

A REVIEW OF PUBLIC TRANSPORTATION FACTORS INFLUENCING TOURISM SECTOR IN KUALA LUMPUR AND ISTANBUL

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ABSTRACT

The objective of this paper is to present a comprehensive review of current research endeavours in the intersection of tourism, transportation, and sustainability. Transportation plays a crucial role in facilitating travel for all tourists and thriving the tourism industry. The relevant keywords will be employed to identify pertinent articles from the Scopus database, ensuring the inclusion of high-quality sources for the review. Based on the review conducted, it is evident that tourist satisfaction holds immense importance in evaluating transportation performance within the destination across diverse research contexts. Additionally, the study reveals that the existing transportation modes in a destination exert an influence on tourist movement, particularly concerning the designated transportation routes and the accessibility of tourist attractions. In conclusion, this review emphasizes the potential of employing new technologies as invaluable analytical tools to enhance transportation systems in the tourism sector. Ultimately, the underlying aim of this review is to identify the variables or attributes associated with achieving the overarching concept of sustainable development.

Keywords: Sustainable Public Transportation, Tourism Sector, Urban Planning

1.0 INTRODUCTION

Extensive literature highlights various factors related to public transportation that significantly impact the tourism sector, and this analysis focuses on two compelling case studies: Malaysia and Türkiye. A well-connected and efficient network of buses, trains, and trams enables tourists to effortlessly reach popular sites, landmarks, hotels, and shopping areas, thereby enhancing their overall experience (Zhang & Zhang, 2019; Zhang et al., 2018). In Kuala Lumpur, the Mass Rapid Transit (MRT), Light Rail Transit (LRT), and monorail systems offer extensive coverage and connectivity to major attractions like the Petronas Twin Towers, Central Market, and the Bukit Bintang shopping district (Chik, 2016; Chang, 2017). Similarly, Istanbul, provides a comprehensive public transportation system including the metro, tram, and ferry services, enabling tourists to visit historical sites such as the Hagia Sophia, Blue Mosque, and Grand Bazaar (Yolal & Dinçer, 2018; Karaman et al., 2020). The provision of a well-connected network improves the overall tourist experience by facilitating convenient mobility throughout the city.

Another factor that influences the perception of public transportation among tourists is convenience and dependability. The reliability, and user-friendliness of the transportation system significantly contribute to a positive experience (Mistilis, 2018; Yolal & Dinçer, 2018). Kuala Lumpur and Istanbul have taken measures to address this aspect by providing clear information to tourists, including multilingual signage, maps, and user-friendly ticketing systems (Zhang & Zhang, 2019; GURSOY & CHI, 2018). These initiatives ensure that tourists can navigate the transportation system effortlessly, with timely schedules, frequent services, and clear signage enhancing their overall

satisfaction (Chik, 2016; Karaman et al., 2020). Public transportation systems that offer low-cost fares or tourist passes tend to attract a larger number of visitors (Cai, 2015; Mistilis, 2018). Both cities offer a variety of ticketing options, such as daily or multi-day passes, catering to the needs of visitors who plan to utilise public transportation extensively (Chang, 2017; Yolal & Dinçer, 2018).

Safety and security are crucial factors that tourists prioritise when utilising public transportation systems (Zhang et al., 2018; Gursoy & Chi, 2018). Adequate security measures, well-maintained facilities, and a visible staff presence enhance the sense of security and contribute to a positive experience (Cai, 2015; Zhang & Zhang, 2019). Both cities have implemented measures to improve public transportation safety, including the deployment of surveillance systems and security personnel (Chik, 2016; Karaman et al., 2020). The provision of relevant information on routes, connections, and attractions assists tourists in making informed decisions and efficiently navigating the city (Mistilis, 2018; Zhang et al., 2018). Tourist information centres, digital platforms, and mobile applications that incorporate transportation information serve as valuable resources to enhance the overall experience (Zhang & Zhang, 2019; Gursoy & Chi, 2018). By integrating transportation and tourist information, Kuala Lumpur and Istanbul effectively cater to the needs of tourists and contribute to their satisfaction.

Lastly, the environmental impact of travel choices has gained attention from tourists who are environmentally conscious (Chang, 2017; Zhang et al., 2018). A well-developed public transportation system that promotes the use of environment-friendly modes of transportation, such as electric trains or buses, appeals to this growing segment of tourists (Cai, 2015; Mistilis, 2018). Both cities have embarked on initiatives to provide greener transportation solutions, thereby aligning with the expectations of environmentally conscious travellers (Chik, 2016; Yolal & Dinçer, 2018). Public transportation exerts a significant influence on the tourism sector of any city. By examining case studies from both cities, it becomes evident that factors such as convenient access, dependability, cost, safety and security, integration with tourist information, and environmental sustainability play crucial roles in shaping the tourist experience. Understanding and addressing these factors can contribute to the enhancement of the overall satisfaction of tourists and promote the growth of the tourism industry in cities worldwide. Therefore, the purpose and objective of this study are to shed light on the factors of the public transportation system influencing tourism sectors in Türkiye and Malaysia.

