological, organizational, service, and other operational functions. This activates the scientific search for intellectual substantiation of tourism business development priorities based on digitalization. Until now, the contours of an effective, perfect tourist business are more the subject of scientific discussions than a substantiation of an already formed paradigm.

The study aims to comparatively review the essence of digitalization, identify types of digital technologies, and determine priority areas for their implementation in the business processes of tourism business entities.

2. METHODOLOGY

The paper uses systematization and generalization to determine cause-and-effect relationships in the formation of digitalization segments and levels of application of digital technologies in the tourism business. Moreover, it applies surveying to determine the impact of digital technologies on the efficiency of business processes of tourism entities. In particular, a survey of 57 managers of tour operators and hotels was conducted (LLC “TPG,” “Coral Travel,” “Travel Hub,” “Casablanca Travel,” NGO “Visit Ukraine,” hotels InterContinental Kyiv, Holiday Inn Kyiv, Premier Palace Kyiv, Grand Hotel Lviv, Bratislava, Khreshchatyk, Ukraine, Superior Golf & Spa Resort and others). The survey was conducted from July 2020 to July 2021 using Google Forms. Respondents were asked to evaluate the use of digital technology tools: contactless payments, robotics, chatbots, VR, AR, MR smart technologies, artificial intelligence, and mobile applications. A comparison of their use in 2020 and 2021 was made based on the survey results. The Delphi method was used to assess the dynamics of various types of digital technologies in the activities of tour operators and hotel chains. The method of grouping functions and their essential characteristics was used to describe the factorial landscape of functions of business processes determined by digital technologies. A graphic method was used to present the dynamics of the application of various types of digital technologies in the activities of tour operators and hotel chains. The information base of the study was the materials of the World Tourism Organization (UNWTO), as well as analytical studies of the State Tourism Development Agency of Ukraine, the Ukrainian Institute of the Future, and the Razumkov Center of leading global companies (Amadeus IT Group S.A, Sabre Corporation, Booking, Google, Amazon Web Services, Forrester Research, and Digital Transformation Report).

3. RESULTS

An objective regularity of modern socio-economic development is forming a digital economy. It is implemented in practice through “digital data (binary, information, etc.) and network transactions, as well as the use of information as a resource,

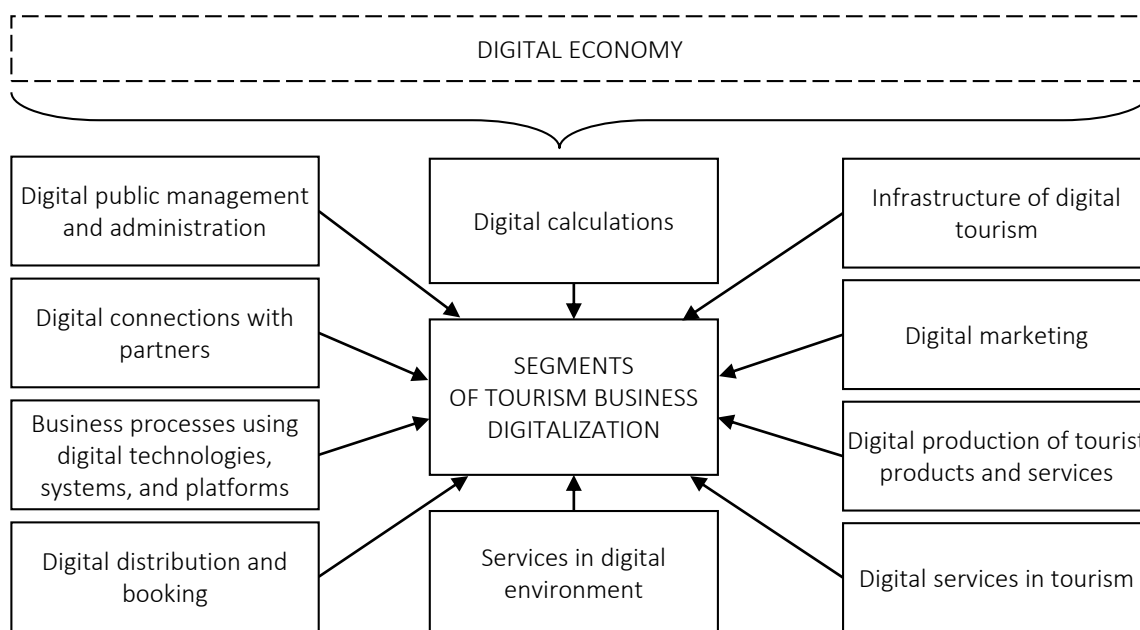


Figure 1. Segments of tourism business digitalization

which makes it possible to significantly increase efficiency, productivity and value of products and services” (Ukrainian Institute of the Future, 2018). Digitization of the tourism business involves a re-thinking of business processes based on the use of digital technologies by its subjects in order to increase revenues and create new values for stakeholders. Therefore, the interpretation of digital technologies in the tourist business is defined as a system of formal and informal network interaction of tourist services’ consumers, which functions to store, analyze, and transmit digital data about the participants. Accordingly, the use of digital technologies in the era of the digital economy refers to the development of tourism products and services that are perceived by the market (consumers) as a value converted into a cash flow with profit for tourism business entities. Therefore, digitization of the tourism business is carried out at different functional levels determined by the adaptability and speed of digital technologies introduction (Figure 1).

