

Chapter 3

Technology Application in Tourism in Asia: Comprehensive Science Mapping Analysis



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Abstract Technology application in tourism new strategy (from now on referred to as the e-smart e-tourism strategy). To provide valuable insights into technology applications tourism and support researchers, we must understand the options and gaps in this type of research. Thus, in this study, a literature review is conducted to map the research landscape into a coherent classification. We operate a focused search for every article related to (1) Technology application in tourism in one significant database, namely, Web of Science. These databases contain a range of publications focusing on technology application in tourism. The final set of data generated from the classification scheme includes 1335 articles. The first section consists of evaluation and comparative articles on the technology application in tourism. The second section is composed of technology application in tourism articles. The final section includes review and analysis articles on technology application in tourism. We then define the essential characteristics of this emerging field in the following aspects: the drive to use the technology application in tourism, open challenges that hinder use, and recommendations for improving the acceptance, use, and implementation of the technology application in tourism. Then, the new directions of this research were described.

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Introduction

In recent years, tourism revenues have continued to increase worldwide because of the emergence of an ideology of entertainment and the increase in countries' national income. Tourism has become part of people's lives, both local and international (Chang & Katrichis, 2016). There is also a set of factors that work as a dam for tourism development, such as economic growth, improving places for access, and political liberalization, given the role of technology in action (Tolkach et al., 2016). It is essential to achieve a relationship with consumers based on mutual benefit and concern for relational aspects to achieve commercial transactions, especially in companies with industries challenging to separate production and consumption (Wang et al., 2014).

Statistics indicated the rapid growth of tourism, as in 2015, the number of arrivals reached 1.19 billion, after it was 528 million in 2005, and the number of tourists is expected to reach 1.8 billion in the next few years (Hamid et al., 2021). Given the importance of tourism as one of the industries that provide millions of job opportunities than other industries, this results from the rapid and equal growth between tourism and technology and making it reach advanced levels of interaction (Buhalis & Law, 2008). The tourism industry has an economic impact as one of the industries that are considered the highest priority at the global and local levels and one of the industries most affected by technological changes rapidly (Steinbauer & Werthner, 2007). The emergence of technology provides more accessible ways for consumers to search for tourist destinations worldwide, so the continuous improvement of the opportunities offered by technology has become significant for destination users (Buhalis & Wagner, 2013). Technology is considered a catalyst for innovation, development, and Expanding competitiveness due to the revolution it has brought about in the tourism industry, which has called many organizations to change their strategic management (Buhalis, 2020).

Technology primarily works with the organization's three strategies, quality, and direction, human resource management, plus information technology. It solves its ability to communicate problems with customers, so organizations must take advantage of these innovative approaches to technology (Chang & Katrichis, 2016). Technology is bringing about a gradual revolution in the tourism industry. It works on interactive innovations between the consumer and the tourism institutions, so many institutions have entirely restructured the process. There are many and fragmented studies on this field due to what information technology has brought about a change in access consumer and tourism services and provide very innovative channels for accessing and using these channels (Ukpabi & Karjaluto, 2017). As a result, technological development will also create more conscious and sophisticated consumers, and thus it must focus on it because it will be difficult to satisfy him.

Because consumers also became more developed and aware, it became difficult to meet them and determine the products and elements of tourism suitable for them.

Therefore, more intelligent organizations should serve consumers and exploit all available resources to achieve added value (Buhalis & Law, 2008). It has become necessary for deep and appropriate planning for the future considering technological progress and applying technical ideas in the tourism and hospitality industry and consumers' coexistence with this progress at a rapid and increasing pace (Law et al., 2019). Technology has changed a lot in society and significantly impacted restructuring and operational engineering management in recent years in the hospitality and tourism industry.

