Mobile Augmented Reality Elements and Social Media Usage on Smart Tourism in Penang: Malaysian

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Mobile Augmented Reality and Social Media usage for Smart Tourism Sustainability in Malaysia

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Malaysia is considered a major attractive destination for tourists, and the tourism industry contributes significantly to the economic state of Malaysia. However, due to the Corona Virus (COVID-19) pandemic, the sector of tourism was affected negatively. This study attempts to discover and explain the current situation in the tourism sector and sustain the tourism services by employing smart tourism and traveling with mobile augmented reality and social media usage, which are vital contributors that can expand and improve the tourism sector in Malaysia. This study has practical and instructional implications for all travel agents and contributes to the body of knowledge, potential customers, government officials, and the long-term sustainability of smart tourism. The research also attempted to emphasize the need for smart tourism adoption for industry innovation, Work and Economic Growth.

Introduction

Tourism was defined as a sector or industry associated with leisure and travel (1). It is regarded as one of the world's most dynamic and most outstanding growing sectors, contributing to economic advantages and gains to society and a source of growth for any economy. With the recent development of ubiquitous technology and incorporation into everyday life, ubiquitous technology into tourism information services is being promoted. Information technology tourism convergence studies that combine information technology and tourism are emerging as future studies. The emerging of information technology with tourism resulted in a new concept called smart tourism. This provision in tourism services delivery has rapidly developed and is becoming familiar to the public (2,3). The benefits of this incorporation did not only improve tourists experience with flexible and relaxing travel experiences, but it also improved business competitiveness in the tourism industry.

Literature Review

Tourism sustainability in Malaysia

Prior to the COVID-19 epidemic, the tourism and traveling industry (directly and indirectly) created one-fourth of all new jobs worldwide, with 10.6% of all jobs, which is estimated with 334 million jobs. According to Oxford Economics Group2021 (4), the tourism and traveling industry accounted for 10.4% of the global GDP with US$9.2 trillion. At the same time, international tourists spending was estimated at $1.7 trillion in 2019.

Besides, the most recent annual exploration from the World Travel & Tourism Council (5) revealed that the travel and tourism sector lost nearly US$4.5 trillion in 2019. Due to the spread of the COVID-19 pandemic, this number was dropped to US$4.7 trillion in 2020, which contributed to GDP falling by 49.1 percent compared to 2019. This decline was also followed by the global economy's 3.7 percent GDP decline in 2020. Also, 62 million jobs were lost in 2020, leaving just 272 million people working globally, compared to 334 million in 2019. In Malaysia, many jobs are were lost and many being preserved thanks to the government retention measures and decreased working hours. However, there is an urgent need for a full recovery in the tourism industry to overcome the dropping economic situation caused by job loss. In Malaysia, tourism has been an industry that aided the country's growth. Meanwhile, given the tourist industry's potential for economic development, the government is focusing on expanding the sector since it substantially influences the economy and the link between the tourist industry and economic growth has been the focus of many recent studies (6). As a result, there is a clear correlation between tourism development and sustainability and economic development. Economic growth would expand in tandem with the development of the tourist industry. The Malaysian government places a high value on this industry because of its ability to provide jobs, either directly or indirectly, improve sales and profit, and generate money, among other things (7). Involved direct sectors are those that are directly engaged in the industry, such as hotels, restaurants, and transportation, while involved indirect industries are those that contribute indirectly to the industry such as heritage and cultural product As a result of the wide range of sectors represented, the industry has had a positive impact on both businesses growth and individual's income. For instance, more transactions will occur if more tourists visit Malaysia, resulting in profit for local businesses and individual revenue by generating job opportunities and reducing Malaysia's unemployment rate. As a result, Malaysia's government is committing a significant amount of resources to develop and sustain this industry to maximize the advantages that may be received from it (8).

According to Malaysia tourism statistics (9), as shown in figure (1), tourists arrivals rate has dropped massively by 2020 as a consequence of COVID-19 pandemic.
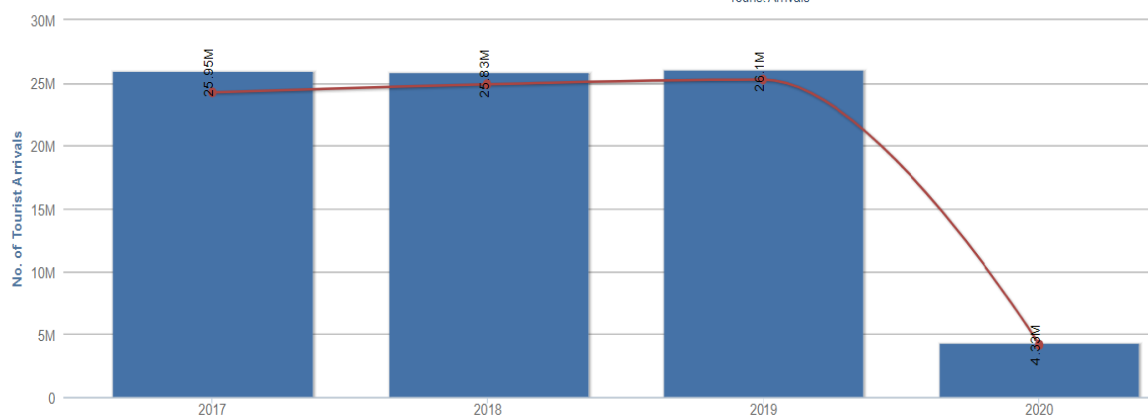