Segments of tourism business digitalization are the result of the synergy of digital and service economies. They create a real opportunity for tourism development with new opportunities and markets, types of management, and business methods (Figure 1). The main segments of digitization in tourism include systems, technologies, and platforms of interaction with consumers, partners, public institutions, digital infrastructure; business

processes of market entities; and results of activity (products). Business entities’ processes are transformed according to the dynamics of digital technology development, using innovative booking systems, e-commerce and distribution, marketing, mobile applications, social media, image recognition systems and technologies, biometric technologies, and processing of big volumes of data. The use of these elements significantly affects the competitiveness of both the subjects of the tourist market and tourist destinations.

The analysis of tourism digitalization makes it possible to systematize the application of digital technologies according to hierarchical levels:

- 1) nano-level (process, personnel, consumer);
- 2) micro-level (business entity);
- 3) meso-level (region, destination, cluster, or field of activity);
- 4) macro-level (national economy);
- 5) mega-level (groups of countries);
- 6) meta-level (global) (Figure 2).

Differentiation in the use of digital technologies by subjects of the tourism sphere according to hierarchical levels is expedient given heterogeneous possibilities of their use, as well as the application of mechanisms and tools for managing them, the amount of added value produced by business subjects at different levels. In particular, for the na-

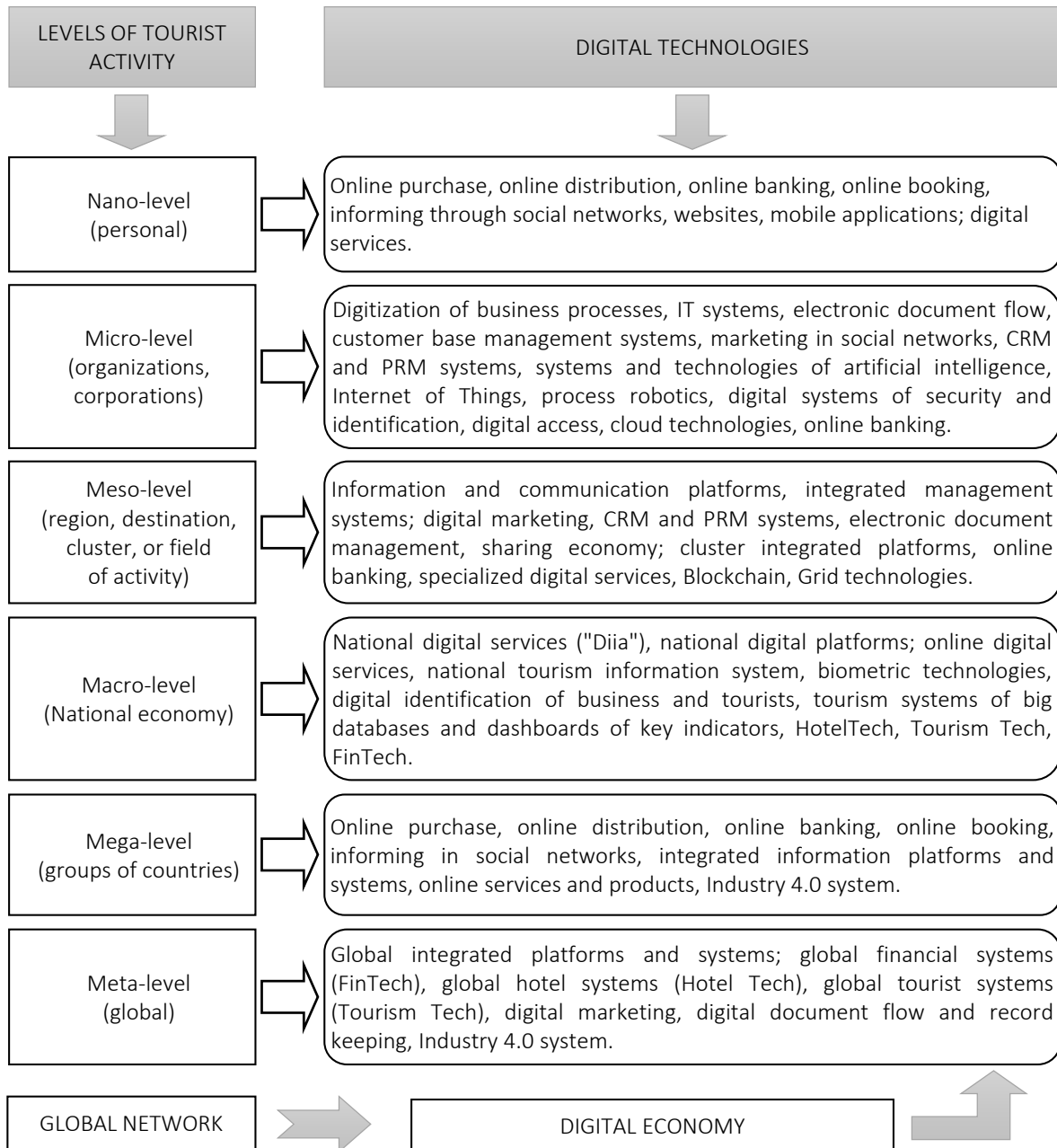


Figure 2. Levels of digital technologies application in the tourism business

tional economy, the added value refers to an increase in GDP due to the use of digital technologies in various spheres, including tourism. For a specific business entity, it is obtaining added value due to the use of digital technologies in business processes, which determines different areas of digitization (Appendix A). Digitization is a driver of innovative changes and development of tourism as it changes the structure of business processes of market subjects, which are transformed and require changes in their configuration and coordination with the organizational structure of

companies and their management system. That is, the subject must make decisions regarding the application of specific digital technologies to implement business processes. The expansion of innovative digital technologies, such as big databases (Big Data), cloud technologies (Cloud Computing), social media, integrated search and communication systems, blockchain, Internet of Things (IoT), robots, financial technologies (Fintech), as well as virtual tourism products (excursions, tours, installations, entertainment), is now an immanent element of the digital economy.

