Multi-Modality at Tourism Destination: An Overview of the Transportation Network at the UNESCO Heritage Site Melaka, Malaysia

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***Abstract*— Antecedents of a tourism destination's sustainability and competitiveness rely on its transportation networks to facilitate the movement of traffic for locals and tourist alike. Multi-modality is vital to support the local economies, which garner its revenue from tourism activities. Modality plays a vital role to facilitate the mobility of tourists, inter destinations and within the destinations and relates to the accessibility aspects at a tourism destination. An observational study, paired with a comprehensive analysis of literature, is conducted to explore the gamut of the transportation networks in Melaka and its relation and contribution to the tourism industry. Findings show that Melaka's tourism industry is dependent on transportation networks. Public transportations are found to be inadequate. Issues such as seasonal congestion and public transportation inadequacy need to be addressed immediately to ensure that smooth flow and dispersal of traffic, entering and exiting Melaka. This paper helps future planning in preparing supporting tourism infrastructures in Melaka.**

Keywords— Public Transport System, Transportation Network, Melaka Malaysia, UNESCO Heritage Site, Tourist Mobility

1. Introduction

The transportation network is a vital engine of growth. Antecedent to any tourism destination sustainability and competitiveness is the accessibility to the tourism products. Greater mobility will help foster accessibility, promote sustainability, increased competitiveness, thus speeds up economic growth extensively [1],[2]. Significant growth in urbanisation has been a catalyst for Malaysia's success in economic development and poverty reduction, but it has been dampened by challenges in urban mobility, which outweigh the benefits of urbanisation and threaten Malaysia ambitions to becoming a sustainable economic powerhouse [3]. Most large and medium-sized cities in Malaysia, face the same problem regarding mobility, such as increased level of road congestion, insufficient of public transport, dissatisfaction with the transportation network, rapid development of urban and suburban areas, which hamper movement and disrupt the flow of mobility. This matter has been made worse with an ever-increasing number of privately owned motor vehicle, to the extent where an urgent solution needs to be formulated and exercised urgently. For tourism destinations, transportation plays a crucial role. It is said that, without transportation, there would not be a tourism industry [4], [5]. Transport is an integral part of tourism, which facilitates the movement of holidaymaker, business travellers, those visiting friend and relatives, and undertaking educational and health tourism [5]. Minimisation of modality interchange would be significant advantages as it would indicate efficiency in the transportation network [6], and earlier studies have indicated this as crucial elements of the tourist experience [5]. In tourism, transportation is used primarily to move tourist to a destination, and within the destination itself [7]. With this, the concept of tourist mobility is conceived.

Tourist destination such as the Historical City of Melaka (City of Melaka), in the State of Melaka (Melaka) has been recognised as one of the top tourist destinations in Malaysia as it hosts numerous historical buildings, artefacts and attractions. The state is divided into three administrative districts, *Alor Gajah*, *Melaka Tengah* and *Jasin*. It is strategically located on the coast of Melaka Straits and covers areas of 1664 km^2, with a total population of 872,900 people [8]. Tourism product line up for Melaka includes the historic building and sites, notably the UNESCO World Heritage Site, gazetted in 2008. In total, the state of Melaka offers 796 tourism products to visitors [9].

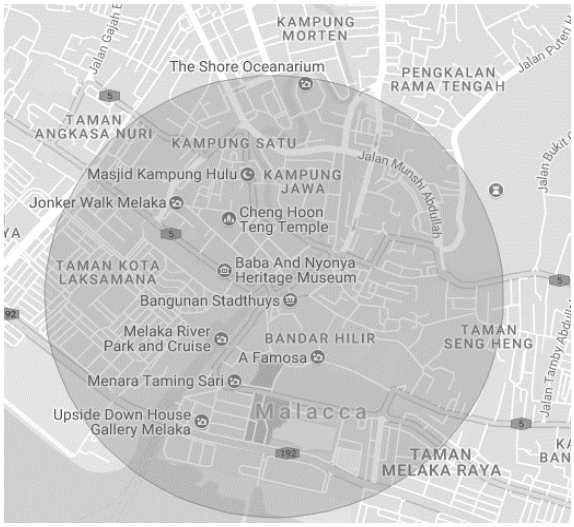

Figure 1: Central Tourist District of Melaka

In 2018, the number of tourists visited Melaka was at 17.02 million visitors, achieving its intended target, generating gross revenue of RM 18.2 Billion to the state economy [10]. 67 % consist of domestic tourist, while 33% is an international tourist. Tourism has been the second most significant contributor to the state Gross Domestic Product (GDP) at 45.6% in 2017 alone [9], [11]. Tourism attraction in Melaka is not concentrated at a particular location only but spread out all over the states. However, the core attraction to Melaka is the UNESCO World Heritage Site located in the City of Melaka. Known as the Central Tourist District (CTD), as shown in Figure 1, it comprises an area of 1 km in radius, which includes the UNESCO World Heritage Site, buffer zone, trading areas, and museums, shopping centres, hotels and accommodation facilities.

