The interconnection between technology and economic through tourism sectors

Alamsyah Agit[1], Peter John Wanner[2], Susilawati Muharram[3], Oktavianty Oktavianty[4]
[1]Universitas Hasanuddin, Makassar. Indonesia
[2]Tohoku University, Sendai. Japan
[3]BAWASLU Parepare, Parepare. Indonesia
Universitas Megarezky, Makassar. Indonesia
Corresponding Author: alamsyahagit@gmail.com
https://doi.org/xxxxxxxx

Abstract:
The paper provides evidence that technology enhances the efficacy, competitiveness, and economic performance of tourism enterprises. The paper investigates the ways in which technology enhances various aspects of the tourism industry, including distribution, marketing, and customer experiences. Additionally, it explores the impact on economic growth, employment generation, and revenue generation. The paper examines the relationship between technology and tourism via case studies and literature using a qualitative research approach. The article demonstrates the profound impact that technology has had on the tourism industry. Technology improves the economic performance, competitiveness, and efficacy of tourism businesses. Contemporary technologies such as virtual reality, augmented reality, artificial intelligence, and robotics facilitate novel tourist experiences, thereby enhancing the overall tourist experience and fostering the principles of sustainable tourism. The paper distinguishes itself through its exhaustive analysis of the multifaceted role of technology in the tourism industry, with a specific focus on how it enhances the efficiency and competitiveness of tourism enterprises while also stimulating economic expansion. It synthesises in a singular way how emerging technologies such as VR, AR, AI, and robots promote sustainable tourism and generate new visitor experiences

Keyword: Competitiveness; Economic; Marketing; Technology; Tourism

INTRODUCTION

Technology has been a part of everyday life, many forms of technology have made human activity become easier, despite its potential to slowly replace humans, technology was meant to assist humans in their life, from the everyday routine of their occupation, technology has the potential to co-exist with humans. This form of co-existence is not only limited to several contexts, but in a broader context, including

specific economic sectors like tourism. The tourism sector is one of the most potential sectors, namely nowadays, with the change of lifestyles, and individual hedonistic behavior to dispose of income, travelling has developed into a hobby, therefore, this can become an opportunity for tourism sectors.

However, the advantages and economic benefits for tourism sectors cannot be limited to just the tourism site, a multiplier effect can impact the surrounding area in which the tourism site is located. Businesses such as culinary, hotel, and gift shop establishments are a potential form of business if an area possesses a unique and interesting tourism site. The contribution of technology on the tourism sector has many potentials, for example, technology such as the laptop, tablets, and smartphone are used to scout for tourism sites, the social media post on one's account viewing of a tourism site can also attract visitors.

Furthermore, for the business owner, technology can be used as media to promote either the tourism site itself or the product they sell. This gives us insight into how technology may have affected economic activities that are achieved through tourism. But, more importantly, does technology have a significant effect on economic activities. According to (Haftu, 2019) technology impacts economics significantly through software development that helps business owners perform more accurate business report performance. Furthermore, social media, and an online market platform is also a part of technological contributions toward economic activities. Recent research (Nascimento et.al, 2019) have also provided this argument, it states that technology was already a concept integrated in a 4.0 economy.

The contribution of technology is illustrated through continuous improvement on methodologies, such as production methods, or marketing methods, both of these manage to be influenced by technology. Furthermore, the creation of new products has also provided strong potential since technology is capable of creating an environmentally friendly product as well as increasing the diversity of products. Economic activities have an infinite amount of diversity, economic activities are capable of expanding their areas of specialty, for example, one individual might sell tires, but not provide a service of installing them, therefore another individual can profit from this area. This also applies to many other sectors, namely tourism, as explained above, tourism has potential, and it is capable of creating a multipliers effect on every form of business surrounding the tourism site.

Technology can contribute in many ways, depending on whose applying it, as in the tourism sector and a site can also align with government responsibility. Technology can help in making a site becoming more interesting. Furthermore, automatic technology is applicable in providing services, especially in the hospitality industries (Bahrini & Qaffas, 2019). In addition, technology is also capable of functioning as a marketing tool. Technology, as a form of prescriptive knowledge, is based on the relationship between people and the physical environment and it is a consequence of human willingness to investigate, manipulate, and exploit natural phenomena and regularities.

