
Impact of Information and Communication Technologies on the Tourism Sector

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Abstract:

Purpose: The article aims to assess the impact of information and communication technologies on the operation of the tourism sector.

Design / Methodology / Approach: The research methodology was based on the application of the desk research method, involving the verification of data obtained from publicly available found sources (professional literature, Internet, web research).

Findings: The continuous development of information and communication technologies over the past decade has radically changed tourism. ICT technologies offer a broad spectrum of solutions affecting the entire tourism industry, including travel, transportation, leisure, and hospitality, and increase the efficiency of economic processes in the tourism sector.

Practical Implications: The article contains valuable information that can serve as source material and a reference for further research related to the development of the tourism sector.

Originality/value: This article contributes to recent European and global academic discussions on the competitiveness of ICT and its importance in the tourism sector.

Keywords: ICT, tourism sector, selected technologies.

JEL classification: C38, Z32, O33.

Paper Type: A research study.

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1. Introduction

The dynamic development of new Information and Communication Technologies (ICT), particularly the Internet and connected devices, accelerated at the end of the 20th century, triggering numerous and diverse changes in every area of activity of all market participants. These changes significantly transform the construction of market offers, the way of service or the system of providing goods and services. They are leading to the emergence of more innovative solutions, which significantly affect buyers' behaviour (Frąckiewicz and Bak, 2021). Unlimited access to information forces the use of digital technologies necessary for building relationships with customers and shaping a positive corporate image (Zawadzki, 2021).

The potential for using widely understood information technology in tourism has also developed. Social media have recently gained particular importance, becoming an easily accessible source of reliable, up-to-date, accurate information. Effective use of the Internet and mobile technologies is becoming increasingly important for the success of tourism offers in the future. Information and communication technologies enable the implementation of promotional activities and the communication of tourism information in new, multimedia, and interactive ways (Pawłowska-Legwand, 2019). These technologies are particularly valued and most enthusiastically used by today's young consumers. Also, in the future, they will increasingly use these technologies to purchase tourist services more efficiently (Bak, 2013).

The tourism market is recognized for its high use of modern information technologies. It is particularly susceptible to the use of the Internet in various aspects: from the dissemination of information, offers and opinions, booking and sales systems, social media, and participation in tourism through global networks (Olearnik, 2016). However, the use of ICT must not be narrowed down to the Internet alone.

ICT has changed tourism worldwide and provided new perspectives for its development. The relationship between the tourism market and information technologies is commonly referred to as e-tourism (Panasiuk, 2015; Neidhardt and Werthner, 2018). It is believed that an essential innovation in tourism, and especially in tourism marketing, is its visualization, i.e., the replacement of tangible resources, real marketing processes and relationships, at least in part with their counterparts in a virtual environment (Rapacz and Jermen, 2015).

The main purpose of the study is to assess the impact of information and communication technologies on the functioning of the tourism sector. The research methodology was based on the application of the desk research method, involving the verification of data obtained from publicly available found sources (professional literature, Internet, web research). The study contributes to recent European and global academic discussions on the competitiveness of ICT and its importance in the tourism sector.

2. Importance of Information and Communication Technologies

Information and communication technologies play a significant role in modern society. They have changed the way we communicate with each other, find the information we need, work, and do business. As they affect everyday life, they also influence macroeconomic growth, which further impacts society by facilitating improvements in infrastructure and living standards (Becker *et al.*, 2018; Roztocki *et al.*, 2019).

As a result of technological change, the nature of businesses' commercial and service activities has completely changed. Access to (instant) information has become a key factor in the development and has forced companies to make several changes regarding their operations, including promotion. Promotion, which is an instrument for an enterprise to communicate with the market, thereby stimulating demand and shaping customer needs, has gained another dimension forced by digitization.

Information technology has provided many opportunities for businesses to reach potential customers. In this regard, the primary means of promotion is to place websites at their own network address. They have become, in a way, business cards of companies, where, in addition to address data, information about the business is included, which, due to the nature of online content, can be easily updated, changed, and adapted to the audience.