For example, statistics in 2018 indicated that the sales obtained by digital sales amounted to US\$ 470 billion in the year 2014 to continue to increase to reach US\$ 629 billion in 2017 (Law et al., 2019); technology has provided new tools that have revolutionized the tourism and hospitality industry, whereby technology is widely used in the commercial and operational process. We can also consider tourism to have developed as a revolution in the light of technology (Dorcic et al., 2019). The technology works in solving problems and difficulties by providing tourism information and thus bringing about a qualitative change in the means and channels of tourism services and maximizing the value of available tourism resources (Li et al., 2017), became possible to identify the past, current and future contributions, analyze them in a better way and discuss the introduction of technology in the tourism industry and its technical change (Stipanuk, 1993).

Literature Review

Tourism

Tourism is the movement of people from their place of residence to a remote location for a temporary period so that you may consider tourism a social, cultural, and economic phenomenon (Chang & Katrichis, 2016). In other words, tourism can be defined as a commercial activity that depends mainly on extensive information and many human resources (Steinbauer & Werthner, 2007). Likewise, tourism has a significant role in the development of the national economy because it is increasingly considered an investment field in addition to its ability to provide foreign currency (Sanjeev & Birdie, 2019). Thus, this comprehensive and extensive scope of tourism has led to the provision of many job opportunities worldwide to contribute to tourism in society (Hamid et al., 2021).

Because tourism has become an essential part of many people's lives, unlike other industries, tourism revenues continue to grow worldwide (Chang & Katrichis, 2016). Tourism is considered one of the service activities concerned with aspects of the relationship with consumers and the endeavor to maintain these relationships to achieve mutual benefits and achieve continuity to reach the organization's common

goals (Wang et al., 2014). The interests and characteristics of travelers are increasingly different. Thus, some factors that improve the quality of tourism have been considered, such as political growth, economic growth, infrastructure, and its development and tourism, which has led to an increase in the number of long-distance visitors or local tourists (Tolkach et al., 2016). Today's business environment witnesses fierce competition in the tourism and hospitality sectors, especially so companies must work hard to develop their competitiveness and pursue business success.

Tourism and Technology

Since the early nineties, technology has played an essential role in the tourism and hospitality industry, facilitating reaching customers through its channels of websites, applications, and social media (Law et al., 2018). Tourism is an ecosystem powered by technology that works to attract audiences through trends of real value and provide platforms for the tourism experience and boost shared value (Buhalis et al., 2019). Technology has an essential and influential role in tourism and hospitality organizations because of its ability to improve quality, reduce costs, improve customer experience, create a competitive advantage, and its importance in marketing and managing distribution on a large scale. Many organizations have changed their strategic management in line with the technological shifts and reformulated some operational and marketing practices to take advantage of these shifts (Buhalis & Sinarta, 2019).

Likewise, information technology can change a tourist's behavior by tracking his performance, providing observations about his behavior, and making appropriate suggestions through innovative personal technologies. Therefore, tourism organizations need to use technology in designing a tourism experience. Technology has provided various channels for consumers to access information to operate its tourism services, and thus it has brought about a change in the ways to access those services (Ukpabi & Karjaluoto, 2017). Technology seeks to maximize the value of all available and available tourism resources and make changes in methods and means of presentation (Li et al., 2017). As a result of the modern technological development in the process, management, and marketing of destinations and tourism products, new challenges appear to the stakeholders, and their role gradually weakens. It has also become possible to proactively develop tourism products due to the apparent effect of technology in increasing the competitiveness of providing an information structure for tourism organizations and the entire industry (Buhalis & Law, 2008). To enhance the tourism experience, tourism companies must provide the components of the tourism ecosystem in a manner appropriate to the consumer, which consists of travel agency experiences, accommodation, transportation, and accommodation.

Therefore, we must consider technological progress as an essential pillar for co-creation in the ecosystem of tourism and hospitality services (Buhalis et al., 2019). The use of technology in the operational and commercial process on a large scale is

appropriate because tourism is one of the industries that have developed increasingly in the shadow of modern technology and thus provided many new industrial tools (Dorcic et al., 2019). In the future, only the organizations that offer technology in their performance and appreciate the opportunities they see and their efficiency in managing their resources will enter the competitive market. In other words, the integration of technology and the digitization of the tourism system, such as augmented reality, artificial intelligence, cryptocurrencies, and robots, creates great opportunities and challenges in the operational strategy in the tourism industry (Law et al., 2019).