2.0 LITERATURE REVIEW

2.1 Public Transportation in Kuala Lumpur

Kuala Lumpur has an extensive and well-connected public transportation system comprising various modes of transportation, including trains, buses, and taxis (Kuala Lumpur City Hall, 2021). The Mass Rapid Transit (MRT) system, encompassing the Sungai Buloh-Kajang Line (SBK Line) and the MRT Putrajaya Line, plays a pivotal role in facilitating convenient access to numerous popular destinations, such as shopping areas, residential districts, and business hubs (Mass Rapid Transit Corporation Sdn. Bhd., 2021). Complementing the MRT, the Light Rail Transit (LRT) system, consisting of the Kelana Jaya Line, Sri Petaling Line, and Ampang Line, offers comprehensive coverage throughout the city, catering to both residential and commercial areas (Prasarana Malaysia Berhad, 2021). Additionally, the Kuala Lumpur Monorail operates within the city centre, providing a reliable transportation option for areas with high tourist footfall and significant landmarks (Rapid Rail Sdn. Bhd., 2021).

Supplementing the rail network, Kuala Lumpur's bus services, operated by various companies including RapidKL, contribute to the city's transportation ecosystem by covering diverse routes and connecting neighbourhoods (Prasarana Malaysia Berhad, 2021). To enhance user convenience, Kuala Lumpur offers an integrated ticketing system, exemplified by the widely utilized Touch 'n Go card, facilitating seamless payments across trains, buses, and taxis (Prasarana Malaysia Berhad, 2021). Looking ahead, Kuala Lumpur has ambitious plans to further expand and enhance its public transportation infrastructure. Future developments include the construction of new MRT and LRT lines, such as the MRT Circle Line and LRT3, aimed at augmenting connectivity and extending accessibility to suburban areas (Mass Rapid Transit Corporation Sdn. Bhd., 2021). These ongoing initiatives demonstrate the city's commitment to continuously improving its public transportation system to meet the evolving needs of residents and visitors alike.

2.2 Public Transportation in Istanbul

Istanbul has a comprehensive public transportation system that caters to its vast population and attracts a significant number of tourists (Tugba & Kadir, 2020). The system encompasses a diverse range of transportation modes, including buses, metro lines, trams, ferries, and a funicular, offering extensive coverage and connectivity throughout the city (Bingöl, 2017). Notably, Istanbul features a well-established metro network operated by Istanbul Ulaşım, with multiple lines linking various parts of the city (Metro İstanbul, 2023). Key metro lines include M1 (Yenikapı-Atatürk Airport-Halkalı), M2 (Yenikapı-Hacıosman), and M5 (Üsküdar-Çekmeköy), providing fast and efficient transportation options (Metro İstanbul, 2023). Additionally, Istanbul's tram network serves both the historic and contemporary areas of the city, facilitating easy access to renowned tourist attractions and bustling commercial districts such as Sultanahmet, Eminönü, Taksim, and Kabataş (Omer & Gulfem, 2022).

To provide comprehensive coverage, Istanbul's bus system operates an extensive network of routes that traverse the city (Omer & Gulfem, 2022). Operated by Istanbul Otobüs AŞ, the bus system acts as a flexible mode of transportation, bridging areas not directly served by rail-based systems (İstanbul Otobüs AŞ, 2023). Moreover, Istanbul's unique geography, spanning two continents, necessitates the presence of ferry services as an integral part of the city's transportation infrastructure (Kiziltan & Özcan, 2021). Ferries operating on the Bosphorus and the Sea of Marmara offer picturesque and convenient transportation options, seamlessly connecting the European and Asian sides of the city (Kiziltan & Özcan, 2021). To facilitate convenience, Istanbul has implemented an integrated ticketing system known as Istanbulkart (Topçu, 2019). Istanbulkart is a contactless smart card that enables passengers to utilize multiple modes of transportation using a single card, including buses, metro lines, trams, and ferries (Topçu, 2019). This unified payment system enhances the convenience and efficiency of commuting for both residents and visitors in Istanbul. Overall, Istanbul's extensive public transportation system, encompassing buses, metro lines, trams, ferries, and an integrated ticketing system, offers a wide array of options for efficient and seamless travel within the city. This sophisticated infrastructure plays a vital role in serving the diverse transportation needs of Istanbul's residents and contributes significantly to the city's appeal as a tourist destination.