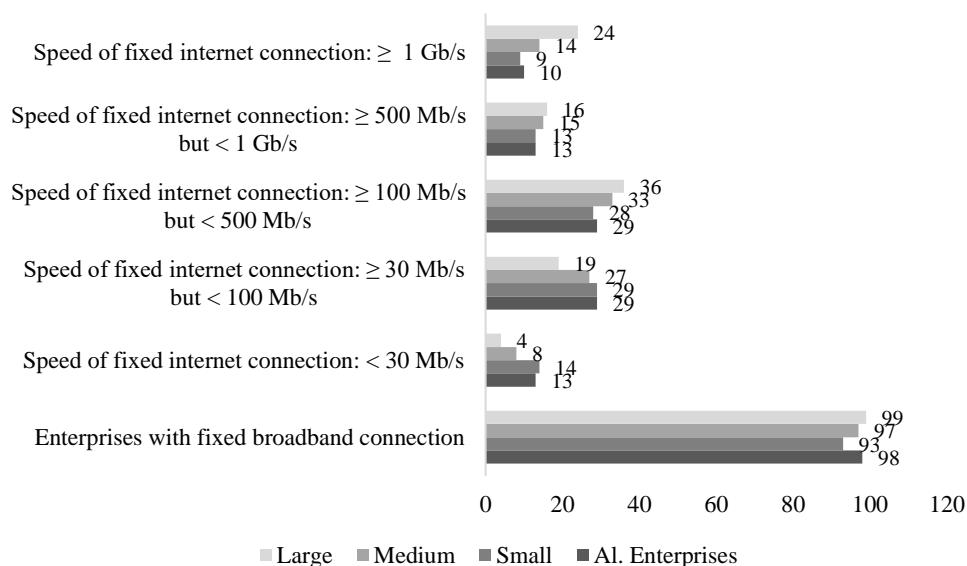
The Internet has become a place for exchanging information, which is why many companies have begun to operate on social media to promote their business there. Social media can combine elements of traditional media, but for the most part in business they are used to create dialogue and interaction between companies and customers, including potential customers. They are a place for networking while providing a forum for exchanging opinions. They offer opportunities for interaction between the provider of services and their targeted customers, but importantly, between the audiences themselves, who, moreover, are given the opportunity for integration. (Lakshmanan and Basariya, 2017; Hosseini *et al.*, 2018; Novianti and Erdiana, 2021).

In 2021, the vast majority (94%) of companies in the EU with at least 10 employees used a fixed broadband connection to access the Internet (Figure 1). The share was even higher for medium and large enterprises, where almost all enterprises reported connecting to the Internet via a fixed broadband connection. Nearly a quarter of large enterprises use Internet connections faster than 1 Gbps.

In 2021, 78% of businesses in the EU had a website, with large companies accounting for 94%, 19 percentage points higher than small businesses. Social media of some kind were used by 59% of EU enterprises (Figure 2). Social networks were the most popular, used by 56% of EU enterprises, followed by sites for sharing multimedia

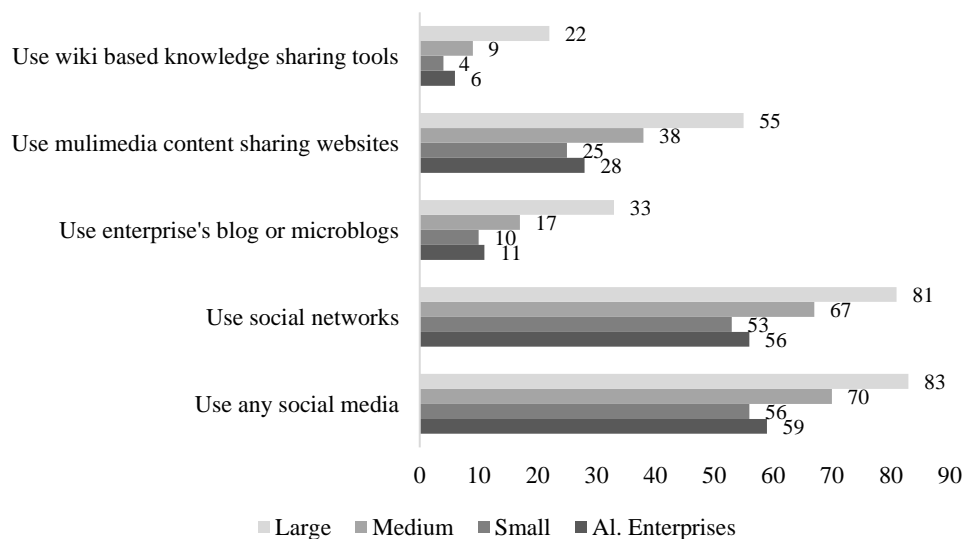
content used by 28% of enterprises. More than three-quarters of large EU enterprises (81%) had an account and used some social media. In contrast, just over half of small businesses (53%) used social networks.