Figure 1: Tourists Arrival rate (tourism.gov.my)

As shown in figure (2), 26.10 million arrivals were hosted in Malaysia in 2019, where only 4.33 million arrivals were hosted in 2020. This drop in arrivals costed Malaysia a loss of 73.4 billion Malaysian Ringgit with 12.7RM billion in 2020 compared with 86.1RM billion in 2019.

YEAR	ARRIVALS	RECEIPTS (RM)
2020	4.33 million	12.7 Billion
2019	26.10 million	86.1 Billion
2018	25.83 million	84.1 Billion

Figure 2: Tourist Arrival and Receipts by Month in 2020 (tourism.gov.my)

Smart Tourism

Smart services for the tourism industry were developed to be available on smartphones for more accessibility. Moreover, location navigation was added as a smart service that tourists could use to reach their hotel (10). However, smart tourism depends on mobile applications or websites that individuals own, not governments, which highlighted the need for the establishment of a smart tourism database that presents information anytime, anywhere, owned by the government to control data flow, control service's quality, identify customer's behaviors and intentions and supply decision-makers with weak points that can be improved (11). Therefore, this study assesses in generating tourism information contents using smart tourism to search in smart tourism information, modify tourism information contents, analyze tourism policies and tourists' inclinations and ratings, and store these efficient tourism information contents. Among other advantages, it highlights the importance of smart tourism information, tourist disposition, and tourism ratings in real-time using smart tourism and its ability to be utilized as a metadata source. In addition, it helps to create a digital tourism policy by patterning smart tourism information content. Smart tourism information is information on tourism products and preferences through smart tourism, which means that tourists can use tourism information contents by acquiring information in real-time through smart tourism for information necessary for making tourism decisions. In addition, a meta-database is built by meta-modeling the current tourism information, tourist tendencies and tourism ratings.

Augmented Reality (AR)

Augmented Reality (AR) is a branch of the Mixed Reality idea in computer science. Milgram and Kishino's (12) work dispelled several myths about AR definitions and categorization. The Reality-Virtuality Continuum, presented in Figure (3), was used to develop definitions and classifications for their research.
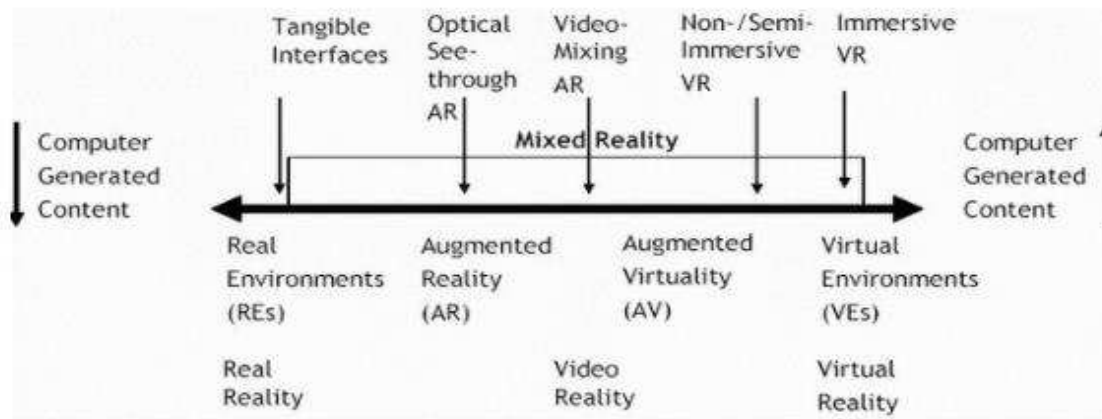
Figure 3: Reality, Virtuality Continuum (11)