2.3 Factors Involving Tourist Transport Mode Choice

Selecting a mode of transportation is considered one of the fundamental components of tourism planning, as transportation plays a vital role in facilitating mobility for tourists both within and to or from their destinations (Rajalakshmi & Alappuzha, 2013). Understanding the factors influencing tourists' choice of transportation mode is important for transportation service providers, as tourist satisfaction serves as a key performance indicator and directly affects mode selection (Gebeyehu &

Takano, 2007). Various studies have been conducted to gain insights into tourist behaviour when selecting the most suitable transportation mode. These studies have revealed a comprehensive range of factors that influence tourists' transportation choices. Analyzing these specific variables aids in identifying the key determinants of tourist transportation mode choice. Table 1 presents the evolution of factors influencing tourist mode of transport, starting with general factors, and progressing to more recent extensive travel characteristics specific to tourists. This comprehensive understanding of the factors impacting transportation mode choice is crucial for both public and private sectors involved in tourism to enhance their services, improve destination competitiveness, and cater to the needs of tourists.

Table 1 Factors considered in the research affect tourists on transport mode choice

Authors	Variables			
Nerhagen (2003)	Duration of travel, expenses, frequency, ease, adaptability, convenience, and security.			
Westlake and Robbins (2005)	Time constraints, distance, standing, convenience, safety, advantage, cost, geographic location, and rivalry.			
Kelly, Haider, & Williams (2007)	Personal attributes, duration of travel, travel expenses, frequency, point of arrival and departure, and comprehensive merits.			
Ortúzar & Willumsen (2011)	<table border="0"> <tr> <td style="vertical-align: top;"> <ul style="list-style-type: none"> ▪ Characteristics of The Trip Maker ▪ Age/Gender ▪ Income ▪ Vehicle ownership ▪ Household structure ▪ Possession of a driving license ▪ Residential density </td> <td style="vertical-align: top;"> <ul style="list-style-type: none"> ▪ Characteristics of The Journey ▪ Travel objective ▪ Time of day the journey is conducted. ▪ Whether the journey is undertaken individually or with companions, etc. </td> <td style="vertical-align: top;"> <ul style="list-style-type: none"> ▪ Characteristics of The Transportation Facility ▪ Punctuality of transportation ▪ Element of financial expenditure ▪ Accessibility and price of parking ▪ Dependability of travel duration ▪ Comfort and ease ▪ Security </td> </tr> </table>	<ul style="list-style-type: none"> ▪ Characteristics of The Trip Maker ▪ Age/Gender ▪ Income ▪ Vehicle ownership ▪ Household structure ▪ Possession of a driving license ▪ Residential density 	<ul style="list-style-type: none"> ▪ Characteristics of The Journey ▪ Travel objective ▪ Time of day the journey is conducted. ▪ Whether the journey is undertaken individually or with companions, etc. 	<ul style="list-style-type: none"> ▪ Characteristics of The Transportation Facility ▪ Punctuality of transportation ▪ Element of financial expenditure ▪ Accessibility and price of parking ▪ Dependability of travel duration ▪ Comfort and ease ▪ Security
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Source: Tan and Ismail (2020)

2.4 Tourist Satisfaction with Tourism Transport

Referring to Table 2, Haron et al. (2010) conducted a study revealing that tourist characteristics do not significantly impact the performance of bus operators in terms of service quality, reliability, accessibility, safety, and security. Rudjanakanoknad (2011) emphasizes that the preferences and influencing factors for tourist satisfaction differ between local and international tourists. Ismail et al. (2012) found that only a few variables, such as comfort and service quality, exhibit a stronger relationship with tourist satisfaction. Hall and Gerike (2014) discovered that visitors in Munich generally express satisfaction with public transportation services, irrespective of various factors. Zainol (2016) suggests that prudent management of information availability, punctuality, customer care, and security is crucial to enhance tourist satisfaction and ridership while mitigating negative environmental impacts. Time punctuality emerges as a significant factor impacting tourist satisfaction due to lengthy travel times caused by traffic congestion and extended wait times at bus

stops (Ismail et al., 2017). Bajada and Titheridge (2017) stress the importance of implementing relevant transport policies to enhance tourist satisfaction, with service quality factors such as 'time,' 'information,' and 'comfort' being paramount. Accessibility, service quality, and perceived value are defined as key factors by Virkar and Mallya (2018).