Tourism and Hospitality

Tourism is the process of moving individuals to different geographical areas outside the scope of their environment, and this movement may be for various purposes such as tourism or work. Tourism is also a service activity that significantly impacts economic, social, and cultural development in many countries (Hamid et al., 2021). Hospitality (transportation, hotels, catering, and travel agent) is an essential component of the tourism supply chain (Chang & Katrichis, 2016). Due to the significant contribution of tourism and hospitality to the GDP. It is important to take essential steps to boost this industry, such as foreign investment, facilitating access to visas, and improving the infrastructure (Sanjeev & Birdie, 2019).

As a result of the availability of technological aspects, technology has reduced the barriers facing consumers of tourism services and changed a lot in all sectors of tourism and hospitality and their industries (Ukpabi & Karjaluoto, 2017). In addition, to obtain a beneficial competitive advantage, relationship marketing was directed as a strategic tool. For example, airline companies use frequent flyer programs and frequent hotel guests and other tourism and hospitality sectors (Wang et al., 2014). The tourism and hospitality industry must go into the midst of market competition. One of the most critical challenges that must be considered is tourists' desires and needs, which have undergone demographic, psychological, economic, and social changes over time (Tolkach et al., 2016). The tourism and hospitality industry, a tangible service company and demanding to separate between consumption and production, is necessary to build a strong relationship with its consumers and strive to continue this relationship (Wang et al., 2014).

Theories and Applications

Information and communication technology has brought about continuous developments and repercussions in tourism, as it strengthened the marketing process and provided new tools for tourism management (Buhalis & O'Connor, 2005). Technology may play a mediating role between employers and customers by

designing tourism technologies that convincingly affect the behavior of tourists and provide a meaningful experience (Tussyadiah, 2017). The tourism applications can be summarized as follows:

- Technology contributes to tourism growth, as technology has contributed to economic growth tremendously and significantly.
- It is important to consider technology as a maker of the tourism experience. It is the creative side of the tourism industry to create a suitable climate, material conditions, and suitable attractions.
- Technology is sometimes a lawyer for the tourist experience, as it helps to protect against potential risks, whether medical or human-made and protect the destination itself.
- Technology is an enhancer to the tourism experience, meaning that it can achieve a more comfortable and enjoyable tourism experience.
- Technology is sometimes a focal point, which uses industrial sites such as farms, ports, and laboratories as tourist destinations.
- Technology is considered a tool that creates the tourism experience. Its contribution as a builder of the industry and not as a service is the administrative and marketing aspects (Stipanuk, 1993).

Given that technology and its platforms are among the essential sources of information that consumers need, it is crucial to develop search engines suitable for consumer behavior. A lot of consumers have turned to search for their next destination. This weakened the role of travel agencies, so it became necessary for the tourism organizations to be present on the databases as part of the operational process (Buhalis & Wagner, 2013). Relying on technological innovations in tourism services creates a shared value for the tourism experience in all stages of travel and increasingly (Buhalis & Sinarta, 2019). To promote innovations further and take advantage of all these opportunities, it is necessary to adopt an agile strategy to transform opportunities for the organization's benefit and strategic management levels. It may also include technological applications, integration, and the continuous digitization of the tourism industry into many papers mentioned countless (such as communication sites, smartphones, enhanced broadband, artificial intelligence, robots, and cryptocurrencies) (Law et al., 2019).

Comprehensive Science Mapping Analysis

The researcher used the bibliometric analysis by the Rstudio program by analyzing the Scopus database to analyze strategic performance. We collected data from the Web of Science website to analyze it, and the tables and figures below show that. Table 3.1. Indicates the primary data gathered regarding technology application in tourism.