Table 1. Functions of business processes caused by the use of digital technologies

Source: According to analytical materials of Razumkov Center (2020).

Function	Basic characteristic
Stability	Determines the ability to withstand unexpected shocks (COVID-19) through the formation of new analog channels of communication with customers
Prognostic	Allows to forecast and predict the state of the system
Flexibility	Determines the ability to quickly adapt and scale the business in response to changes in competition, market opportunities, and economic conditions
Efficiency	Makes it possible to use digital resources that create greater value for customers, employees, and owners
Selectivity	Determines the ability to generate information about the state of business and consumers, which has a positive effect on strengthening competitiveness, efficiency, and sustainability
Regulation of mutual relations	Regulates interactive relations with the subjects of the system being the basis for the development of an innovative format of relations with partners (blockchain technologies)
Globalization	Causes an increase in the intensity of connections between socio-economic systems
Adaptive	Ensures quick adaptation to the requirements of the business environment
Educational	Has a positive impact on the desire to improve the level of qualification, which qualitatively improves human capital, supports social stability, encourages self-development
Innovative	Creates new values for the socio-economic system
Stimulating	Creation of jobs of a new type
Goal setting	Activates goals, forms their content, expands the goals of management activity, determines the optimal solutions for companies in choosing development priorities
Communicative	Acts as a means and subject of communications, ensures exchange and interaction of participants in communication processes based on digital platforms
Integrative	Unites the subjects of the system in solving economic and social tasks

Currently, digital transformation is a priority among the investment and innovation priorities of market entities in Ukraine (Razumkov Center, 2020). This makes it possible to note that digital technologies in tourism should be considered not only in the context of improving business processes but also as factors of organizational change, allowing to take advantage of new technologies (Buvat et al., 2018). It should be noted that the implementation of digital technologies in tourism has weakened the negative impact of COVID-19. This became possible due to the acquisition of new functions by the subjects of tourism activity thanks to end-to-end digital technologies of data collection, storage, processing, retrieval, transmission, and presentation. It also creates new market capabilities and improves business processes' functions (Skift, 2020). Table 1 summarizes the functions of business processes due to digital technologies.

The system of functions (Table 1) reflects the complex phenomenon of digital technologies as technological, organizational, service, and other operational functions. The above functions of digital technologies lead to changes in the basic configurations of the tourism activity's parameters, which is primarily expressed in the transformation of the content of business processes due to their acquisi-

tion of flexibility, modularity, mobility, dynamism in the organization, structure, and relationships with stakeholders. This ensures innovative development of the tourism business, but on the condition of timely application of digital technologies.

In order to determine the level of use of digital technologies by subjects of the tourism and hotel business in Ukraine, a study was conducted based on selective discontinuous observation. Here, not all units of the population (market subjects) are subject to review, but only a part of them ensure the sample's representativeness. According to the State Tourism Development Agency of Ukraine (2022), in recent years, 30 tour operators (1.9% of the total number of registered tour operators) served 92.8% of the total number of people who used the services of tour operators. It should be noted that digital technologies are mainly used by leading business entities located in big cities. Therefore, business entities located in these cities were chosen for the survey. To determine the general list, the number of functioning hotels in cities was taken into account: Kyiv – 132, Lviv – 55, Kharkiv – 33, Odesa – 75, as well as 30 tour operators. Thus, the total number of business entities is 325 units.

To determine the average sampling frame of the number of representatives of these business en-

tities in the survey, the serial selection was used; the selection scheme was chosen as repeated. The survey was conducted in July 2020 and July 2021 using Google Forms; the total number of respondents was 325 representatives of the tourism and hospitality sector. At the same time, it should be taken into account that 230 of them have been operating on the market for more than 5 years, so the specific weight of experts working in these entities of tourism activity (P) is $P = 230 : 325 = 0.71$. Finally, the paper determined the size of a representative sample of respondents (how many managers of hotels and tour operators should be involved in the survey):

$$n = \frac{P(1-P) \cdot t^2}{\Delta P^2}, \tag{1}$$

where n – the size of the sample’s respondents, P – specific weight of experts who represent subjects of tourism activity operating on the market for more than 5 years, t – the Student’s t-test at the given level of significance (confidence interval) $t = 2$, ΔP – the average fraction margin of error (specified as 12%).

$$n = \frac{0.71(1-0.71)2^2}{0.12^2} = 57. \tag{2}$$

To conduct the survey, it is necessary to involve managers of 57 tourism business entities (hotels and tour operators). At the same time, to ensure representativeness and take into account the opinion of various groups of tourism and hotel business subjects, 27 hotel managers were involved in the survey (InterContinental Kyiv, Ramada Kyiv, Fairmont Grand Hotel Kyiv, Holiday Inn

Kyiv, Premier Palace Kyiv, Premier Palace Kyiv, Bratislava, Khreshchatyk, Grand Hotel Lviv, Rius Hotel Lviv, Lviv, Kharkiv Palace, Premier Hotel Aurora, and others). Moreover, there were 30 managers of tour operators (Join Up, Tez Tour, Pegas Touristik, TUI, Coral Travel, Mouzenidis Travel, TPG, Anex Tour, Algol, Rose of Winds, Extravaganza of Travels, Alf, Accord Tour, Zeus Travel, Natalie Tours, Casablanca Travel and others).

Based on Google Forms, respondents were asked to indicate which types of digital technologies and how actively (a percentage ranking scale was offered) they used in their business processes. The survey was conducted in two sessions: July 2020 and July 2021. Figure 3 presents a comparison of the results.