A willingness to embrace and develop technology can lead to advancements that can be applied in the tourism sector, such as improvements in transportation, accommodation, and communication (Cinar, 2020). Technology in the tourism sector develops in many forms, some technology requires skills to be applied practicably such as the adoption of digital technologies in Enterprise Resource Planning (ERP) systems. These systems enhance the efficiency and productivity of firms in the accommodations

and catering sector, which are a significant part of the tourism industry. This system integrate various functions into a single comprehensive system to streamline processes and information across the organization. This mechanism allows for the efficient management of bookings, customer relationships, inventory, human resources, and financials within a unified platform.

Moreover, the use of Customer Relationship Management (CRM) software can improve the management of customer interactions and experiences, which are critical in the tourism sector, CRM systems compile data from a range of different communication channels, including a company's website, telephone, email, live chat, marketing materials, and more recently, social media, in which few known contribution of this system include (1) Personalized marketing; (2) Enhanced costumer service; (3) Increased Efficiency; (4) Better decision making; (5) Improve costumer retention; and (6) Maximizing revenue (Nicoletti et.al, 2020).

Technology plays a crucial role in enhancing the efficiency and competitiveness of tourism businesses, improving the overall tourist experience, and facilitating the marketing and distribution of tourism products and services (Goldfarb & Tucker, 2019). This helps us understand how we view technology. While some may fear technology will soon replace humans, technology in reality is capable of creating job opportunities. In economics activities. Many jobs require precision, namely in the tourism sectors with businesses related to this area like hotels, and restaurants.

This form of businesses can acquire customers by promoting their products and services, therefore, technology becomes utilized to its full potential thus gaining new customers, or simply continuing to make old costumers loyal. Many potentials of technology are yet to be discovered, especially in the rural area. Technology, in general, is capable of creating innovation, and these innovative creative ideas become a realization on the part a government that implements them. The government works to disseminate knowledge on how to use technology and increase the digital literation, transition toward digital society, especially if it can reach rural area. The purpose of this paper is to explore the potential contribution of technology on the economy. This paper considers the tourism sector through its media. It will illustrate how technology affects the tourism sector such that it becomes a positive contribution towards economic activities.

RESEARCH METHOD

This paper uses qualitative methods, using literature review as its approach this paper focus on empirical evidence including data and research to reviews and ilustrate the role of technology in affecting tourism sectors to contribute toward economic activities alligning with the purpose of this paper. The data in this paper are gathered using google scholar, semantic scholar, and other sources containing scientific contents, in which this data are in the form of academic article such as original research article and review paper, other than these other scientific sources such as conference paper and book chapters were also used this in research.

Using search engine such as google scholar and semantic scholar the literature were filtered by using keyword and the object of this research which is tourism. To extract the data there will be a selection process to ensure that the empirical research contains relevant information needed for this research. Using deductive reasoning this paper will interpreted its result to provide relevant answers alligning to the objective of this paper.

The step of deductive reasoning used by focusing on few aspect and the result were clasified and used to form a strong argument accumulated from diversity of paper in which the finding were similar. Further this paper will also contribute on providing conclusions, implications, and possible recommendations on improvement for the next research under the similar themes.

RESULT AND DICUSSION

Technology is an important aspect in human life, it helps assist us in everyday tasks. These tasks can be production purposes as well as learning purposes. The fact that technology is rapidly becoming advanced could potentially lead to a gap in individuals. This gap is illustrates the capability of an individual to fluently use technology for their advantage, in terms of economic activity. Nowadays, the gap that exists between shop owners and online shop owners is very clear.

For example, the online shop owners have an advantage of having more promotional media such as facebook, instagram and other forms of social media such as online media. This will slowly distance the shop owner who operates without any online profile and potentially lead to a significant decline in their sales performance. Likewise, this illustration shows how shop owners are affected in the tourism industry. Technology predicts an increase in tourism performance through promotion and other forms of attraction leading to an increase in the number of visitors in the future. A toursim site contains many businesses such as hotels, culinary shops, and gift shops. The increasing performance of one tourism site will also influence the performance of the other business establishments around the tourism site.