Other tourist destinations are located beyond the CTD; which is still accessible using transportation. *Ayer Keroh* areas, for example, located 12 km from the city centre, about 30 minutes' drive, houses attraction such as a zoo, crocodile park, aborigine's museum, cultural park, golf courses, planetarium, water park, bird park, bee's farm and much more attraction. Due to its faraway distance to the city centre, the attractions received far less attention among tourist, especially those who did not have any mean of transportation by themselves. Fortunately, this area is located at one of the primary entry points to Melaka, Ayer Keroh Toll Plaza on the North-South Expressway (NSE), making it visible to the incoming visitors. Some tourist attraction such as Malay Heritage Houses is located in a rural area of *Jasin* and *Alor Gajah* [12]. In this research also, [12] saw glaring differences between tourism infrastructure, especially in transportation between the City Of Melaka and other rural/suburban area in Melaka.

Table 1: Flow of Tourist into Melaka Through Multi-Modal Access

Modality	Entry Point	Point of Origin
Road and Highways Networks	North-South Expressway, Federal, and State Trunk Road	Peninsular Malaysia, Singapore, and Thailand
Air Travel	Melaka International Airport	Penang, China and Indonesia
Interstate Bus Services Domestic/Transit Bus Services Taxi Services	*Melaka Sentral*	Peninsular Malaysia, Singapore, and Thailand
Sea-lanes	Melaka International Ferry Terminal	*Dumai Bengkalis Pekanbaru*
Rail Services	*Pulau Sebang / Tampin* Station	South, North and East Coast Peninsular

Source: original and [13]

Transportation systems and networks are a crucial element and infrastructure in accommodating the tourism industry in Melaka. It relates to the issues of mobility and accessibility for the tourist, and the destination competitiveness itself. Without adequate and appropriate planning regarding modality systems and transportation network, it can hamper the growth and sustainability of Melaka as a leading tourist attraction in the region [3], [14]. The inefficiency in transportation systems and destination inaccessibility has resulted in severe congestion problem [15] and eventually affect the tourism industry [16]. Melaka is known for her cultural and heritage tourism product, and it needs better transportation systems helps in maintaining Melaka's competitiveness as a heritage and historical destination. The preservation of cultural heritage product is related to the destination mix. It covered five aspects, including attraction, facility, infrastructure, transportation and hospitality as suggested by [12]. The objective of this paper is to investigate and report on the transportation systems and network in the State of Melaka, as well as its relation to the tourism industry in general.

2. Literature Review

Transportation systems play a vital role and catalyst in economic development [1]. Transportation has been acknowledged as part of the growth factor in the tourism industry, which provides mobility, accessibility, and connectivity [17]. Unreliable, undeveloped and under-maintained transportation systems and the network has been proven to affect the tourism industry as well as impede the growth of the economy [18]. Two concepts that need to be understood first are the "Transportation System" and "Transportation Network". The *Transportation Systems* is an amalgamation of a specific modal type such as buses, taxis fleet or rail services with fixed routes, fares, and scheduling. Most of the time, it is funded and managed by the government or heavily subsidised by the government. *Transportation Network* meanwhile is known as a combination of multiple transportation systems, either owned by public or private, homogenised to create an efficient network of transportation [6], [19]–[22]. A network consists of multiple systems working in tandem to provide seamless and uninterrupted services to the passenger and commuters [6], [19]–[22]. At the heart of this network is a fully functional and prepared array of infrastructure such as road networks and connectivity, terminals for embarking and disembarking as well as other related infrastructure deemed necessary for the operation of the transport network. Each transport will have their supporting ecosystems, which based on the same fundamentals. A good transportation network will result in higher mobility and access to a destination while facilitating the flow of passenger and freight. Research on a modal choice among tourist still attracted a considerable amount of attention from academicians. Model estimation of the modal choice preferences and effect has been extensively researched out by [17], [23]–[36]. Mobility and accessibility are an essential element in determining tourist satisfaction to a destination [37]. Tourist tends to adopt private vehicle as a mode of their transportation in the destination as it gives them flexibility regarding the time at disposal and itinerary choice [24]. Tourist spatial movement also affected by the mode of transport they choose at the destination. The transport network is said to be the factor that influenced the movement pattern of tourist [38], [39]. In their research, [38] proposes that human factors, physical factors, and trip factor, has the following effect towards tourist mobility. Transportation elements are included in the physical factors.