Comprehensive science mapping analysis was adopted to explore the problems of technology application in tourism in most cases discussed since it only indicated

Table 3.1 Main Information about the collection

Description	Results
<i>Main information about data</i>	
Timespan	1970:2021
Sources (Journals, Books, etc.)	63
Documents	75
Average years from publication	8.29
Average citations per documents	0
Average citations per year per doc	0
References	1
<i>Document contents</i>	
Keywords Plus (ID)	0
Author's Keywords (DE)	209
AUTHORS	
Authors	179
Author Appearances	194
Authors of single-authored documents	13
Authors of multi-authored documents	166
<i>Authors collaboration</i>	
Single-authored documents	13
Documents per Author	0.419
Authors per Document	2.39
Co-Authors per Documents	2.59
Collaboration Index	2.68

Source: Developed by the authors with R-studio software, 2021

the advantages of technology application in tourism. Many barriers were neglected, so mapping analysis based on bibliometrics was used. It is possible to clarify the literature that was investigated in Table 3.1 that shows there is tremendous growth in cases that incorporate technology application in tourism, especially the last four years, which were adopted as criteria for selection, as the number of papers was 1335 for different cases, while at the level of authors, most of them were joint papers. It included multiple authors except for one article belonging to one author. Figure 3.1 explained the most frequent words. Wordcloud refers to the most important topics dealt with technology application in tourism, as Fig. 3.1 shows the essential critical words adopted by previous studies on this topic's relationship.

It is clear from Fig. 3.1 that the most frequent keyword is technology adoption and customer usage decisions, whether about travel or the internet, indicating that the most frequent categories are technological and marketing cases that have adopted the technology application in tourism.

Figure 3.2 shows that the analyzed literature has applied technology application in tourism in different sectors. Moreover, the tourism sector has the most extensive papers and reached ten articles, followed by the technology sector. Nevertheless,



Fig. 3.1 WordCloud. (Source: Developed by the authors with R-studio software, 2021)

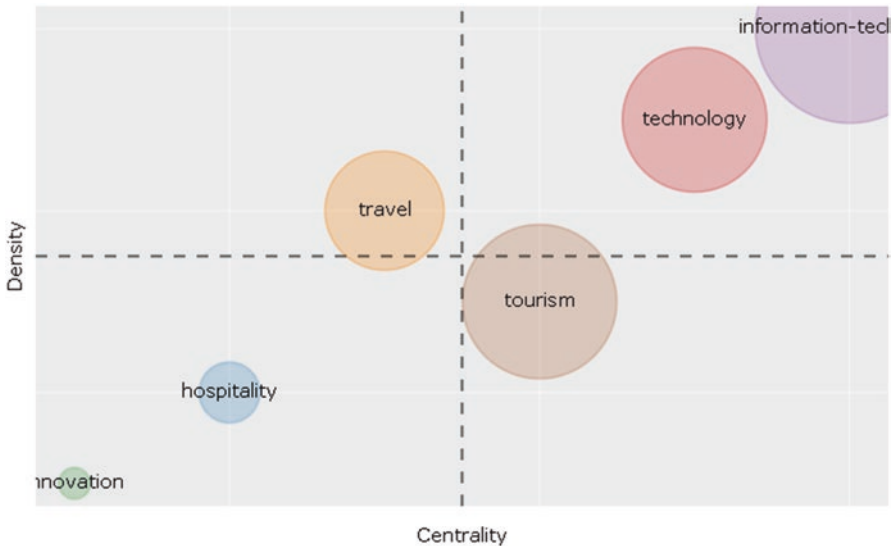


Fig. 3.2 Thematic map. (Source: Developed by the authors with R-studio software, 2021)

there is a severe lack of implementation of this method in some industries, for example, airports industrial sectors, there is gap in this review because many studies ignore vital sectors, and this gap can open a lot from future research to experiment