Figure 1. Enterprises with a fixed broadband connection, by size class and speed, EU, 2021 (% of enterprises)



Source: Own study.

Figure 2. Enterprises using social, by type and size class, EU, 2021 (% of enterprises)



Source: Own study.

From the point of view of the user, the biggest advantage of social media is precisely the possibility of exchanging information and opinions about a particular product or entrepreneur. Thus, among the main benefits of creating a company's image with the use of social media are, the speed of information provided, quick potential responses, relatively low cost of reaching and a large audience, which facilitates the effective development of new business opportunities (Andersen, 2001; Andersen and Foss, 2005).

According to many researchers (SeYoo, 2003; Kallal *et al.*, 2021), investment in information technology contributes significantly to economic growth in developing countries. In contrast, Yousefi's (2011) research shows that their impact on economic growth varies by income group of countries - they play an essential role in high and upper-middle-income countries but do not contribute to growth in lower and middle-income countries. Similar conclusions are made by Lee *et al.* (2017), according to whom the diffusion of information and communication technologies is a determinant of human progress at the global level, and the effects vary depending on the type of technology or income level in a country.

3. Use of ICT in Tourism - Examples of Good Practices

Tourism is a fast-growing industry that is one of the most significant and dynamic factors in socioeconomic progress. It contributes to employment growth through job creation and business competitiveness, which significantly impacts the country's economy. It ranks third in export volume after chemicals and fuels and ahead of automotive products and food (Nikoli and Lazakidou, 2019). Since it is a major industry in the global economy, many destinations compete to attract potential tourists through all means of communication. Over the past decade, the tourism sector has been revolutionized by online applications that provide potential tourists with access to communication and information and allow them to participate in planning their travel trips.

The proliferation of ICT has created new opportunities to expand the tourism business and reach potential customers. The development of ICT has transformed the modern global marketplace, enabling businesses to reach audiences worldwide, export a broader range of goods and services, and improve efficiency. The following are selected ICTs used in the tourism services market:

1. Geospatial Information System (GIS) has many applications both in the tourism industry and in the administration and management of a tourist destination. The basic element of a GIS is a database containing information (spatial and descriptive) about real-world objects represented in the system. The ubiquity of the Internet has made it increasingly common to encounter systems that take the form of an Internet service. Advanced technologies and applications allow immediate access to data, their selection, and conducting analysis and obtaining ready-made reports. All this is intended to facilitate decision-making and the selection of the optimal solution.

In Poland, the construction of GIS systems is led by administrative units (voivodships and cities), for which it is one of the most important elements in the development and functioning of the local community while also providing a rich source of information for potential investors and tourists. More and more thematic or industry-specific systems are also being created, such as the spatial information systems operating in Poland for the Odra River Basin, the Tatra National Park, and the State Forests. The map services such as Google Maps, Yahoo Maps or their Polish counterparts are also extremely popular: Zumi.pl, Targeo.pl and others.

2. Global distribution systems (GDS), gathering databases of tour operators, agents, carriers, accommodation, and transportation facilities. They also offer an option to make a booking or rent a car.

3. Tourist Assistant “TAIS” application based on the “Tourist Guide” category, which provides information about tourist locations nearby based on tourists’ preferences. It includes information, transportation options and a tourist guide (Smirnov *et al.*, 2014).

4. TripAdvisor (<https://www.tripadvisor.com>) - currently the world’s largest travel site, allowing users to plan and book trips. Anyone can use its resources, create profiles of sites and attractions, and post photos and opinions.

5. Self-service technologies (SSTs) are used in airports, hotels, restaurants and many other services. They can be defined as a technological interface that allows users to produce a service independent of the direct involvement of service employees. Modern airline services include self-check-in, issuing electronic boarding passes and baggage claim tags, and notifying passengers of boarding times, gate information, etc. Mobile apps communicate with the airline, and the passenger’s status is updated during check-in. In addition, many airport apps provide maps, navigation tools, devices and Wi-Fi systems (Benckendorff *et al.*, 2019).