Table 2 Review of tourist satisfaction variable

Author(s)	Accessibility	Information	Time Punctuality	Safety	Service Quality	Reasonable Fare	Bus Driver Quality	Perceived Value
Haron, Noor, Farhan, Sadullah, & Leong (2010)	X	X		X	X		X	
Rudjanakanoknad (2011)	X	X		X	X	X	X	
Ismail et al., (2012)	X	X	X	X	X	X	X	
Hall & Gerike (2014)	X	X	X	X	X	X	X	X
Zainol (2016)	X	X	X	X	X		X	
Ismail et al., (2017)	X	X	X					
Bajada and Titheridge (2017)		X	X		X	X	X	
Virkar & Mallya (2018)	X				X			X

Source: Tan and Ismail (2020)

2.5 Comparison of Tourist Arrival: Malaysia & Türkiye

Referring to Table 3, Malaysia has consistently attracted a significant number of tourists over the years, with a peak in 2019 at 26.1 million. However, in 2020 and 2021, there was a noticeable decline, possibly due to the COVID-19 pandemic. In 2022, there was a partial recovery with 10.07 million tourists. Türkiye also experienced fluctuation in tourist arrivals. The year 2016 stands out as a peak with 51.8 million tourists. In 2022, Türkiye welcomed 39.2 million tourists, showing recovery after a sharp decline in 2019. Despite facing challenges in 2020 and 2021, Malaysia's tourism sector seems to be gradually recovering. However, it has yet to reach the peak levels seen in 2019. The country's diverse culture, beautiful landscapes, and well-developed infrastructure have traditionally been attractive to tourists. Türkiye's tourism sector has shown remarkable growth especially from 2013 to 2016 when the number of tourists nearly doubled. The decline in 2020, likely due to the pandemic, was followed by a rebound in 2022. Türkiye's unique blend of history, culture, and natural beauty continues to draw visitors.

Table 3 Tourist Arrival and Total Expenditure in Malaysia and Türkiye's

Year	Malaysia		Türkiye	
	Tourist Arrivals (million)	Total Expenditure (USD) (Billion)	Tourist Arrivals (million)	Total Expenditure (USD) (Billion)
2022	10.07	6.81	39.2	33.07
2021	0.13	0.06	41.4	35.1
2020	4.33	3.12	41.6	32.4
2019	26.10	20.77	31.3	22.8
2018	25.83	20.26	38.6	27.04
2017	25.95	19.82	45.6	30.5
2016	26.76	19.89	51.8	38.9
2015	25.72	16.63	15.8	14.8
2014	27.44	17.35	29.3	30.1
2013	25.72	15.76	51.3	46.4

Source: Ministry of Tourism & Culture Malaysia (2023) and Republic of Türkiye Ministry of Culture & Tourism (2023)

The total expenditure by tourists in Malaysia increased over the years to 20.77 billion USD in 2019. In 2022, it was 6.81 billion USD. Meanwhile, Türkiye’s total expenditure also showed growth, reaching a peak in 2016 at 38.9 billion USD. In 2022, it was 33.07 billion USD. Despite fluctuations in tourist arrivals, Malaysia has consistently attracted high spenders, particularly in 2019 when it reached the highest total expenditure. The country has a well-developed tourism infrastructure, offering various luxury and cultural experiences. Türkiye’s tourism sector has experienced significant growth in total expenditure, driven by its diverse attractions and the increasing popularity of the destination. Even though there was a dip in 2019, the total expenditure remained substantial.

Both Malaysia and Türkiye have been attractive tourist destinations with their unique cultural, historical, and natural attractions. Malaysia has traditionally attracted a large number of tourists, but its recovery from the COVID-19 pandemic has been slower. Türkiye’s tourism sector has shown impressive growth, with significant increases in tourist arrivals and total expenditure. It managed to rebound quickly after the pandemic. Türkiye’s success can be attributed to its diverse offerings, including historic sites, beautiful coastlines, and a rich culture. Both countries have strong tourism sectors, but Türkiye’s sector has demonstrated remarkable growth and resilience, making it an emerging global tourism hub. Malaysia, on the other hand, has the potential to further recover and diversify its offerings to attract a wider range of tourists.