Technology in the tourism sector will improve the performance of the tourism sector, thus it enhances the economic activities around any variety of tourism sites (Neunen & Scarles, 2021). Technology in tourism sectors changes travel in a significant way by changing the way business is conducted, and how tourism services and experiences are created and consumed. This research stated that by adopting technology tourism, organizations will be able to manage information more efficiently, possibly using this information to create attractive offers such as discounts, it also enhance process efficiencies, and facilitates global interaction among consumers.

(Pencarelli, 2020) maintains that technological contributions in the tourism industry will increase economic performance overall with the application of digital business applications. These applications provide support and knowledge among other industries in their area. Likewise, this form of technological application manages to improve the tourism experience for many individuals, the key to increasing competitiveness. This research demonstrates the importance of technology generally in tourism sectors. The improvement of technology also improve the tourism experience, for example technology has the capability to provide individuals with information about what they're about to see in the actual locations, this will spark an interest to visit the tourism site especially if one manages to provide clear information of what accommodations and facilities are available in that site.

Technology has enhanced the performance in tourism sectors by transforming management and marketing methods evident in pursuit of a more advanced approach. This shift allows tourism markets and actors, including providers, stakeholders, intermediaries, and tourists, to both shape and be shaped by technology. Technological advances empower traditional and new tourism actors creating new markets, offerings,

management practices, and competitive strategies. Technologies enable connectivity, data utilization, and smartness, leading to the formation of complex tourism ecosystems that support interactions and collaborations among various actors (Sigala, 2020).

There is quite a significant difference before and after technology dominated the tourism sectors. Before technological application in the tourism industry which operated in a more traditional manner, businesses were relying on direct customer interactions and conventional marketing strategies. Meanwhile technological transformation has ushered in new business models, productivity gains, and market & consumer control, fundamentally altering the economic landscape of the tourism sector. Moreover, the value of the tourism industry is increasingly measured in views, likes, and stars, with personalized consumer data becoming central to business strategies (Gossling, 2021).

(Susanto et al., 2020) maintain that there are several opportunities technology created in tourism sectors regarding its performance and economic opportunities related to this industry, which is smarter and more enhance customer services providing consumers with information and assistance to prepare their travel plans and enhance their tourism experience. Next is the value created through multimedia, unlike the old times, nowadays a tourism site can record and display their site in any online media to attract tourists for potential future trips. Lastly, technology assists in promoting innovation and creative ideas, as many products are newly added such as local products which are often not noticed. With the help of technology these local products also help contribute to attracting tourists to the tourism site, therefore increasing the performance of both local businesses as well as the tourism site itself.

Performance of tourism sectors can be reflected from indonesia toursim sectors in which the number of international visitors (Tourist) were spiking up in 2022 which the number of international visitors that were droping 61.57% in 2021 suddenly increased by 251,28% in 2022. The fact about covid-19 were causing a decresing number of visitors in 2021, but the fact that these number were spiking up in 2022 is an evidence that people love to travel, and in this context is international visitors. To align this with the importance of technology in tourism sectors, we need to understand that for an information can only distributed overseas due to the existence of internet and gadget, and this ilustrated that the existence of technology help to improve potential of tourism sectors to contribute more toward the economic in general. This ilustration should be able to serve as reference for policy formulation to empower tourism communities in many rural areas.

Technological Role Toward Economic Performance

Technology in terms of tourism has a tendecy of explaining only the effect on tourism performance while in reality economic performance is integrated in this process, many businesses are helped with the presence of technology, digital business is a new trend. Many individuals with little to no academic requirements are capable of establishing a business nowadays. This has shown the shift in our society in which people have adapted with technology and have managed to use technology to their advantage. The forms of business have much diversity including many types of Micro, Small, and Medium Enterprise (MSME) operate mostly online or act as a dropshipper.