Country Collaboration Map

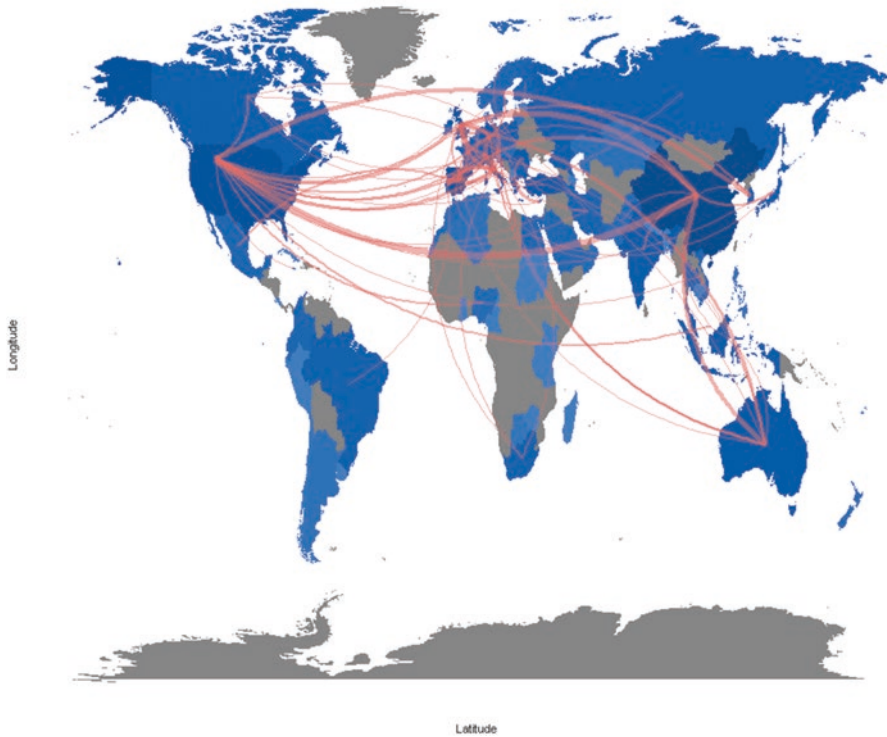


Fig. 3.3 Collaboration WorldMap. (Source: Developed by the authors with R-studio software, 2021)

with implementing technology application in tourism in other sectors. Figure 3.3 shows the most word dynamics for ten keywords concerned with this topic. The technology has repeatedly published papers to show that these journals have recently been interested in technology application in tourism. We note that the tourism applications were the number of articles interested in many papers. Therefore, this is normal as it is specialized in this field.

The word dynamics for these categories during the year and we note the reactions of employees and leaders, gender as well, began to be taken care of in 2006 and increased attention to it in recent years, especially in 2020. A thematic map is a type of map that depicts the style of a specific subject. This usually involves using map symbols to visualize the characteristics of invisible features in Fig. 3.4. Presented the thematic map, and it showed technology application in tourism produces a cause technology, travel, tourism, hospitality, and information.

A research cooperation network is a network where the authors are the nodes, and the co-authors are the contacts. Research cooperation is one of the most recorded ways of teamwork in science. Hence, the strength of the technology application in