3.0 METHODOLOGY

This study used the query function to retrieve publications related to factors of public transportation influencing the tourism sector from the Scopus database. Selection includes using Scopus’ extensive global coverage, its inclusion of a wide range of disciplines, its robust citation data, the presence of author and institutional profiles, and its user-friendly data analysis features. The query focused on terms such as ‘Public Transportation system in Kuala Lumpur’, ‘Public Transportation system in Istanbul’, ‘Factors influencing tourists’ transport mode choice’, and ‘Tourists’ Satisfaction factors on Transportation services’ within the titles and keywords of the publications. The most common types of publications were articles (60.4%) and conference papers (18.7%), while the least common type was a conference review (2.2%).

4.0 RESULT AND DISCUSSION

Table 4 below shows case studies on factors of public transportation influencing the tourism sector in Malaysia and Türkiye based on the Scopus database. The studies collectively highlight the vital role of public transportation services in shaping the tourism industry in Malaysia and Türkiye. Efficient, high-quality, and comfortable public transport services are key factors in attracting and satisfying tourists, leading to increased tourism revenue and overall economic growth. These findings emphasize the importance of ongoing investments in transportation infrastructure and service quality improvements to support the tourism sector in these regions.

Table 4 Case Study on Factors of Public Transportation Influencing Tourism Sector in Malaysia and Türkiye’s

Author (Year)	Title	Study Area	Findings	Variables
Tan and Ismail (2020)	Reviews on the interrelationship between transportation and tourism: Perspective on	Malaysia	Dimensions of tourist satisfaction toward tourism transport	- Accessibility - Information - Time punctuality - Safety - Service quality - Reasonable fare

	the sustainability of urban tourism development			<ul style="list-style-type: none"> - Bus drivers' quality - Perceived value
			Factors that influenced tourists on transport mode choice	<ul style="list-style-type: none"> - Travel time - Cost - Frequency - Convenience - Flexibility - Comfort - Safety
			Tourist mobility and advanced tracking technologies used	<ul style="list-style-type: none"> - Land transport - Air transport - Water transport - Motorized transport - Non-motorized transport
Nur et al., (2019)	An Overview of Public Transportation Services as an Attraction of Tourism Industry in Malaysia.	Malaysia	The development of public transportation, infrastructure and the use of new technologies in this sector speed up the development of tourism.	<ul style="list-style-type: none"> - rapid development of public transportation sector - application of technological innovations
Mohd et al., (2020)	An Evaluation of Service Quality Towards Tourists on Hop-On Hop-Off Tour Bus Service in Kuala Lumpur	Malaysia	There is a positive and significant relationship between the dimensions of service quality and customer satisfaction on the patronage of Hop-On Hop-Off Tour Bus service in Kuala Lumpur	<ul style="list-style-type: none"> - tangibility - reliability - responsiveness - assurance - empathy
Dalkic et al., (2018).	A First Evaluation of the relationship between High-Speed Rail (HSR) and the tourism sector in Turkey: The cases of two Turkish cities	Türkiye	<ol style="list-style-type: none"> 1. communications concerning its possible use for tourism should be provided in rail stations and airports 2. in HSR stations, wi-fi access should be provided, and tourist information offices and souvenir shops must work 3. in trains, images related to the tourist areas in the city should be presented 4. information about public transportation should be presented (intermodality) 5. intelligent transportation systems used 	<ul style="list-style-type: none"> - comfort - travel time - cities attractiveness
Yukseket al. (2016)	The effects of Public Transport Performance on Destination Satisfaction	Türkiye	The local transportation has a significant effect on the destination satisfaction.	<ul style="list-style-type: none"> - ease of use - physical condition - infrastructure - staff - timing

İmrea & Çelebia, (2016).	Measuring Comfort in Public Transport: A Case Study for Istanbul	Türkiye	The level of discomfort is higher than the passengers' acceptable level, the private car usage may become more attractive than public transport because of its convenience and comfort	- number of passengers per transportation mode per day - crowd density in vehicles during peak hours
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According to Nur et al. (2019), accessible and efficient public transport can enhance the tourism industry by making it easier for visitors to explore different destinations. The availability of diverse and well-connected transportation options can positively influence tourists' experiences and encourage them to visit more places within the country. This underscores the importance of investing in public transport infrastructure to boost tourism. Meanwhile, the research indicates that the quality of tourist-specific transportation services can significantly impact visitors' experiences. High-quality services, such as informative guides and comfortable buses, can enhance tourists' satisfaction and their likelihood of returning. This emphasizes the need for tourist-specific transportation services to meet the expectations and demands of visitors, contributing to the success of the tourism sector (Mohd et al., 2020).