In the context of Malaysia, the transport network is considered extensive. However, limited to a specific location centralised to urban areas. Cities within the Greater Klang Valley (GKV) conurbation, Penang, and Johor Baharu, are significant transformation recipients in transportation networks. Among the problems associated with the transportation systems in Malaysia is congestion during peak periods, unreliable services with frequent delay and cancellations, reduced connectivity between modes, poor access to public transport services [1]. Going to more even micro level, the studies of transportation in particularly at the state level is minuscule. For the case of Melaka, only a few published types of research delve on the issues of transportation. For example, research by [40] touches on spatial technology in the planning framework of the multimodal public transport systems. Ref. [40] also indicate the underlying problem of connectivity and inefficiency of the public transportation systems in Melaka. In another research by [41], found that tourist spends less on transportation during their length of stay in Melaka. With that, an assumption could be made that tourist tend to flock into destination closes to their place of accommodation as suggested by [36]. This may be true towards tourist who does not have any means of private transport on their own. Paired this, with results by [42], who suggested that tourist mobility within the CTD is relatively high. The findings also noted two critical factors that explain why mobility within CTD is high. The first factor is the tendency of tourist to walk within the CTD rather than use any means of transport, and secondly the proximity of each attraction. As opposed to this, the mobility of tourist beyond the CTD is indicatively moderate and low [42].

3. Methodology

This paper adopts the thematic analysis of previous literature and secondary data to get an overview of the current situation of the transportation systems in Melaka. For this review, a thorough analysis of literature and secondary data are conducted. For the first phase of this research, secondary data source consists of literature are sought from journals, conference proceedings, working paper, annual reports, trade reports and discussion on social media engagement. Raw data was analysed and dissected

using a Literature Matrix Table to get inferential data from each of the literature. Data gathered are analysed using ATLAS. Ti 8 and Keywords-in-Context (KWIC) techniques to draw a pattern and theme of discussion [43].

To validate the data, observational studies at the sites, operations and process were conducted namely at the *Melaka Sentral*, UNESCO World Heritage Site, Melaka River International Ferry Terminal and domestic bus services. Observational studies give an added dimension invalidating the secondary data given [20], [44]–[46]. For this observational study incognito, an observation protocol is developt to ensure impartiality and systematic representation of the data collected. For each of the modality type, a specific observation inclusion criteria were initiated, and only those who within the criteria are used in this review. The observational study was conducted for the first two weeks of October 2018, which includes weekdays and weekends cycles. The findings from the observation were concluded and triangulated with the secondary data, to give a clearer picture of the transportation systems and network in the State of Melaka.

4. Results

The finding is presented according to the mode of transportation systems. An annotation on the general overview is given to describe the condition of the transportation network in Melaka as it relates to the tourism industry.

4.2 Overview of Transportation Network

The transportation Network in Melaka can be represented as a Hub and Spoke configuration, as shown in Figure 2. The configuration is popular with the planner in planning the transportation network [5]. At the heart of the network is the *Melaka Sentral* Terminal, being the hub of the transportation network in Melaka. It acts as an integrated terminal, housing three different transportation systems, the interstate bus service, domestic /transit bus service and the taxi services [40]. Connectivity to every part of the state can be access here. Its advantage is the centrality of its location, and busses are the most popular mode of public transportation embarking and disembarking from Melaka. Most domestic/transit bus routes began and ended at the terminal. For public transportation systems, users at some point will converge at *Melaka Sentral* for transit purposes, either to another mode transportation or to get to their destinations. Services rendered out of *Melaka Sentral* provide the first and last-mile connectivity to users. Getting into Melaka is easy as it can be accessed through a variety of modality, as shown in Figure 2.