6. Online travel sites and the Internet Distribution System (IDS) provide travellers with smart tools for booking hotel rooms, car rentals, airline tickets, etc.

7. Group Recommendation Systems support a group of people in decision-making by giving recommendations tailored to user preferences. The system identifies the individual needs of all group members, then finds a compromise accepted by all group members and offers a recommendation (Nguyenand and Ricci, 2017).

8. A model for local destination management systems at heritage sites (DMS) that facilitates destination management and coordination of local suppliers. DMSs provide interactive displays of local amenities and attractions, allowing consumers to build itineraries based on their interests and requirements. As an example, Valčić and Domšić (2011) describe Croatian world heritage sites and their status on the Internet.

9. Various channels and platforms that provide photos, graphics or video clips. With these tools, tourists have a complete picture of the target tourist product and a tangible image of the attraction, as well as the ability to search and book in real-time (Valčić and Domšić, 2012).

4. ICT and Tourism - A Review of the Literature

The use of information technology in tourism has become a topic of research in many research centres. Both the technologies themselves and the extent to which they are used by tourism professionals, tourist destinations and tourists alike are being studied. Ramos and Rodrigues (2013), studying the number of Internet users in eighteen European countries, showed a positive relationship between the number of online bookings and ICT. Mavri and Angelies (2009), analysing Mediterranean EU member countries, showed a clear positive relationship between traveller arrivals and Internet use.

Adeola and Evans (2020) analysed the relationship between ICT, infrastructure, and tourism development in Africa between 1996 and 2016. The results of their study indicate that ICT and infrastructure have a positive, statistically significant relationship with tourism development; as ICT and infrastructure increase, tourist arrivals also increase. It follows that ICT and infrastructure development have opened tremendous opportunities to strengthen tourism in Africa.

A study by Lee *et al.* (2021) indicates that secure web servers, mobile subscriptions and fixed broadband subscriptions positively impact international traveller arrivals, while mobile and especially computer-based subscriptions and communications have a negative impact on tourism receipts in countries with the highest tourism revenues.

Amaro *et al.* (2021) provided an overview of the use of ICTs in religious tourism, proving how useful they can be in this type of tourism, as in the tourism industry in general. The article highlights several applications of information and communications technology to religious tourism and ways to effectively manage religious sites, events, and pilgrimages.

The growing impact of information and communications technology on tourism, which has been observed for many years, was magnified during the COVID-19 pandemic. According to Gretzel *et al.* (2020), an essential condition for tourism to function during and after a pandemic is using modern ICT technologies. They are essential in solving many of the problems associated with a pandemic, such as travellers' control, online education, and entertainment. Various entities and institutions, both public and private, are looking for ways and tools to combat the pandemic, commonly and quickly implementing new technological solutions into everyday life, including the sphere of tourism (Kowalczyk-Anioł and Pawlusiński, 2021).

The pandemic increased the level of technology acceptance among both tourists and service providers. Olszewski (2022), examining the resilience of tourism start-ups to the crisis caused by the COVID-19 pandemic, indicated that start-ups related to:

- restaurant food delivery (UberEats, Glovo, Bolt, Pyszne.pl),
- local transportation (Uber, Bolt),
- the automation of guest service processes, such as self-check-in, communication (iLumio, ExtraInHotel, iBeeQ),
- virtual meetings, online conferences (Zoom, Gridaly, GoToMeeting).

Ali *et al.* (2015) pointed out that the growing impact of ICT on the tourism industry has become one of the main challenges facing developing countries, particularly small island developing states. Thanks to these technologies, the distance barrier has been overcome, thus opening new markets. However, realizing the full potential of ICT can be problematic for small island developing states due to limited financial resources and human capital.

In Poland, studies of the impact of ICT on tourism have been conducted by, for example, Pawłowska-Legwand (2019). To learn about the activity of tourists on the Internet, the author conducted a survey in 2014-2016 in tourist destinations of the Małopolskie Voivodship with a sample of 1,053 people. The analysis of the survey results revealed that the respondents actively used information and communication technologies before their tourist trip to access information and services (in terms of planning, moving and enjoying tourist attractions). Among the people surveyed, the most active users of ICT are 20- and 30-year-olds, the so-called Generation Y, which is more broadly characterized by Panfiluk, Pek, and Markowska (2022).