The survey results indicate that digital technologies are the most powerful mechanism of adaptation to external challenges in a significant decrease in consumer demand. Their application, in addition to the technologies of “artificial intelligence” and “facial recognition,” has increased significantly. The top 5 most used digital technologies are “contactless payments,” “chatbots,” “mobile applications,” “mobile registration,” and “VR technologies.” The focus of the application of digital technologies is the intellectualization of service chains, operational processes, and interaction with consumers. In addition, more than 60% of respondents noted that digital transformation is one of the priorities for successful development. Respondents claimed that the reduction of barriers

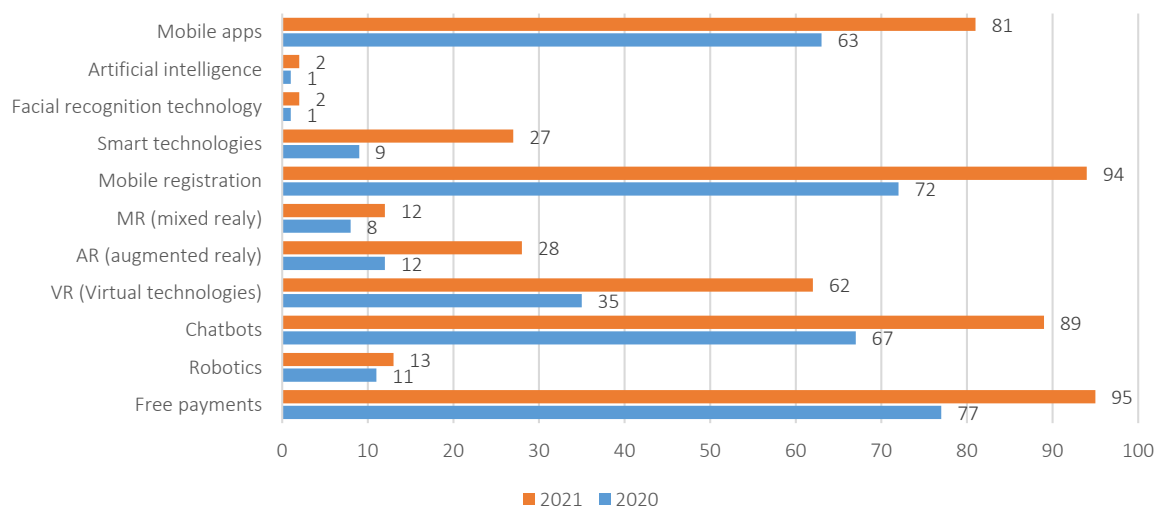
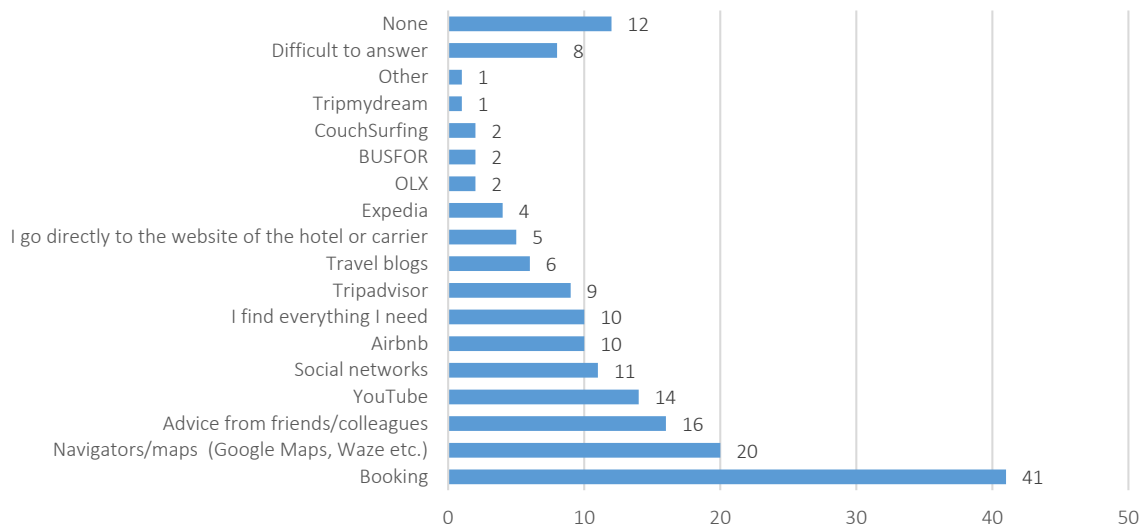


Figure 3. Dynamics of application of digital technologies by tour operators and hotels, %



Note: Respondents could have chosen several answers so that the sum of all answers exceeds 100%.

Figure 4. Distribution of answers of foreign tourists regarding sources of information about Ukraine, %

ers in the conditions of hybrid reality compared to physical reality makes it possible to optimize various business processes, reduce transaction costs, and create conditions for the formation of new types of offers and new ways of interaction.

Furthermore, the level of use of certain types of digital technologies differs between tour operators and hotels. For example, chatbots are used to a greater extent by tour operators and AR – by hotels. It is also noted that consumers widely use certain technologies to plan their own trips; in particular, artificial intelligence significantly simplifies the selection of carriers and route planning. According to the survey data, on average, the growth rate of digital technologies in the activities of tour operators and hotel chains in Ukraine increased by 72.2% over a year. The results of the field research indicate the absolute necessity and priority of digitalization in various directions and types of digital technologies.