Some of these were operated in a tourism site, tourism site popularity and performance are affected by any kind of businesses built around it, this includes MSMEs such as hotels, and other forms of business near the tourism sites. This illustrates that tourism site performance is important to influence economic performance of the

economic actors involved in the tourism industry, and one way in enhancing this performance is to adopt and increase the usage of technology. Technology is capable of many tasks including large scale automatic promotion, which is a very important aspect in the tourism industry to attract consumers, the large amount of consumers will increase the probability of purchasing power which indirectly increases sales performance of MSMEs and other businesses near the tourism site.

Technology increases economic performance in the tourism industry in which technology has transformed global tourism by making it easier for consumers to access information, make reservations, and share their experiences through consumer-generated content and social media. The ability for any tourism entity to be judged, rated, recommended, or disapproved online has major repercussions for consumer perceptions and choices, directly impacting the economic success of businesses. Furthermore, online content influences customer flows and price settings, affecting inter-business and inter-destination competition. It also drives service innovation and host motivation, further contributing to the economic performance of local, national, and global tourism systems (Gossling, 2020).

(Pantano & Stylidis, 2021) maintain that the existence of technology, particularly social media, in the tourism sector is important for enhancing its economic performance. Social media serves as an innovative marketing tool that allows for the strategic promotion of tourism destinations and services. This strategic use of social media in tourism marketing can lead to an increase in the ability of a destination to attract tourists, thereby improving its economic performance.

Alligning with this idea, (Brida et al., 2020) explained that technological advances play a crucial role in enhancing the economic performance of the tourism sector. By providing desirable infrastructure facilities related to transport, telecommunications, hotels, restaurants, shops, and various other utilities, technology can significantly improve the experience for tourists. This, in turn, contributes to the growth of tourism in developing economies, leading to job creation, income generation, and an increase in foreign exchange reserves, which promotes economic development.

Technology is just a form of media or tools, there are methods and ways to use technology to its maximal potential, therefore in order to provide an optimal contribution toward economic performance of tourism sectors, technology has to be used correctly. Fostering the adoption of advanced technologies can be accomplished through the improvement of tourism-related infrastructure, making tourist destinations more accessible, attractive, and convenient. This approach will enhance not only the economic performance, but also the competitiveness of tourism sectors in general. In this way, government can play an important role to encourage the actors in tourism industries to adopt technology and intensely implement it in their business process (Richards, 2020).

Technology supports creative industries and facilitates the creation of new tourist experiences, thereby enhancing the tourism industry's economic performance through increased visitor numbers and optimized visitor experiences. (Tobias, 2022) maintains that a suitable strategy to enhance the economic performance of the tourism industry using technologies involves the concept of "playable cities." This approach leverages digital technologies to co-create, thus engaging urban environments that cater to both residents and tourists. By transforming cities into interactive and playful spaces, stakeholders can revitalize urban areas, making them more attractive and meaningful.

This strategy fosters co-creation processes involving different stakeholders, including local citizens, tourists, policymakers, and businesses, to democratize citizenship and empower participants through playfulness. A strategy that harnesses technology to increase economic performance significantly affects its ability to contribute to the economic performance of the tourism industry (Nunkoo et.al, 2020).

Effective resource allocation and policy differentiation, considering regional characteristics, are crucial for maximizing the economic benefits of tourism. Specifically, diversifying tourism products through strategic industrial planning can involve a wider variety of economic sectors in producing tourism-related outputs, thereby enhancing the overall economic performance of the tourism industry. Furthermore, the investment in certain infrastructures, such as transport, is vital to tourism growth, indicating that the strategic use of technology and infrastructure development can significantly impact the economic performance of the tourism industry.

The importance of technology in enhancing the economic performance of the tourism sector is multifaceted and profound. Technology facilitates the creation of new tourist experiences and supports the competitiveness of the tourism industry by enabling creative industries. This not only increases visitor numbers, but also optimizes visitor experiences, thereby boosting the economic performance of the sector. The concept of "playable cities" illustrates how digital technologies can transform urban environments into engaging spaces for both residents and tourists, fostering co-creation and democratizing citizenship, which in turn enhances the attractiveness and economic vitality of cities. Moreover, technology has revolutionized the way consumers access information, make reservations, and share their experiences, significantly impacting consumer perceptions and choices.