Generation Y comprises people born from the early 1980s to 2000, that is, people entering the workforce without family obligations. People from this generation are distinguished by the fact that they grew up in the era of digitization, in a globalized world, with the widely available Internet, which has become a defining characteristic of this generation.

This generation is also characterized by a high level of travel activity, driven by openness and a desire to explore the world and seek out new and diverse experiences. It is a generation for whom technology plays a key role, and they buy travel products mainly online, from which they also get information about travel destinations (Lin, 2012; Giovannini and Thomas, 2015). They mainly prefer short-term trips (Cavangaro *et al.*, 2018) for sightseeing, nature, and qualified tourism (Panfiluk *et al.*, 2022).

Perechuda and Nawrocka (2013) studied the use of information and communication technologies in customer service, investigating travel agencies. Their research shows that a key role in customer service is played by the website, which, in addition to providing the customer with information about the company and the services offered, also influences the formation of the company's image, the company's efficient and

rapid communication with the public, and the sale of products directly via the Internet. From the customer's point of view, it primarily provides an opportunity to shape the various elements of the tourist product actively.

Information and communication technologies are also used by local governments carrying out activities in the field of tourism promotion and information. It was demonstrated by the results of a survey conducted in Poland in 182 communes in the Małopolskie Voivodship. It turned out that the basic promotional tool and the source of tourist information, such as official websites, fulfilled their role in most cases. Mobile apps, like thematic websites, were part of a regional or local tourism information system created by a municipal or provincial government as part of a broader cooperation for tourism development, such as a supra-local tourism product (Pawłowska-Legwand, 2019).

An important issue is the effectiveness of ICT use. According to Aramendia-Muneta and López (2013), the use of a variety of information and communication technologies has little effect on the level of competition and productivity growth. However, it has a positive impact on increasing the market share of companies. In turn, the results of Mihalic and Buhalis (2013) indicate an indirect positive effect of the ICT factor on company profitability.

5. Conclusions

Information and communication technologies have had a significant impact on the development of the economy, including the tourism economy, for several decades. There has been a systematic increase in the importance of technology in the private and professional lives of modern society, including during tourist trips. The increasing use of ICT technologies is resulting in benefits for both private and public sector information, product and service providers and consumers.

From the point of view of tourism companies, it has become possible to expand their business with online channels, introduce electronic sales, and thus reduce costs, automate customer service, and increase sales. Tourists, on the other hand, by choosing digital solutions that are convenient to them, can seek the best solutions for themselves, both when planning their trip and their stay in a tourist destination. Technological opportunities will undoubtedly continue to develop, creating further changes and a new quality in the functioning of the tourism industry.

References:

- Adeola, O., Evans, O. 2020. ICT, infrastructure, and tourism development in Africa. *Tourism Economics*, 26(1), 97-114. At: <https://doi.org/10.1177/1354816619827712>.
- Ali, V., Cullen, R., Toland, J. 2015. ICTs and Tourism in Small Island Developing States: The Case of the Maldives. *Journal of Global Information Technology Management*, 18(4), 250-270. DOI: 10.1080/1097198X.2015.1108095.