Moreover, the study suggests that efficient and reliable public transportation can enhance the overall satisfaction of tourists. A well-functioning public transport system can improve accessibility to various attractions, reduce travel-related stress, and create a positive impression of the destination. As a result, destination satisfaction is likely to be higher, leading to increased visitor numbers and positive word-of-mouth (Dalkic et al., 2018). The importance of comfort in public transport, using a case study in Istanbul was discussed by İmrea & Çelebia (2016). The research underscores that passenger comfort is a crucial factor in attracting and retaining tourists. Comfortable transportation can lead to positive travel experiences, which are likely to be shared with others and contribute to the overall image of a destination. Therefore, investing in measures to enhance passenger comfort in public transport can be a valuable strategy to boost the tourism sector.

5.0 CHALLENGES AND FUTURE DIRECTION

In this section, the common challenge, and limitation of sustainable transportation in tourism by researchers, with a few observations, have been highlighted.

Table 5 Challenges and future direction of sustainable transportation in tourism

Challenge	Author	Title	Mode of Transport	Journal
Tourist Mobility and advanced tracking technologies	Wu et al., (2015)	FTT: A System for Finding and Tracking Tourists in Public Transport Services.	Integrated Transport (MRT, LRT & Bus)	Institute for Infocomm Research
	Edwards & Griffin (2013)	Understanding Tourists' Spatial Behavior: GPS Tracking as An Aid to Sustainable Destination Management.	Public Transport	Sustainable Tourism

Grinberger et al., (2014)	Typologies of Tourists' TimeSpace Consumption: A New Approach Using GPS Data and GIS Tools.	Ferry, Light Rail, Subway and On Foot	Tourism Geographies
Bauder (2015)	Using GPS-supported speed analysis to determine spatial visitor behavior.	On Foot (Pedestrian)	International Journal of Tourism Research
De Cantis et al. (2016)	Cruise passengers' behavior at the destination: Investigation using GPS technology.	On Foot, Taxi, Coach, or Sightseeing Bus.	Tourism Management
Martín et al. (2019)	An Analysis of the Tourist Mobility in the Island of xxx?	Public Bus, Taxi, Rental Vehicle, Bicycle, Tourist	Sustainability

Tourism mobility is defined by two essential factors: the directional movements of tourists and the designated routes they follow. Traditionally, tracking tourism movement relied on conventional ground survey methods, including physical counters and questionnaire surveys conducted on tourists. However, the advent of advanced technology has revolutionized data collection methods in the form of Global Navigation Satellite System (GNSS) trackers and Geographic Information System (GIS) tools, which have gained widespread usage (East et al., 2017). These innovative approaches enable the generation of extensive and accurate data, offering valuable insights into overall tourism mobility patterns and individual travel behaviours. While previous research on tourist mobility primarily focused on identifying factors influencing travel choices (Sugimoto et al., 2019), the recent rapid advancements in technology have facilitated limited studies utilizing tracking systems to comprehend tourist mobility according to their chosen modes of transportation.

6.0 CONCLUSION

The existing body of research predominantly delves into the nexus between transportation and tourist satisfaction, primarily concentrating on public transportation modes. This research, however, has somewhat overlooked the array of available transportation modes within destinations, potentially neglecting their impact on overall tourist satisfaction. To address this gap, future investigations into tourist satisfaction must adopt a broader perspective that encompasses a more diverse range of transportation options. Beyond this, the literature has witnessed a prevalent reliance on advanced tracking systems like GIS and GNSS technologies to analyze tourist mobility patterns. While these tools offer valuable insights, there remains untapped potential in exploring alternative analytical techniques. Relying solely on GIS and GNSS technology for the study of tourist movement patterns might be limiting. It is imperative to extend the research scope to encompass various other facets of tourism research, such as predicting tourism demand, conducting sentiment analysis on tourists, scrutinizing tourist behavior, and offering tourism recommendations. These aspects have garnered significance in urban tourism research.