In addition to information on priorities for the use of digital technologies, respondents determined that digital technologies provide scaling and flexibility of business, leading to effective targeting of communication with tourists. Therefore, in addition to improving business methods, digital technologies are, at the same time, an accelerator of creativity in the formation of tourist demand and strengthening of competitiveness.

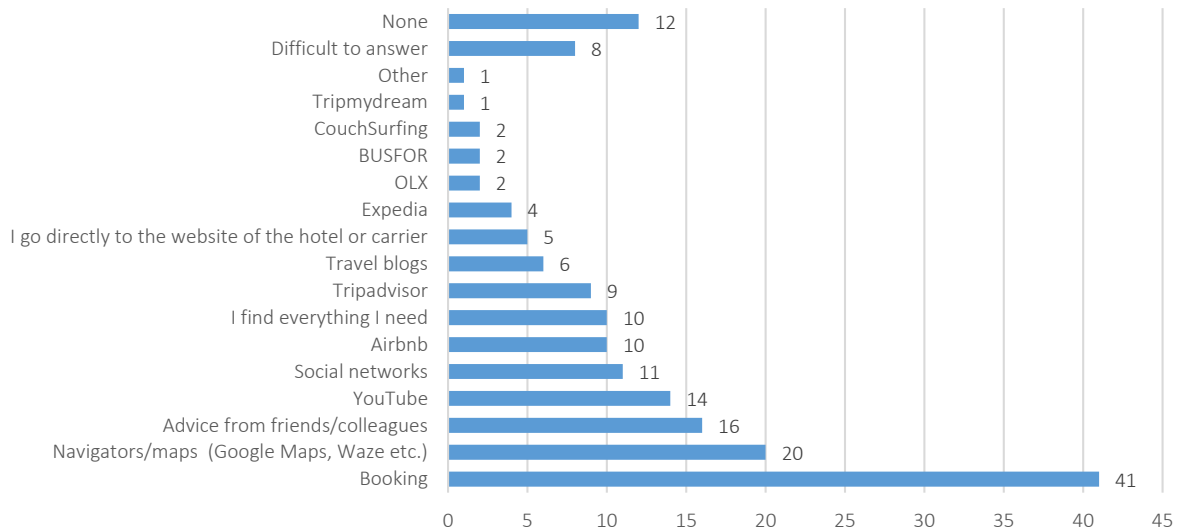
According to the results of the survey “Conducting quantitative studies of inbound tourism at check-

points across the state border” (State Agency for Tourism Development, 2022), which was initiated by the central body for regulating tourism in Ukraine – the State Agency for Tourism Development – when organizing a trip in Ukraine and during the journey itself, foreign tourists prefer digital technologies as sources of information. This paper analyzes the survey results of foreign tourists (respondents could have chosen several answer options, so the sum of all answers exceeds 100%).

Regarding sources of information about Ukraine, foreign tourists indicated social networks (27.0%), YouTube, video blogs (18.0%), and online publications (8.0%). Thus, from a total of 156 answers, 54 or 34.6% refer to digital technologies (Figure 4). Other factors are less significant. Respondents who learn about Ukraine from social networks use Facebook and Instagram as a source of information.

Regarding travel planning and organization tools, out of the total number of responses, 174, 137 or 78.7% use digital tools – Booking, Airbnb, Tripadvisor, Expedia, Tripmydream, navigators/maps (Google Maps, Waze, etc.), travel blogs, YouTube, social networks (Figure 5). Moreover, tourists most often use Booking (41%) to organize and plan their trip, as well as navigation tools on mobile devices (Google Maps, Waze, etc.) for local orientation (20%).

Regarding the tools for orientation in the city, from a total of 147 responses, 88 responses or 59% refer to digital tools – navigators, tourist navi-



Note: Respondents could have chosen several answers so that the sum of all answers exceeds 100%.

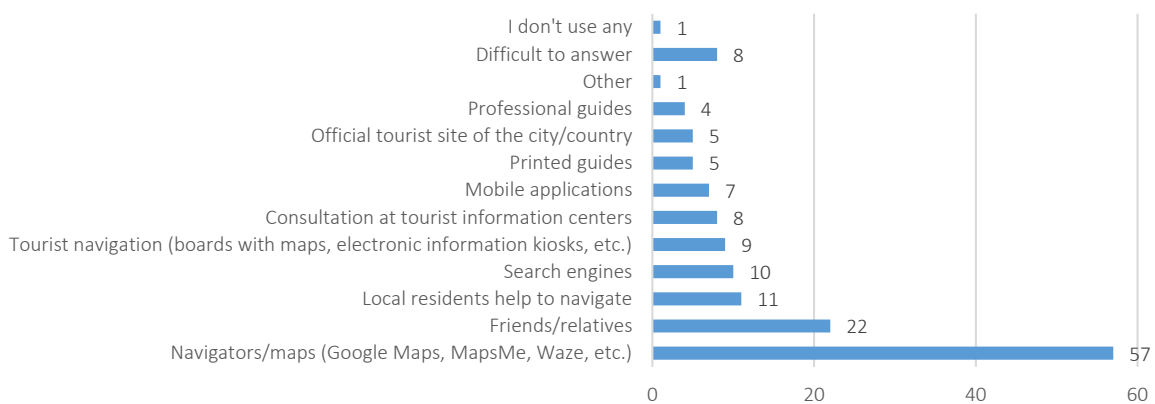
Figure 5. Distribution of answers of foreign tourists about tools for planning and organizing a trip to Ukraine, %

gation, search engines, mobile applications, and tourist sites (Figure 6). Accordingly, GPS navigators and maps are the main tools for orientation in cities (Google Maps, MapsMe, Waze, etc.).