- Amaro, S., Barroco, C., Fonseca, P. 2021. The use of information and communication technologies in religious tourism. *The Routledge Handbook of Religious and Spiritual Tourism*. Routledge.
- Andersen, T.J., Foss, N.J. 2005. Strategic opportunity and economic performance in multinational enterprises: The role and effects of information and communication technology. *Journal of International Management*, 11(2), 293-310. Available at: <https://doi.org/10.1016/j.intman.2005.03.008>.
- Andersen, T.J. 2001. Information technology, strategic decision-making approaches and organizational performance in different industrial settings. *The Journal of Strategic Information Systems*, 11(2), 101-119. At: [https://doi.org/10.1016/S0963-8687\(01\)00043-9](https://doi.org/10.1016/S0963-8687(01)00043-9).
- Aramendia-Muneta, M.E., Ollo López, A. 2013. ICT impact on tourism industry. *Int J Manag Caset*, 15(2), 87-98.
- Bąk, I. 2013. Statystyczna analiza aktywności turystycznej seniorów w Polsce. Wydawnictwo Uczelniane Zachodniopomorskiego Uniwersytetu Technologicznego w Szczecinie.
- Becker, J., Becker, A., Sulikowski, P., Zdziebko, T. 2018. ANP-based analysis of ICT usage in Central European enterprises. *Procedia Computer Science*, 126, 2173-2183. Elsevier, Amsterdam (22nd International Conference on Knowledge-Based and Intelligent Information & Engineering Systems – Belgrad, Serbia 3-5.09.2018 r.). ISSN 1877-0509. Available at: <http://doi.org/10.1016/j.procs.2018.07.231>.
- Benckendorff, P.J., Xiang, Z., Sheldon, P.J. 2019. *Tourism Information Technology*. 3rd Edition, Boston, CABI Tourism.
- Cavagnaro, E., Staffieri, S., Postma, A. 2018. Understanding millennials' tourism experience: values and meaning to travel as a key for identifying target clusters for youth (sustainable) tourism. *Journal of Tourism Futures*, 4(1), 31-42. Available at: <https://doi.org/10.1108/JTF-12-2017-0058>.
- Frąckiewicz, E., Bąk, I. 2021. Postawy i opinie polskich seniorów wobec zjawiska ich cyfrowego wykluczenia. In: Frąckiewicz, E. and Iwański, R. (Eds.). *Srebrna gospodarka. Perspektywa interdyscyplinarna*. Akademia sztuki w Szczecinie, 428-450.
- Giovannini, S., Xu, Y., Thomas, J. 2015. Luxury fashion consumption and Generation Y consumers: Self, brand consciousness, and consumption motivations. *Journal of Fashion Marketing and Management*, 22-40.
- Gretzel, U., Fuchs, M., Baggio, R., Hoepken, W., Law, R., Neidhardt, J., Pesonen, J., Zanker, M., Xiang, Z. 2020. e-Tourism beyond COVID-19: A call for transformative research. *Information Technology and Tourism*, 22, 187-203.
- Hosseini, Z., Mohammadi, S., Safari, H. 2018. An assessment of the impact of information technology on marketing and advertising. *Engineering, Technology & Applied Science Research*, 8(1), 2526-2531. Available at: <https://pdfs.semanticscholar.org/7f67/5e018b80a5b2c86761eff58e1346d61425dc>.
- Januszewska, M., Jaremen, D., Nawrocka, E. 2015. The Effects of The Use of ICT by Tourism Enterprises. *Szczecin University Scientific Journal*, 883, 65-73.
- Kallal, R., Haddaji, A., Ftiti, Z. 2021. ICT diffusion and economic growth: Evidence from the sectorial analysis of a periphery country. *Technological Forecasting and Social Change*, 162. Available at: <https://doi.org/10.1016/j.techfore.2020.120403>.
- Kowalczyk-Anioł, J., Pawłusiński, R. 2021. Miasto turystyczne wobec pandemii COVID-19. Pierwsze doświadczenia w świetle literatury przedmiotu. *Annales, Universitatis*