This digital transformation drives service innovation, motivates hosts, and influences customer flows and price settings, which are crucial for the economic success of tourism businesses and destinations. Social media, in particular, serves as an innovative marketing tool that strategically promotes tourism destinations and services, increasing their ability to attract tourists and improve economic performance. Additionally, technology plays a critical role in providing the necessary infrastructure for a seamless tourist experience, including transport, telecommunications, and hospitality services. This not only improves the experience for tourists but also contributes to the growth of tourism in developing economies, leading to job creation, income generation, and an increase in foreign exchange reserves, which are essential for economic development.

The presence of technology has also facilitated the emergence of digital businesses, including micro, small, and medium enterprises (MSMEs), many of which operate online or as dropshippers in tourism sites. The popularity and performance of tourism sites significantly affect these businesses, illustrating the interconnectedness of technology, tourism site performance, and the economic performance of actors within the tourism industry. Technology enables large-scale automatic promotion, which is crucial for attracting visitors to tourism sites, thereby indirectly increasing the sales performance of MSMEs and other businesses located near these sites. In summary, technology is indispensable for enhancing the economic performance of the tourism sector. It supports the creation of innovative touristic experiences, facilitates effective marketing through social media, provides essential infrastructure, and enables the

growth of digital businesses around tourism sites, all of which contribute to the overall economic vitality of the tourism industry.

Technology and Tourism

Tourism sectors provide much potential, especially in the modern era where people love to travel and flex. This leaves us with a question, is the tourism sectors management and performance already at its peak, do these sectors need improvement or any assistance going forward. Tourism sectors as we know promote tourism activities, in this case most people recognize the tourism sector for its tourism site only, but this sector is also capable of bringing a multiplier effect resulting in a variety of forms of business. The tourism sites are built on many values, some are built on heritage while others embrace locals value as their main attractions.

During its development, one tourism site may only contain little to no accomodations which are most people needed when plan on a vacation or a trip. Taking advantage of technology, locals often establish motels, or hotels to provide hospitality to the tourists, moreover some other businesses at this point may follow, such as food and beverages, and lastly a gift shop which often crafts their own products by using local values or tradition as its symbols. Upon reflection, using the advantage of technology indicates that tourism act as a host for many kinds of businesses.

If the tourism site is not able to attract visitors it will also affect the other businesses performance around the site. The presence of technology builds enough potential for either the tourism site or the businesses around it to operate without dependency on the tourism site itself where they can promote their product online or sell it on the national market through distributors.

Technology has led to the development of e-tourism, which encompasses the digitalization of all processes and value chains in the tourism, travel, hospitality, and catering industries. This includes the use of the internet for making travel arrangements, such as reserving and booking travel and tourism products online, which has become a significant commercial sector. Furthermore, the deployment of mobile technology has fundamentally transformed tourism offerings by enhancing transactions through mobile devices and providing guides, even when the tourist is at the destination (Sari et.al, 2021).

Technology is capable of enhancing tourism industry and businesses located around the tourism site, due to the strategic role in the management and marketing of tourism channels, contributing to relationship enhancement and performance improvement in the sector (Leung, 2020). Technology has reshaped the structure of the tourism distribution channels, enhancing the competitive structure of the travel industry and playing a crucial role in its evolution. Technology also provides important knowledge leading to management and marketing performance improvement, direct effects on cost reduction and service differentiation, improved activities coordination and control, and it contribute to the globalization of the industry.

Reviewing the bigger picture, some of the opportunities technology has managed to provide in tourism sectors is (1) Social Networks to provide information and serve a role as marketing platform; (2) E-Tourism, this forms of technologies allow consumers to have book reservations, and obtain a brief image of the tourism site as well as obtaining information of what facilities and accommodation are available in that tourism site; and (3) Mobile Technology, this technology have numerous of function, which carried out all the functions of computer and tablets (Hamid et.al, 2021).