The real environment, which is the actual physical environment where humans interact with real and physical quantities inside their natural space, lies on the far-left side of the continuum. The virtual environment, the realm of computer-generated pictures or unreal physical quantities interaction, lies on the extreme right side of the continuum. The main distinction between these two is that the virtual environment involves complete immersion in computer-generated pictures, while the actual world includes non-computer-generated item interactions. AR and Augmented Virtuality are two different environments between these two worlds (real and virtual environments) (AV). According to Ternier, Klemke, Kalz, and Specht's research, AV entails bringing real life into the virtual world (13). AR, on the other hand, entails the placement of virtual items in the actual world, as shown by (14), (15), and (16). The concept of Mixed Reality (MR) is the combination of virtuality with reality in these two settings (AV and AR) (a mixture of real and virtual objects). According to this continuum, AR has gotten greater attention in recent years because of its nature (14, 17).

AR is a simulated world in which physical (unreal and lifeless) and real-life entities are combined (augmented) using computer-generated sensory input. It's comparable to mediated reality, which employs the notion of altering real-life events and enhancing them using technology in order to get the intended reality impressions. The virtual reality created by computers is a real-time simulation that replaces prior real-life events. Object identification and computer vision will be integrated into the simulated world, making it interactive and digitally manipulable. In this research, augmented reality (AR) is described as a technology that overlaps digital information in the shape of images, text, video, and 3D models onto a real-time environment to improve user experiences. Augmented Reality and Tourism Industry These augmented experiences may be made more accessible to travelers by using cutting-edge mobile applications to streamline their travel search and develop trust. AR has the potential to enhance search experiences by providing dynamic and compelling data. Even travel experts believe that by embracing the potential of AR, travel organizations will be able to create unique user experiences that will benefit the tourist domain and industry (18). Using Augmented Reality to discover tourist spots and excursions makes typical city tours a little more exciting. We may journey back in time, considering the progression of landmarks in time, enjoy 3D models of locations, and hire entertaining tour guides. Theme parks, gardens, and zoos are excellent examples. (19). When taking a tour of a city with many attractions, it's easy to overlook an intriguing

location. An Augmented Reality smartphone application may be used as a real-life tour guide. Through the camera viewfinder capabilities of augmented reality travel applications, travelers may learn more about their travels. As the camera captures the area's scenery, the mobile application highlights significant locations and gives more information (19). Various tools within smart tourist destinations can be utilized. QR codes and tags, for example, establish linkages between the real and digital worlds, adding value to the visitor experience. They improve access to information about nearby sites of interest. Distance is unimportant; a smart tourism tool with augmented reality allows tourists to have near field communication (NFC) experience in a different place and time, enabling travel instructions to come to life in real-time areas (20). According to (21), smart tourist location has a higher chance of competing than other destinations. Thus, it may be appealing to international investors. From a tourist's standpoint, it may also have advantages since smart tourism solutions can be easy and user-friendly. In general, the primary benefit of these instruments is to enhance the visitor experience. According to (22), consumers become trackable, vulnerable, and easily exploited by linking so many products through the internet of things. People often utilize portable devices to remain connected with others, and introducing the 'Internet of Things' will amplify this phenomenon. Furthermore, it is expected that Augmented Reality will radically alter the tourist industry's economic models soon. Here's a rundown of how Augmented Reality is providing value to both end-users and the tourist industry right now.

- Virtual and Augmented Reality cutting down on language barriers: traveling to a foreign place without the assistance of a translation is both challenging and enticing. On the other hand, smartphones may be used to translate foreign languages for a variety of consumers using AR technology.
- Augmented Reality apps ensure no travelers get lost: finding your way around an unfamiliar city might be challenging. On the other hand, AR makes navigation applications smarter by including digital elements such as arrows and additional relevant information. AR can enhance travel experiences by exploring a new area by integrating and merging smartphone cameras with Google Maps.
- Using AR mobile apps to improve travel convenience: traveling may become hectic if you don't access accurate and timely information. Travel firms use augmented reality to expand smartphone apps for visitors to enhance their travel experiences.

Hotel, restaurant, and travel agency marketing and advertising using augmented reality when browsing a hotel, tourists may use AR to create all-around room tours with accommodation data and costs. It's an excellent technique to sell and advertise a hotel since it allows targeted clients to explore a wide range of offerings. This can potentially transform one-time visitors into repeat visitors (23). That's Augmented Reality for the travel industry: effortless and full of convenience. Assume you're in your hotel room and need information about cleaning, tourist attractions, distances between locations, and other travel services. As a result, you can quickly grab your smartphone or tablet, open the hotel mobile app, point to a marker, and obtain the information you need (24). In addition, some hotels provide visitors with an interactive wall map on which they may use their mobile phones to explore local tourist destinations in the region. Today's travelers will no longer consider simple pamphlets while choosing a hotel to stay at. Using 3D animations from printed brochures allows users to discover information on a new level. To produce and

distribute AR-based adverts in magazines, hotels partner with content-based enterprises and marketing agencies. The hotel mobile app users may also scan the advertisements to see a presentation video. In addition, restaurants and bars may benefit from AR technologies in various ways. Restaurants may use an AR application to create menus that include an intriguing and dynamic 360-view of each culinary item and its components. Several businesses are employing AR games to attract customers, with the help of smartphone applications that utilize AR to provide information about restaurants, cafés, and local bars. (25).