Accordingly, it is possible to indicate the advantages of using digital technologies in the activities of tourism business entities for their positive impact on the national economy:

- 1) Marketing consists of transforming consumer mentality through the spread of virtual reality and virtual travel, social networks, simplifying information storage, and changing consumer preferences.

- 2) Economic includes business operational efficiency and cost reduction; digitization of assets, which comprises the integration of the information system with effective management; functioning in the form of a multi-purpose tool, in particular, as a tool for leveling the risks of the unprofitable activity, reducing the cost of providing services, increasing sales volumes, etc.; improvement of business models based on mobile applications, individual online approach to the consumer, personal advertising; aggregation and provision of access to information about the activities of the tourism system entities, including mechanisms for mul-



Note: Respondents could have chosen several answers so that the sum of all answers exceeds 100%.

Figure 6. Distribution of answers from foreign tourists regarding orientation tools in the cities of Ukraine, %

- ti-parameter search and feedback from interaction participants.
- 3) Innovative is reflected in the creation of prerequisites for the introduction of innovations, new products, and their consumer properties, consumer values, and business processes; making changes in business models and interaction of individual subjects with each other, which take place with the use of digital technologies, which is both a measure of the level of implementation and a driver of innovation.
- 4) Environmental, which can reduce the over-exploitation of natural and human resources (the phenomenon of overtourism), contributes to the achievement of goals of sustainable tourism development.
- 5) Service ones are related to the simplification and improvement of service processes and interaction with consumers, establishing contacts with potential consumers (digital collaboration), monitoring the level of demand satisfaction, business scaling, forecasting tourism development trends, preventive formation of consumer interest, and effective distribution of services.
- 6) Configurational is about configurational management, which through an information platform provides operational configuration of management decisions regarding the maximum use of resource potential, strengthening manageability through organizational forms of new business processes (virtual, smart, digital), which is important for tourism business entities providing services with a short life cycle.

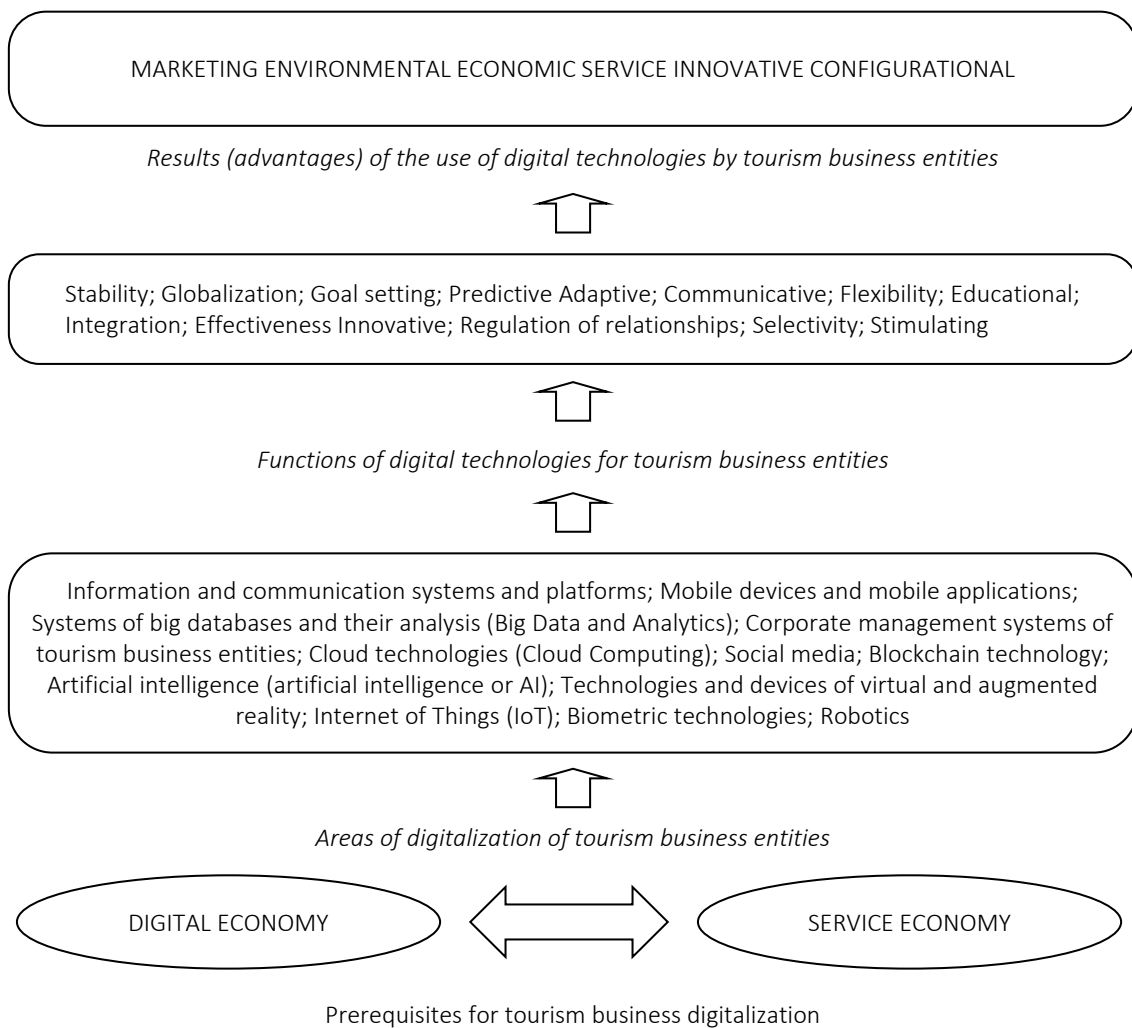


Figure 7. Prerequisites and results of the use of digital technologies by the subjects of the tourism business

The logic of the influence and interrelationship of digital technologies in the activities of tourism business entities in Ukraine is reflected in Figure 7.