A distinctive pattern emerges from the above example where most of the journey ends up in *Melaka Sentral* if the traveller's modal mode is other than driving a private vehicle, which put *Melaka Sentral* as essential infrastructure in Melaka transportation systems. *Melaka Sentral* located approximately 3 km from the city centre and accessed by public transportation and private vehicles. Road access to *Melaka Sentral* is adequate, with dual carriageway up to the main terminal building. The *Melaka Sentral* not only cater to the transportation needs but also houses additional services such as shopping, food and beverage and a fresh market. Due to its popularity as a transit point and point of commerce, the areas are inundated with a high volume of traffic, to the point of congestion during peak periods of operation.

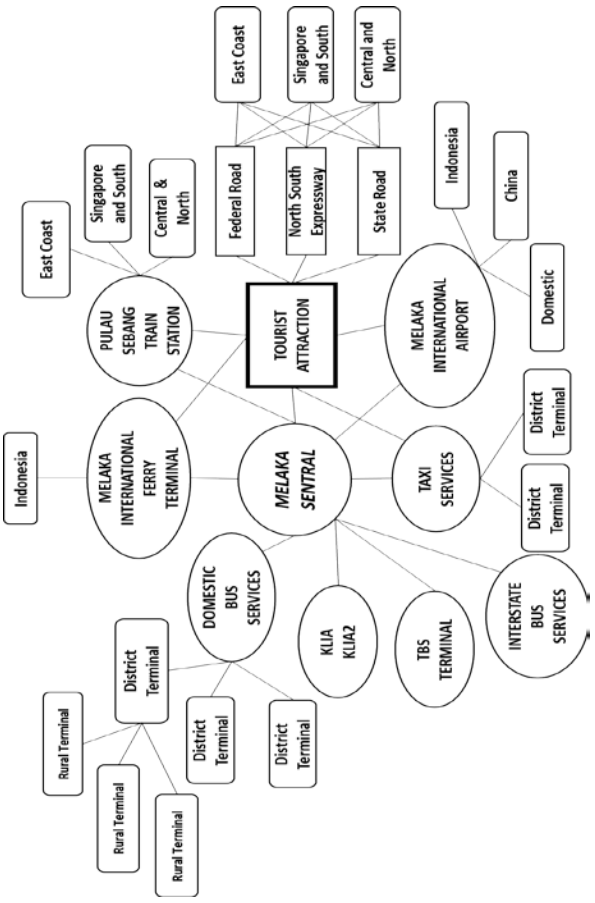

Figure 2: Spoke and Hub Distribution for Tourism-related Transportation Systems and Network in Melaka

4.2.1 Road Networks

The road systems provide accessibility and some degree of mobility for the other modes of modality to function well. Three categories of roadways exist in Malaysia, Federal Road, State Road and Municipal Road [13]**.** As for 2016, the length for each of the road systems is at 313 km, 4210 and 1547 km respectively [13] in Melaka. Most older town roads in Melaka are built during pre and colonials' rules. Roads in the CTD is narrow which can only accommodate a single lane of traffic at one time. Expansion is not feasible as historical gazetted buildings on each side, impede that process. Only small and light vehicle such as cars can use this road, while bigger vehicles such as buses will have problems navigating those routes. Due to this also, traffic congestion is inevitable within the city centre. The roads can only cope with so much flow of vehicle until they reach a point of congestion. Congestion in Melaka is categorised as seasonal, where the heavy presence of vehicles is detected at a particular time [47]. A high number of vehicles can also be observed during weekends, school holidays and public holidays, mostly out of towners. Traffic congestion in the CTD and city centre has a cascading effect on the traffic outside and beyond these areas, as it is interconnected. The state can be accessed through North-South Expressway (NSE), major arteries in the road systems in Malaysia. Three interchanges were demarcated, the *Simpang Ampat* Interchange, *Ayer Keroh* Interchange, and *Jasin* Interchange. *Ayer Keroh* Interchange is the most popular entry-exit point as it were the closest to the city centre and provided direct access to a major tourist destination.