Social Media and Smart Tourism

Nowadays, social media plays a crucial role in many tourism areas during each trip phase, before, during, and after travel, notably in terms of decision-making behavior. As a result, various studies on social media and social networks look at the effect and influence of social media as part of tourist management or marketing strategy and the economic contribution of social media to the sector. According to Datareportal (26), between April 2019 and January 2020, the number of Malaysians using social media grew by 1.0 million (+4.1%) with an 81% social media penetration rate.

By 2020, 3.8 billion individuals were on social media sites, mainly via smartphones. This figure accounted for 49 percent of the world's population and has increased by 9% in 2021(27). These impacts have a significant influence on the travel sector. Travelers and tourists may share their travel experiences via Facebook, Twitter, and YouTube. Social media radically alters their search for, locate, and read the information on tourism providers and tourist destinations.

The corporation of technologies with the tourism sector was one of the factors that expanded this sector. For instance, social media offers digital marketing and long-term business solutions to help companies reach many passengers using solid digital marketing tools that enable them to touch a large number of individuals at once. It comprises creating and spreading information (28). Just a few examples include social networking (LinkedIn, Facebook, Google+), microblogging (Tumblr, Twitter), picture sharing (Instagram, Pinterest, Snapchat), and video sharing (Instagram, Pinterest, Snapchat) (YouTube, Facebook Live. Instagram, Vimeo, Periscope). Moreover, despite the fact that the number of tourists is growing every year, the tourism business is fast transforming due to the new adoption of smart tourism and the use of social media in the present tourism market, which has become increasingly complex (29). The empowerment of information technology resulted in high competition in the tourism industry and shed light on particular destinations to receive a lot of attention from various stakeholders using digital marketing in social media, particularly in the rural setting (30). Previous research (31) found that understanding visitors' perspectives is critical in influencing the competitiveness of tourism destinations. As a result, social media plays a significant role in promoting tourism. Internet of Things have felt the need for device charging(32-37).

Discussion and Conclusion

The COVID-19 pandemic influenced social, economic, and cultural aspects and massively influenced the tourism sector. Consequently, it is expected for tourism stakeholders to suffer from the pandemic effects for a longer time. The COVID-19 pandemic has produced countless complications for international societies, which forced governments to take significant steps to protect people and save the economy. One major decision caused by the pandemic is that the borders closed in almost every country, and Malaysia was not an exception. With the closing of borders, traveling into Malaysia was not an option for tourists. Thus, the tourism sector paid a heavy bill.

Researchers in the field of travel and tourism industry are encouraged to start thinking of reshaping revival strategies based on innovative methods to promote tourism in Malaysia. One helpful method is getting advantage of the technological revolution, the famousness and spread of social media, the countless benefits and convenience of AR and implementing the concept of smart tourism. The implementation of smart tourism in Malaysia will affect not only the tourism sector but will also affect the economy; it will directly affect the country's GDP growth. In addition, the involvement of social media and AR in tourism marketing enhances the ability to promote Malaysia as an attractive destination with a high level of technological potentials that advertise the country sits as it is in reality, which gives a comfortable feeling for tourists that can watch diversity videos, pictures and reviews for the place before visiting it.

With the implementation of smart tourism in Malaysia, it is expected to expand the promotion of Malaysia attractive sites and, consequently, sustain tourism activities. This could boost the number of investments, the number of job vacancies, individual income, increase in technological companies, development in the infrastructure and sector transformation. To go along with the current situation of the pandemic, it is suggested to implement social media and AR for domestic tourism as an initiative to bring life again to the sector successfully.

The government of Malaysia, tourism agencies, tourism companies, hotels, restaurants are encouraged to exploit the COVID-19 pandemic with all its negativity and interpret it as a transformative power to redesign the structure and infrastructure of tourism in Malaysia as the future of the tourism sector does not only depend on utilizing social media and AR to promote for it, it also depends on providing a high quality of services as the pandemic created a competitive environment for this sector worldwide. However, the closer of this sector for almost two years in Malaysia could be an advantage to renovate the infrastructure, hotel services and transportations to ensure high-quality services for tourists.

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