There are several reasons technology should exist in tourism sectors which are (1) Technology optimizes communication between travel service providers, travel agencies, and travelers, making it an integral part of the industry; (2) The rise of e-tourism and digitalized tourism and hospitality activities, such as online reservations, travel blogs, and e-tour guides, further underscores the importance of technology in enhancing the efficiency and accessibility of travel services; and (3) Technology plays a crucial role in adapting the industry's offerings to match changing tourism patterns and in devising new marketing strategies, which is essential for gaining success in the competitive marketplace (Khatri, 2019). There are significant differences in how a tourism site operates with and without technology (Xiang et.al, 2020).

Table 1. Outlining The Emerging Technologies

Technology	Description	Benefits for Sustainable Tourism	New Visitor Experiences
Virtual Reality (VR)	Immersive digital experience that simulates real-world environments	Reduce physical footprint, lower carbon emissions, and preserve fragile ecosystems	Virtual tours of sensitive sites, interactive experiences, and immersive storytelling
Augmented Reality (AR)	Overlays digital information onto real-world environments	Enhance visitor engagement, reduce paper waste, and promote responsible tourism practices	Interactive AR trails, gamified experiences, and personalized itineraries
Artificial Intelligence (AI)	Intelligent systems that can analyze and learn from data	Optimize resource allocation, reduce waste, and improve visitor satisfaction	AI-powered chatbots, personalized recommendations, and predictive analytics
Robots	Autonomous machines that can perform tasks independently	Assist with visitor management, reduce labor costs, and enhance the visitor experience	Robot-guided tours, automated customer service, and interactive exhibits
Geospatial Technology	Utilizes geographic information systems (GIS) to analyze and visualize spatial data	Improve resource allocation, reduce environmental impact, and enhance visitor understanding of destinations	Interactive maps, geotagged content, and location-based services
Blockchain	Distributed ledger technology that enables secure and transparent transactions	Securely record tourism transactions, promote transparency in supply chains, and reduce waste	Digital certificates of authenticity, secure payment systems, and transparent supply chain tracking

Technology	Description	Benefits for Sustainable Tourism	New Visitor Experiences
5G Networks	Next-generation wireless networks with high-speed data transfer capabilities	Enable seamless connectivity, enhance visitor experiences, and facilitate real-time data analysis	Fast data transfer for VR/AR experiences, real-time language translation, and instant access to destination information

Source: Analysis Author, 2024

With technology, the tourism industry has seen substantial changes in all aspects of the trip journey and everyday life, reshaping touristic behavior fundamentally. Technology provides the computing and networking capacity for the travel industry to develop and maintain systems for managing demand, enabling the development and implementation of new models, efficiencies, and processes for managing firms, places, and travelers themselves. Without technology, these advancements in efficiency, accessibility, and customer engagement would not be possible, indicating a less dynamic, less efficient, and potentially less customer-focused operation.

Tourism sectors will certainly be one of the sectors that will operate and they need to adopt technologies in the future, in which there are several advantages such as it may provide tourism sectors in the future with Increased Integration of Information Technologies. The strategic use of information technologies in the tourism industry is expected to continue growing, with advancements in eTourism research and the application of new technologies to enhance both operational efficiencies and customer experiences providing greater emphasis on social media and digital platforms. The role of social media and digital platforms in transforming identity, community, and culture within tourism will become more pronounced.

This includes leveraging these platforms for marketing, customer engagement, and creating personalized tourism experiences through the adoption of advanced technology. The integration of advanced technology such as virtual reality (VR) and augmented reality (AR) will further evolve, offering immersive and enhanced travel experiences. This will also include the utilization of artificial intelligence and robotics for frontline service interactions that focus on sustainable and mindful tourism. In the wake of the COVID-19 pandemic and growing environmental concerns, there will be a shift towards more sustainable and mindful tourism practices. Technology will play a crucial role in facilitating this shift by enabling more responsible travel behaviors and operations (Cai et.al, 2021).

The importance of technology in the tourism sector is multifaceted and profound, impacting every aspect of the industry from operational efficiencies to customer experiences. First, technology has revolutionized the way travel and tourism products are marketed, distributed, and consumed, leading to the development of e-tourism. This digitalization of processes and value chains enhances transactions, facilitates online reservations, and provides tourists with comprehensive guides and information, significantly improving the commercial sector of tourism. Moreover, technology plays a strategic role in the management and marketing of tourism channels, contributing to relationship enhancement and performance improvement within the sector. It reshapes

the structure of tourism distribution channels, enhances the competitive structure of the travel industry, and contributes to its globalization by offering cost reduction, service differentiation, and improved coordination and control of activities.