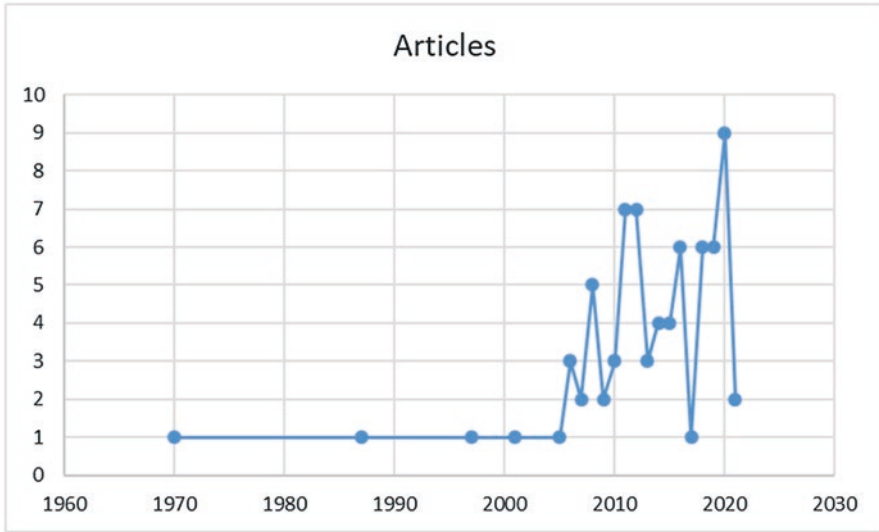


Fig. 3.4 Annual scientific production. (Source: Developed by the authors with R-studio software, 2021)

the tourism research network may also represent a network of cooperation between authors. However, the interaction may also be limited, as depicted by the many issues that still require further investigation (Fig. 3.5).

A research cooperation network is a network where the authors are the nodes, and the co-authors are the contacts. Research cooperation is one of the most recorded ways of teamwork in science. Hence, the strength of the technology application in the tourism research network may also represent a network of cooperation between authors. However, the interaction may also be limited, as depicted by the many issues that still require further investigation. The following Fig. 3.6 shows annual scientific production relative to the year of publication, as it shows that the year 2020 interest in this topic has increased dramatically.

The following figure shows the most relevant sources for more than 20 journals concerned with this topic. We note that the journal of applied behavioral science was the number of articles. It was interested in is six papers. Therefore, this is normal as it is specialized in this field (Fig. 3.5).

Figure 3.6 shows that the articles on technology application in tourism included in this review came from 25 countries and nationalities. These articles generally include case studies conducted in 25 countries.

The value $n = 1335$ In particular, the geographical distribution of the selected articles on technology application in tourism in terms of numbers and percentages shows that the most productive authors are from the USA with 20, China with 7, UK with 6, Australia with 4, Canada, Germany, Israel, South Africa with 3, France, Ireland, Netherland, Norway, Saudi Arabia with two studies, Austria, Brazil, Denmark, Estonia, Greece, India, Lithuania, Pakistan, Singapore, Spain, Sweden and Switzerland with 1 case.

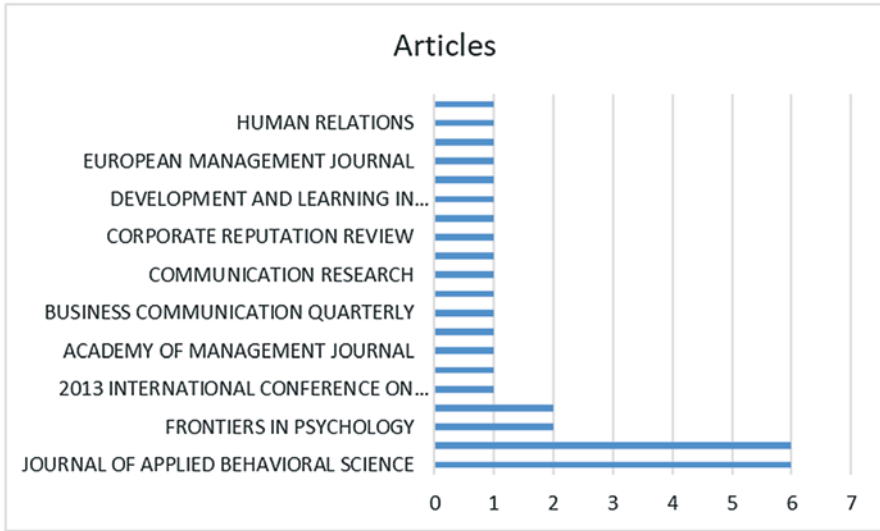


Fig. 3.5 Most relevant sources. (Source: Developed by the authors with R-studio software, 2021)