- Mariae Curie-Skłodowska, Lublin-Polonia, LXXVI, sectio B, 203-222. DOI: 10.17951/b.2021.76203-222.
- Lakshmanan, D., Basariya, S.R. 2017. The role of social media on enhancing advertising effectiveness. *International Journal of Civil Engineering and Technology*, 8(9), 1042-1047.
- Law, R., Buhalis, D., Cobanoglu, C. 2014. Progress on information and communication technologies in hospitality and tourism. *International Journal of Contemporary Hospitality Management*, 26(5), 727-750.
- Lee, Ch., Chen, M.P., Wu, W., Xing, W. 2021. The impacts of ICTs on tourism development: International evidence based on a panel quantile approach. *Information Technology and Tourism*, 23, 509-547. Available at: <https://doi.org/10.1007/s40558-021-00215-4>.
- Lin, W. 2013. Agnostic notes on regression adjustments to experimental data: Reexamining Freedman's critique. *The Annals of Applied Statistics*, 7(1), 295-318.
- Mavri, M., Angelis, V. 2009. Forecasting the growth of e-tourism sector: the case study of Mediterranean countries. MPRA, Paper No. 25439.
- Mihalic, T., Buhalis, D. 2013. ICT as a New Competitive Advantage Factor – Case of Small Transitional Hotel Sector. *Economic and Business Review*, 15(1), 33-56.
- Neidhardt, J., Werthner, H. 2018. IT and tourism: still a hot topic, but do not forget IT. *Information Technology and Tourism*, 20(1), 1-7. Available at: <https://link.springer.com/article/10.1007/s40558-018-0115-x>.
- Nguyen, T.N., Ricci, F. 2017. A chat-based group recommender system for tourism. *Information and Communication Technologies in Tourism. Proceedings of the International Conference in Rome, Italy, January 24-26*, Schegg, R, Stangl, B. (Eds.). Springer, 17-30.
- Nikoli, G., Lazakidou, A. 2019. The Impact of Information and Communication Technology on the Tourism Sector. *Almatourism Journal of Tourism, Culture and Territorial Development*, 10(19), 45-68.
- Novianti, W., Erdiana, E. 2021. *Technologia informacyjna wspierająca e-reklamę*. *International Journal of Research and Applied Technology (Injuratech)*, 1(1), 134-139. Available at: <https://doi.org/10.34010/injuratech.v1i1.5656>.
- Olearnik, J. 2016. Współczesny marketing w turystyce i jego specyfika. *Ekonomiczne Problemy Turystyki*, 1(33), 9-19.
- Olszewski, M. 2022. Odporność start-upów na kryzys wywołany przez pandemię COVID-19. Przykład branży turystycznej. *Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego*, 36(2), 190-202.
- Panfiluk, E., Pek, J., Markowska, J. 2022. Wykorzystanie innowacji technologicznych IT w podróżach turystycznych pokolenia Y. *Academy of Management*, 6(3), 200-217.
- Pawłowska-Legwand, A. 2019. Zastosowanie technologii informacyjno-komunikacyjnych w promocji i informacji turystycznej na przykładzie gmin województwa małopolskiego. *Prace Geograficzne*, 158, 45-64. Doi: 10.4467/20833113PG.19.015.10919.
- Panasiuk, A. 2015. Nowoczesne technologie informacyjne w kształtowaniu innowacji na rynku turystycznym. *Rozprawy Naukowe Akademii Wychowania Fizycznego we Wrocławiu*, 49, 99-106.
- Pawłowska-Legwand, A. 2019. Wykorzystanie technologii informacyjno-komunikacyjnych w dostępie do informacji i usług turystycznych w świetle wyników badań przeprowadzonych wśród polskich turystów w województwie małopolskim. *Turyzm*, 29(2), 109-117. DOI: <http://dx.doi.org/10.18778/0867-5856.29.2.22>.

- Perechuda, K., Nawrocka, E. 2013. Nowoczesne technologie informacyjno -komunikacyjne jako narzędzie wspomagające CMR w firmie turystycznej. *Współczesne Zarządzanie*, 1, 124-131.
- Ramos, C.M., Rodrigues, P.M. 2013. Research note: the importance of online tourism demand. *Tour Econ*, 19(6), 1443-1447.
- Rapacz, A., Jaremen, D.E. 2015. ICT a innowacje marketingowe w przedsiębiorstwach turystycznych. *Logistyka*, 2, 1346-1354.
- Roztocki, N., Soja, P., Weistroffer, H.R. 2019. The role of information and communication technologies in socioeconomic development: towards a multi-dimensional framework. *Information Technology for Development*, 25(2), 171-183. DOI: 10.1080/02681102.2019.1596654.
- Smirnov, A., Kashevnik, A., Shilov, N., Teslya, N., Shabaev, A. 2014. Mobile Application for Guiding Tourist Activities: Tourist Assistant –TAIS. *Proceeding of the 16th Conference of Fruct Association, Oulu, Finland 27-31*, 94-100.
- Valčić, M., Domšić, L. 2012. Information technology for management and promotion of sustainable cultural tourism. *Informatica*, 36, 131-136, Slovenia.
- Yoo, S.H. 2003. Does information technology contribute to economic growth in developing countries? a cross-country analysis. *Applied Economics Letters*, 10(11), 679-682. DOI:10.1080/1350485032000138971.
- Yousefi, A. 2011. The impact of information and communication technology on economic growth: evidence from developed and developing countries. *Economics of Innovation and New Technology*, 20(6), 581-596. DOI: 10.1080/10438599.2010.544470.
- Zawadzki, P. 2021. Rola technologii cyfrowych w procesie rozwoju turystyki społecznej. In: Stasiak, A. (Eds.) *Turystyka społeczna w Polsce*. PTTK Kraków-Świdnica, Available at: <https://dspace.uni.lodz.pl/bitstream/handle/11089/40640/Zawadzki%281%29.pdf?sequence=1&isAllowed=y>.