The deployment of mobile technology, in particular, has transformed tourism offerings by enabling transactions through mobile devices and providing guides and information even when the tourist is at the destination. This illustrates the broader opportunities technology provides in the tourism sector, such as leveraging social networks for information sharing and marketing, and enhancing the consumer experience through e-tourism and mobile technology. Furthermore, technology is crucial for adapting the industry's offerings to match changing tourism patterns and devising new marketing strategies. This is essential for gaining success in the competitive marketplace.

The integration of advanced technologies like virtual reality (VR), augmented reality (AR), artificial intelligence (AI), and robotics is expected to evolve further, offering immersive and enhanced travel experiences while also focusing on sustainable and mindful tourism practices in response to global challenges like the COVID-19 pandemic and environmental concerns. In summary, technology is indispensable in the tourism sector for optimizing communication, enhancing efficiency and accessibility of travel services, adapting to changing tourism patterns, and devising new marketing strategies.

CONCLUSION

This paper investigates the significant impact of technology on the tourism sector, focusing on how advancements such as virtual reality, augmented reality, artificial intelligence, and robotics enhance various aspects of the industry including distribution, marketing, and customer experiences. It underscores the role of technology in driving economic growth, creating jobs, and generating revenue within tourism. Through qualitative research and case studies, the paper illustrates how technology improves the efficiency and competitiveness of tourism businesses, fosters sustainable tourism, and introduces innovative experiences for visitors.

This important aspect which explains the pivotal role of technology within the tourism sector cannot be overstated. It has emerged as a fundamental driver of economic performance, fostering innovation, enhancing operational efficiencies, and revolutionizing the way tourism products and services are marketed and delivered. The adoption and integration of cutting-edge technologies such as virtual reality, augmented reality, artificial intelligence, and robotics not only promise to elevate the tourist experience but also to pave the way for sustainable tourism practices.

As the tourism industry continues to evolve in response to technological advancements, it is imperative for stakeholders to embrace these changes. By doing so, they can ensure the continued growth and competitiveness of the sector, contributing significantly to economic development, job creation, and income generation. The future of tourism, therefore, lies in the strategic leveraging of technology to unlock new possibilities, enhance global connectivity, and ensure a sustainable and prosperous future for the industry.

ACKNOWLEDGEMENT

REFERENCES

Bahrini, R., & Qaffas, A. A. (2019). Impact of information and communication technology on economic growth: Evidence from developing countries. *Economies*, *7*(1), 21. https://doi.org/10.3390/economies7010021

Brida, J. G., Gómez, D. M., & Segarra, V. (2020). On the empirical relationship between tourism and economic growth. *Tourism Management*, *81*, 104131. https://doi.org/10.1016/j.tourman.2020.104131

Cai, W., McKenna, B., Wassler, P., & Williams, N. (2021). Rethinking knowledge creation in information technology and tourism. *Journal of Travel Research*, *60*(6), 1377-1384. https://doi.org/10.1177/0047287520946100

Çınar, K. (2020). Role of mobile technology for tourism development. In *The emerald handbook of ICT in tourism and hospitality* (pp. 273-288). Emerald Publishing Limited https://doi.org/10.1108/978-1-83982-688-720201017

Goldfarb, A., & Tucker, C. (2019). Digital economics. *Journal of economic literature*, *57*(1), 3-43. https://doi.org/10.1257/jel.20171452

Gössling, S. (2020). Technology, ICT and tourism: from big data to the big picture. *Journal of Sustainable Tourism*, *29*(5), 849-858. https://doi.org/10.1080/09669582.2020.1865387

Gössling, S. (2021). Tourism, technology and ICT: a critical review of affordances and concessions. *Journal of Sustainable Tourism*, *29*(5), 733-750. https://doi.org/10.1080/09669582.2021.1873353