Therefore, the development of the tourism business in the conditions of digitalization assumes that its multi-criteria excellence can be assessed by a set of different results and indicators. In turn, this leads to the thesis that objectively, digital technologies' implementation has different states of excellence (efficiency) depending on the purposeful influence of digital technologies on the business entity in terms of the corresponding coordinates of priority changes (marketing, economic, innovative, environmental, service, configuration).

4. DISCUSSION

The comprehensive implementation of digitalization is now the main factor in the post-crisis recovery and development of the tourism business (Akhtar et al., 2021; Bovsh et al., 2021; Galvani et al., 2020; Gössling et al., 2021). At the same time, in previous studies on tourism, the main attention was paid to its development in the environment of the service economy. Now, a synergy of the digital and service economies as interdependent drivers of creativity in tourism business entities' operational and strategic activities is observed. However, it is also possible to observe the uneven development and fluctuations in the dynamics of the implementation of digital technologies by the entities of the tourism business in Ukraine under the influence of certain processes and events.

Taking into account the survey of representatives of the Ukrainian tourism business and elaborating the study of Tajeddini et al. (2019), it is possible to systematize the functions of digital technologies for the development of tourism business as:

- 1) defining determinants that lay the foundation for the strategic potential of tourism development in the global environment – artificial intelligence, smart technologies, robotics;
- 2) optimizing determinants, which are the driving factors in a specific business environment and time period. They, influencing the process of creating a tourist product, optimize busi-

ness processes, and positively affect the perception of the consumer value of tourist products – contactless payments, mobile registration, chatbots, mobile applications;

- 3) complementary determinants, which have a functional focus on the digitalization of certain types of business processes – VR, AR, MR, and facial recognition technologies.

One of the promising areas for digitalization of the tourist business in Ukraine is the monitoring and evaluation of the growth of tourist flow rates, including by types of tourism, changes in the specific weight of individual types of tourism in the total volume of tourist flows, tourist balance for building a system of indication and visualization (dashboards) of the state development of tourism, analytical assessment of the current situation regarding online sales of tours, and development of mobile applications. At the state and regional levels, this requires real-time interactive analytical panels and blockchain technologies, which provide data on tourist services in a single digital space through a single Internet platform. Therefore, in the conditions of global digitalization, the priority direction for the application of information technologies in the tourism system of Ukraine is the creation of a service infrastructure such as the online service “Diia” by adding to it the offer of tourist services – “Diia.Tourism.” Consolidating services related to accommodation, transport, excursions, and route formation will significantly simplify the processes of organizing tourism activities from the point of view of various stakeholders: consumers, business structures, state and local authorities, and public organizations. At the same time, for the country's economy, this implies a change in the technological paradigm, changes in management models of the economic system and its subsystems, and transformation and large-scale shifts in the tourism sector, in particular, in connection with the transition to the online environment.

Gössling (2021) started a discussion that the introduction of the latest, in particular, digital technologies, reflects new opportunities and risks requiring a critical assessment of their consequences. Therefore, further research will require the study of the impact of digital technologies on specific seg-

ments of the tourism business and the processes of building a consistent management mechanism for implementing digital technologies by tourism business entities. Furthermore, challenges related to the quality and ethics of social networks, active

development of “e-tourism,” and the introduction of new distribution information systems should become the research vector for further scientific discussions regarding the impact of digitalization on the development of tourism business.

CONCLUSIONS

A comparative analysis of digitalization as an innovative, comprehensive, and multidirectional process was done. In addition, the study analyzed types of digital technologies in the context of determining the priority areas of their implementation by tourism business entities. This makes it possible to note that digitalization is a modern global trend that manifests through the application of digital technologies in various market participants' activity areas.

The implementation of digital technologies in the tourism business reflects two aspects: the impact of external challenges (globalization, crises) on the one hand, and the symbiosis of digital and service economies, on the other hand. At the same time, by introducing an element of chaos (entropy) into tourism as an open system, fluctuating processes can, nevertheless, carry positive development scenarios thanks to the use of digital technologies. Furthermore, the objectivity of digitization in the tourism business makes it possible to systematize the application of digital technologies at hierarchical levels taking into account the heterogeneous possibilities of their use. In particular, for the national economy, the added value refers to the increase in GDP due to the use of digital technologies in various spheres, including tourism.

For a specific subject of tourism business, added value is obtained due to the use of digital technologies in business processes, which determines various directions of digitalization and ascertainment of new functions of business processes through the use of digital technologies. This is confirmed by the results of the field research of tourism business representatives. It was determined that, firstly, the complementation of elements of the digital economy for tourism business entities is carried out based on digital platforms that integrate business processes at different hierarchical levels. Secondly, there is a general understanding that digital technologies are reformatted from a marketing tool into a powerful strategic development tool based on innovative knowledge. Thirdly, tourism business is characterized by leap-like waves of digital technology implementation processes, which cause the modernization of not only business processes, but also the reformatting of tourism management mechanisms at various levels (from personal to global), covering all component subsystems, processes, and technologies. There is the large-scale use of digital technologies, according to the surveys of consumers of tourist services. 34.6% of tourists use digital technologies as sources of information search, 78.7% as tools for planning and organizing trips, and 59.5% as tools for navigating destinations. This indicates that business entities are transforming into omnichannel centers, applying innovative technical solutions for relationships with potential consumers.