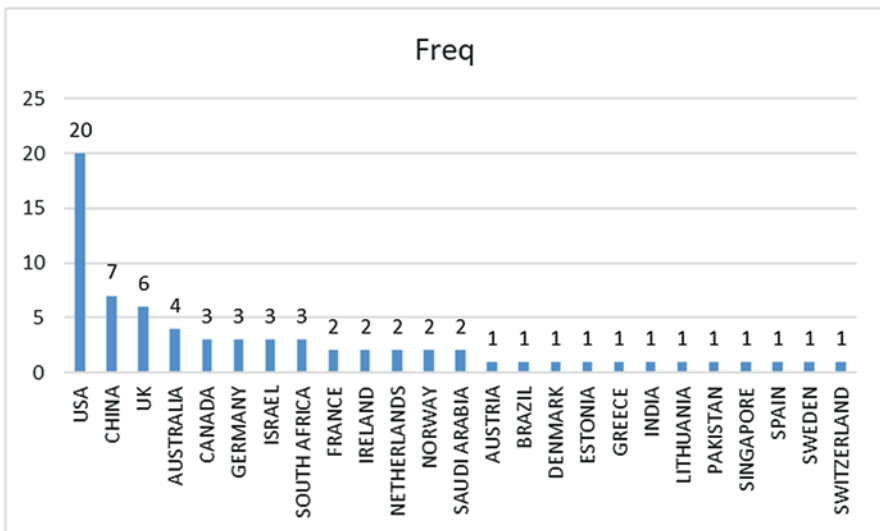


Fig. 3.6 Country scientific production. (Source: Developed by the authors with R-studio software, 2021)

Conclusion

A recent trend has emerged regarding technology application in tourism, which is the technology application in tourism. Research on this topic is still ongoing. Much of the literature has indicated that this strategy is more weighted than technology application in tourism. Moreover, despite the many challenges that this strategy has faced, it has proven it is worth it and needs further investigation. Specific patterns can be drawn from different businesses around technology application in tourism as these businesses have been classified into three categories. The first-class included the evaluation and comparative study for the technology application in tourism that tackled studies on the assessment and comparison, which attempted to find the best methods of technology application in tourism according to a set of criteria (1335 papers). An in-depth analysis of the data helps the benefits, challenges, and recommendations of the technology application in tourism.

The results indicate that the technology application in tourism is a new starting point that organizations must adopt to obtain a sustainable competitive advantage. Nevertheless, there are many gaps associated with the topic, whether at the application level or the conceptual model and the sector. The literature also made some recommendations to increase strategic performance as well as achieve marketing differentiation in addition to high customer satisfaction and help reduce risks and respond to uncertainties and achieve high flexibility to react to changing environmental conditions, especially in emergencies, in addition to increasing social responsibility, high earnings quality, and entrepreneurship. More developed. These recommendations can solve the challenges facing the technology application in tourism when applied and open more opportunities for future research in this area. These problems are related to poor performance because of adopting traditional strategies that competitors can easily imitate. Insights were defined in the current review, and a summary of previously published studies on the technology application in tourism is provided. A review of these works may serve as a reference for researchers on this topic.

Moreover, the competitive advantage in technology application in tourism may be a viable philosophy mainly when managed with a combination of internal and external factors and achieve proportionality between these factors because they act as information filters to create a more robust strategy. Finally, the research has yet to explore more about the hybrid strategy that controls competitive advantage. Another consideration for the study is the adoption of multidisciplinary approaches with other strategic and scientific fields.

Limitations and Future Directions

The most relevant limitation to this review is the number and quality of databases. Although the data selected are reliable and represent broad groups, they are subject to error. The other thing is, or is there significant progress in this area, so the time factor is considered one of the most critical determinants of the survey. Finally, the results of this review reflect the main objective of this paper, which is to explore the role of hybrid strategies in the business world. It is necessary to explore more about this topic in future research.

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