REFERENCES

- Bajada, T. & Titheridge, H. (2017). The attitudes of tourists towards a bus service: Implications for policy from a Maltese case study. *Transp. Res. Procedia*, 25, 4110–29 DOI: 10.1016/j.trpro.2017.05.342.
- Bauder, M. (2015). Using GPS-supported speed analysis to determine spatial visitor behaviour. *Int. J. Tour. Res.*, 17, 337–46. DOI: 10.1177/1356766717706102.
- Bingöl, H. (2017). Comparative analysis of public transportation system and access to facilities: Istanbul, Izmir, Bursa case study. *Journal of Economy, Culture, and Society*, 56, 27–45.
- Chang, Y. Y. (2017). The impact of urban rail transit on tourism. *Journal of Sustainable Tourism*, 25(7), 1004–1019.
- Chik, C. T. (2016). Public transportation and tourists' experience: A study of Mass Rapid Transit (MRT) in Kuala Lumpur. *Journal of Tourism, Hospitality, and Culinary Arts*, 8(2), 35–46.
- Dalkic, G. T., Tuydey-Yaman, H., & Delaplace, M. (2018). A first evaluation of the relationship between High-Speed Rail (HSR) and the tourism sector in Turkey: The cases of two Turkish cities. *360.revista de alta velocidad*, 409–433.
- De Cantis, S., Ferrante, M., Kahani, A. and Shoal, N. (2016). Cruise passengers' behavior at the destination: Investigation using GPS technology *Tour. Manag.* 52 133–50 DOI: 10.1016/j.tourman.2015.06.018.
- East, D., Osborne, P., Kemp, S. & Woodfine, T. (2017). Combining GPS & survey data improves understanding of visitor behavior *Tour. Manag.* 61 307–20 DOI: 10.1016/j.tourman.2017.02.021.
- Edwards D. and Griffin T. (2013) Understanding tourists' spatial behavior: GPS tracking as an aid to sustainable destination management *J. Sustain. Tour.* 21 580–95 DOI: 10.1080/09669582.2013.776063
- Gebeyehu, M. & Takano, S. (2007). The effect of travellers' level of satisfaction on transport mode choice: an input for policy analysis *11th World Conference on Transport Research France: World Conference on Transport Research Society 24-28 June 2007 California* 1-17.
- Grinberger, A. Y., Shoal, N., and McKercher, B. (2014). Typologies of tourists' time-space consumption: a new approach using GPS data and GIS tools *Tour. Geogr.* 16 105–23.
- Hall, C. M. & Gerike, R. (2014) Analysis of visitor satisfaction with public transport in Munich *Journal of Public Transportation*, 17, 68–85.
- Haron, S., Noor, S. M., Farhan, A., Sadullah, M. & Leong, L. V. (2010) The headway patterns and potential parameters of bus Proc. of Malaysian Univ. Transp. *Research Forum and Conf.* 21 December 2010, Putrajaya, 279-90.
- İmrea, Ş., & Çelebia, D. (2016). Measuring Comfort in Public Transport: A case study for İstanbul. In Proceedings of the World Conference on Transport Research (WCTR) 2016, 10-15 July 2016, Shanghai.
- Ismail, I. K., Leh, O. L. H. & Zaki, Z. A. (2017). An evaluation of urban public transport route. Case study: Hop-on hop-off, Kuala Lumpur, Malaysia *Plan. Malaysia* 15 109–22 DOI: 10.21837/pmjournal.v15.i2.273
- Ismail, R., Hafezi, M. H., Nor, R. M. & Ambak, K., (2012). Passengers' preference and satisfaction of public transport in Malaysia *Aust. J. Basic Appl. Sci.* 6 410–6 Statista (2023). Istanbul: number of foreign tourist arrivals 2022. (2023, February). <https://www.statista.com/statistics/1346671/istanbul-number-of-foreign-tourist-arrivals/>
- Istanbul Otobüs (2023). Search for route and station. <https://iETT.istanbul/en>.
- Karaman, O. A., Arslan, H., Ünüvar, E., & Kocabaş, İ. (2020). Evaluation of Istanbul's transportation system by tourists. *Advances in Transportation Studies*, 51, 67–78.