A generalized view of the content and directions of digitalization in the tourism business makes it possible to state that digital technologies determine marketing, economic, innovative, environmental, service and configurational advantages in business environment. They also offer flexible interaction with consumers and suppliers, effective distribution, and reduce transaction costs, which make it possible for business processes to acquire the features of flexibility, modularity, mobility, and dynamism. A separate and fundamental place in the introduction of digitalization in the tourism business belongs to the conclusion that digital technologies have the ability to influence the achievement of a state of excellence (efficiency). That is, they act as a kind of attractor (a set of alternatives) for the post-crisis recovery and development of the tourism business in the conditions of globalization and military and pandemic challenges.

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APPENDIX A

Table A1. Areas of tourism business digitization

Areas of digitization	Types of digital technologies	Digital systems and platforms
Information and communication systems and platforms	Universal global systems for booking tourist services	Skyscanner, Booking.com, Otel.com, Agoda.com, Hotels.com, Airbnb, Trivago, Skyscanner, Kiwi, OnetwoTrip, Hotelworld, Home Away, DB Navigator
	Specialized airline websites and platforms	Wizzair, Ryanair, Iberia i Vueling, MAV
	System of independent accommodation and accommodation selection	TripAdvisor, TripMyDream, Rome2rio, izi.TRAVEL
	Search and navigation services	Google.com, Bing, Ask.com, Ukr.net, I.ua, Online.ua
	Car rental platforms and systems	Europcar i Hertz, Economybookings, Uber and Taxify, Ultimate Drives
	Systems of financial services and banking	BankID National Bank, Privat24, Oshchad24, Monobank
	Travel blog services	Twitter, Blogger, WordPress.com, Blog.com, LiveJournal, Blogoreader, Meta.ua, Hiblogger.net
	Multifunctional global administrators	Glovo, UberEats
Mobile devices and mobile applications	Systems of consumer-generated content	User-Generated Content
	Translators, maps, hotel reservations	Google Translate, ITranslate Translator, Google Maps, Hotellook, Booking, BiletYPlus, Hotels Maps 3D
	Car rental	Sixt, Bookinsautos, Getmancar, inDriver
	Ticket purchasing and comparative integrated sales services	Aviasales, Scyscanner, Momondo, Chartershop
	Guides, audio guides and reference books	TravelMe, Google guide, iziTravel
	Search for fellow travelers	BlaBlaCar Mixway
	Travel visualization applications	TripTrip, Spottly, Blink
Social media	Search engines	Google, Momondo, Kayak, Bilet, App In The Air, Hotel Reservation Service, Hotels.com, Expedia.com
	Social platforms for communication with customers	Snapchat, Pinterest, Facebook, Instagram, Zoom, Google Duo, Moodle, Teams, TikTok, Twitter, LinkedIn
Systems of big databases and their analysis (Big Data and Analytics)	Technologies of personal interaction with customers	Viber, Whatsapp, Telegram, Skype, Facebook Messenger
	Technologies of services personalization; market monitoring; revenue management; business analytics, geo-analytics, tourist services	Hotel Advisors, Google Analytics, Skyscanner, Booking.com
Corporate management systems of tourism business entities	Business process management systems and technologies, management accounting, digital marketing, strategic management	Fideo Front Office, Distant-Office, AMADEUS, Worldspan Galileo, Opera
Cloud technologies (Cloud Computing)	Technologies of information storage, processing and integration on remote servers	Rental of SaaS (Soft as a Service) or AaaS (Application as a Service) software for the information network; rental of PaaS (Platform as a Service) software development and implementation environment: Google App Engine service, Sales Cloud (CRM system); Service Cloud (customer support system); Collaboration Cloud (aka Chatter – joint work system); Social Marketing Cloud (social network monitoring system)
Blockchain technology	Distributive databases for algorithmization and optimization of transaction accounting; consumer identification and access management, smart contacts; financial calculations	Winding Tree (decentralized travel distribution network); Concierge (CGE) (mobile booking and payment application); Travelflex (payment and social communication application); Cool Cousin (CUZ) (travel forum); MeetnGreetMe (global concierge service platform); Go Cubo Lodge Club (GO) (global mobile home rental platform)
Artificial intelligence (AI)	Management decision-making systems; personalization of tourist products' sales; data processing; automation of business processes	Hotel management systems – PMS (property management system); real-time risk management and anti-fraud systems; automated virtual assistants (marketing, analytics, quality, room service, F&B, animation); business analytics systems; customer services (chatbots of 24-hour hotel service from check-in to check-out; "service concierge" system; "room service" system; "smart house" system; neural networks (automation of operational activities of a tourist office, restaurant, hotel or networks); systems of neurointerfaces (exchange of information between the human brain and an electronic device)

Table A1 (cont.). Areas of tourism business digitization

Areas of digitization	Types of digital technologies	Digital systems and platforms
Technologies and devices of virtual and augmented reality	Devices and systems for visualization of tourist objects and infrastructure (VR and AR devices, gadgets, headsets)	VR installations of expositions, tourist objects, destinations, hotels, seats in airplanes; AR (virtual tours of hotels, resorts, museums); CAVE virtual reality rooms
Internet of Things – IoT	Technologies, objects and devices equipped with sensors, software and other equipment that allow receiving and exchanging data via the Internet	Provision of “seamless” service; self-service; remote provision of services; obtaining market analytics; asset monitoring; pricing
Robotization	Electromechanical and virtual agents (automation of operational and management processes); intelligent robots (communication, information search and processing)	Robot vacuum cleaners; concierge robots; porter robots (Space Egg); robot animators
Biometric technologies	Digital systems that record the authenticity of a person’s presence and identification based on a person’s biometric information	“Diia” system; biometric passports; digital tickets