Haftu, G. G. (2019). Information communications technology and economic growth in Sub-Saharan Africa: A panel data approach. *Telecommunications Policy*, *43*(1), 88-99. https://doi.org/10.1016/j.telpol.2018.03.010

Hamid, R. A., Albahri, A. S., Alwan, J. K., Al-Qaysi, Z. T., Albahri, O. S., Zaidan, A. A., Alnoor, A., Alamoodi, A. H., & Zaidan, B. B. (2021). How smart is e-tourism? A systematic review of smart tourism recommendation system applying data management. *Computer Science Review*, *39*, 100337. https://doi.org/10.1016/j.cosrev.2020.100337

Khatri, I. (2019). Information technology in tourism & hospitality industry: A review of ten years' publications. *Journal of Tourism and Hospitality Education*, *9*, 74-87. https://doi.org/10.3126/jthe.v9i0.23682

Leung, X. Y. (2020). Technology-enabled service evolution in tourism: a perspective article. *Tourism Review*, *75*(1), 279-282. https://doi.org/10.1108/TR-06-2019-0229

Nascimento, D. L. M., Alencastro, V., Quelhas, O. L. G., Caiado, R. G. G., Garza-Reyes, J. A., Rocha-Lona, L., & Tortorella, G. (2019). Exploring Industry 4.0 technologies to enable circular economy practices in a manufacturing context: A business model proposal. *Journal of manufacturing technology management*, *30*(3), 607-627. https://doi.org/10.1108/JMTM-03-2018-0071

Nicoletti, G., von Rueden, C., & Andrews, D. (2020). Digital technology diffusion: A matter of capabilities, incentives or both?. *European economic review*, *128*, 103513. https://doi.org/10.1016/j.euroecorev.2020.103513

Nunkoo, R., Seetanah, B., Jaffur, Z. R. K., Moraghen, P. G. W., & Sannassee, R. V. (2020). Tourism and economic growth: A meta-regression analysis. *Journal of Travel Research*, *59*(3), 404-423. https://doi.org/10.1177/0047287519844833

Pantano, E., & Stylidis, D. (2021). New technology and tourism industry innovation:

evidence from audio-visual patented technologies. *Journal of Hospitality and Tourism Technology*, *12*(4), 658-671. https://doi.org/10.1108/JHTT-01-2020-0023

Pencarelli, T. (2020). The digital revolution in the travel and tourism industry. *Information Technology & Tourism*, *22*(3), 455-476. https://doi.org/10.1007/s40558-019-00160-3

Richards, G. (2020). Designing creative places: The role of creative tourism. *Annals of tourism research*, *85*, 102922. https://doi.org/10.1016/j.annals.2020.102922

Sari, D. R., Saniati, S., & Parjito, P. (2021). E-tourism kebudayaan dan pariwisata kabupaten pesisir barat. *Jurnal Teknologi dan Sistem Informasi*, *2*(4), 62-67. https://doi.org/10.33365/jtsi.v2i4.1322

Sigala, M. (2020). Technology and tourism: Themes, concepts and issues. In *Tourism* (pp. 114-133). Routledge. https://doi.org/10.4324/9781003005520-8

Susanto, E., Novianti, S., Rafdinal, W., Prawira, M. F. A., & Septyandi, C. B. (2020). Visiting tourism destination: Is it influenced by smart tourism technology?. *Journal of Indonesian Tourism and Development Studies*, *8*(3), 145-155. https://doi.org/10.21776/ub.jitode.2020.008.03.04

Tóbiás, K. (2022). Leorke, D. and Owens, M.(eds.): Games and Play in the Creative, Smart and Ecological City. *Hungarian Geographical Bulletin*, *71*(3), 305-308.

Van Nuenen, T., & Scarles, C. (2021). Advancements in technology and digital media in tourism. *Tourist Studies*, *21*(1), 119-132. https://doi.org/10.1177/1468797621990410

Xiang, Z., Fesenmaier, D. R., & Werthner, H. (2021). Knowledge creation in information technology and tourism: a critical reflection and an outlook for the future. *Journal of Travel Research*, *60*(6), 1371-1376. https://doi.org/10.1177/0047287520933669