- Kelly, J., Haider, W. & Williams, P. W., (2007). A behavioral assessment of tourism transportation options for reducing energy consumption and greenhouse gases *J. Travel Res*, 45, 297–309
- Kiziltan, G., & Özcan, G. A. (2021). Accessibility to public transport stops in Istanbul and its effect on the value of real estate properties. *Journal of Urban Management*, 10(2), 148-158.
- Kuala Lumpur City Hall. (2021). Public transportation services. Retrieved from https://www.dbkl.gov.my/index.php?option=com_content&view=article&id=513&Itemid=663&lang=en
- Martín, J. M. M., Martínez, J. M. G., Moreno, V. M. & Rodríguez, A. S. (2019). An analysis of the tourist mobility in the island of Lanzarote: Car rental versus more sustainable transportation alternatives *Sustain*. 11 1-17 DOI:10.3390/su11030739
- Mass Rapid Transit Corporation Sdn. Bhd. (2021). MRT Sungai Buloh-Kajang Line. Retrieved from <https://www.mymrt.com.my/projects/previous-projects/sungai-buloh-kajang-line/>
- Metro Istanbul (2023). Fast, punctual, and comfortable. <https://www.metro.istanbul>.
- Ministry of Tourism and Culture Malaysia (2023). Tourist. Retrieved from <https://www.motac.gov.my/en/tourist>
- Mistilis, N. (2018). Enhancing visitor experiences through public transportation accessibility: Evidence from Melbourne, Australia. *Journal of Destination Marketing & Management*, 8, 239-248.
- Mohd, N., Hashim, N. I., & Zan, U. M. S. M. (2020, March 30). An Evaluation of Service Quality Towards Tourist on Hop-On Hop-Off Tour Bus Service In Kuala Lumpur. <https://doi.org/10.5281/zenodo.5196782>
- Nerhagen, L. (2003) Travel mode choice: Effects of previous experience on choice behaviour and valuation. *Tour. Econ*. 9, 5–30 DOI: 10.5367/000000003101298240
- Nur, I., Hashim, N. I., Mohd, N., & Kolej, S. (2019). An Overview of Public Transportation Services as an Attraction of Tourism Industry in Malaysia. Proceeding of the 6th International Conference on Management and Muamalah 2019 (ICoMM 2019)
- Ömer Arifoğulları & Gülfem Işıklar Alptekin. (2022). Public Transportation Data Analysis to Estimate Road Status in Metropolitan Areas: *The Case of Istanbul. Procedia Computer Science*, 210, 12-18.
- Ortúzar, J. de D. & Willumsen, L. G. (2011). *Modelling Transport* (Oxford: Wiley-Blackwell)
- Prasarana Malaysia Berhad. (2021). Rapid KL Bus. Retrieved from <https://www.myrapid.com.my/traveling-with-us/how-to-travel-with-us/rapid-kl/bus>
- Puchongkawarin, C., & Ransikarbum, K. (2020). An Integrative Decision Support System for Improving Tourism Logistics and Public Transportation in Thailand. *Tourism Planning & Development*, 18, 1–16.
- Rajalakshmi, P. & Alappuzha, A. (2013). Mode choice modelling based on work trips artificial neural network model. *Int. J. Innov. Res. Sci. Eng. Technol. Proc. of Intr. Conf. on Energy and Env.* 12-14, December 2013, 2, 360–9.
- Republic of Turkiye Ministry of Culture & Tourism. (2023). Activities. Retrieved from <https://www.ktb.gov.tr/EN-99217/activities.html>
- Rudjanakanoknad, J. (2011) Study of sightseeing bus service for tourists on the Rattanakosin Island in Bangkok Proc. of the Eastern Asia Society for Transp. Studies 8 available at https://www.jstage.jst.go.jp/article/eastpro/2011/0/2011_0_165/_pdf accessed 27-11-2019
- Tan, P.Y. & Ismail, H. N (2020). Reviews on interrelationship between transportation and tourism: Perspective on sustainability of urban tourism development. IOP Conference Earth Environment.
- Topçu, Y. İ. (2019). The effects of Istanbulkart on urban transportation patterns in Istanbul. *European Scientific Journal*, 15(18), 105-119.

- Tugba, D. Z. & Kadir, A. (2020). Modeling of greenhouse gas emissions from the transportation sector in Istanbul by 2050. *Atmospheric Pollution Research*, 11(12), 2190-2201.
- Virkar, A. R., & Mallya, D. P. (2018). A Review of Dimensions of Tourism Transport Affecting Tourist Satisfaction. *Indian Journal of Commerce and Management Studies*, 9(1), 72–80. <https://www.ijcms.in/index.php/ijcms/article/view/157/151>
- Westlake, J. & Robbins, D. (2005) *Transportation Tourism: Principles and Practice* 3rd edition editors Cooper, C., Fletcher, J. et al. (Essex: Pearson Education Limited)
- Yolal, M., & Dinçer, H. (2018). The impact of Istanbul's transportation systems on the tourist experience. *European Journal of Tourism Research*, 19, 67-85.
- Yukse, G., Akkoc, I. T., & Bayer, R. U. (2016). The Effects of Public Transport Performance on Destination Satisfaction. *African Journal of Hospitality, Tourism and Leisure*, 5(4). Retrieved from <http://www.ajhtl.com>
- Zainol, R. (2016) Auditing a Central Area Transit (Cat) bus service in a Malaysia's world heritage site: A case study of Georgetown, Penang Geogr. Malaysian J. Soc. Sp. 12 61–73.
- Zhang, H., & Zhang, J. (2019). The influence of public transport accessibility on tourists' travel behaviors in the urban context. *Sustainability*, 11(4), 1106.
- Zhang, J., Ryan, C., & Kim, S. S. (2018). The role of public transportation in enhancing the tourist experience. *Journal of Travel Research*, 57(5), 584-597.