Table 2: Access to Melaka Using Federal Route

Route Number	Route Name	Access From
138	*Masjid Tanah – Kuala Linggi*	Negeri Sembilan, Port Dickson
143	*Jalan Peringgit-Padang Jambu-Lebuh Ayer Keroh-Plaza Toll Ayer Keroh*	North-South Expressway, Negeri Sembilan,
61	*Alor Gajah – Tampin*	Negeri Sembilan, East Coast
5	*Melaka – Muar*	Johor
5	*Melaka-Masjid Tanah-Lubok Cina*	Negeri Sembilan, Klang Valley
19	*Lebuh AMJ*	Johor and Negeri Sembilan. Provide connectivity from NSE Jasin Interchange to the city centre.
264	*Semabok-Gapam-Ayer Keroh*	NSE

Source: [13]

The road network leading to and within Melaka itself, are considered as excellent in term of connectivity and accessibility to major tourist destination. The maintenance of the road is done periodically, with the majority of it are paved with asphalt. Majority of the road in the city centre are dual carriageways, except the old quarters of the city, especially in the CTD where the road is small and narrow. The tendency to use private vehicle as opposed to public transportation due to its flexibility of time and itinerary choice [24]. This is one of the reasons why tourist prefers to drive and use their vehicles, rather than using the public mode of transportation in Melaka. Consequently, this has resulted in an increase in seasonal traffic congestion, air pollution, and parking space problem within the tourist destination [41], [48]–[50]. An after-effect of this has been studied, which show that traffic congestion along highways and access roads represent a severe threat to the quality of visitor experiences while visiting a tourism destination [51]. The mobility of tourist in Melaka is highly dependent on its road network using as part of transportation mode.

4.2.2 Rail systems

Melaka does not have a comprehensive rail network systems. The only rail-based services are provided by Keretapi Tanah Melayu Berhad (KTMB). Two stations connect Melaka with the train systems, the *Pulau Sebang* Station and *Batang Melaka* Station [52]. Train systems connect Melaka to north, south and east coast of Peninsular Malaysia through Electric Train Services (ETS) and Intercity Train Services. Both of these stations located quite far from the city centre, *Pulau Sebang* (36 km, 60 minutes' drive) and *Batang Melaka* (47 km, 60 minutes' drive) based on the observational study. Connectivity to the city is by taxi, rental car and bus service which may

only operate during the day. Due to the poor connectivity and it is isolated in the distance from the CTD, this form of transportation into Melaka is not as popular as busses or using a private vehicle.

4.2.3 Public Transport Systems

There is two significant public transportation within Melaka, domestic bus services and the taxi (There are two types of taxis, one is the "Taxi" which is a traditional taxi, with metered systems, and another one is the "*Teksi Kereta Sewa*" or loosely translated as a Hired Taxi. *Teksi Kereta Sewa* does not use the meter and is rented based on per car/ per destination. Although fare determination is according to the metered systems, most taxi drivers refused to use it. An observation was conducted at two sites, *Melaka Sentral* taxi stands outside the terminal building and taxi stand in front of the *Mahkota Parade Shopping Mall*. The latter one is within the CTD. Ten taxis were taken to be the sample, at both locations. The first impression on the condition of the taxis was not satisfactory as they were old and battered, and some use the old model, which estimated more than 20 years old. Majority of the driver is above 40, and all are locals. Taxi at both locations did not use the meter, but systems of negotiation and verbal quote from the driver. The driver will quote a specific price, which is assumed to be the standard price for that destination. For example, from *Melaka Sentral* to CTD, the fare is around RM15 to RM20 per car. The majority of the passenger are foreign workers, followed by the elderly, and a few tourists. The frequency of passenger seeking taxi service is quite slow, on average during the observation, took 15 to 20 minutes interval per passenger.

The bus systems are operated by the state-owned company, Panorama Melaka Sdn. Bhd (PMSB). The state government took over the management of busses systems from 11 private company in 2012 and appointed PSMB as the sole bus operator. They currently operate a fleet of 61 buses. Out of 61 busses, 47 of these busses were rented [53]. The analysis There were initially 45 routes all over Melaka. In an audit report released by the National Audit Department in 2015, on the overall quality and service level given by PMSB. The reports indicate that 57.7%, 52 % and 73.1% of the respondents unsatisfied with the service regarding safety, comfort & cleanliness and driving level. The routes of bus services show that the majority of the routes begin and end at the *Melaka Sentral* Terminal. The terminals functions as a transportation hub, connecting commuters to their destination. Observational studies were conducted on-site.

Bus route No. 17 was chosen, as the routes past through the CTD. The route follows along a major road in the city of Melaka. This is the only known bus route which serves the CTD. The route starts from *Melaka Sentral-Mata Kucing – Pengkalan Rama-Jalan Bendahara – Bangunan Merah-Mahkota Parade-Bandar Hilir – Ujong Pasir*. On a typical day, the route would take 76 minutes, end to end. However, during peak periods, especially during morning and evening rush hours, and weekends, the journey would take an additional 30 minutes. Super peak periods, weekends with extended public holidays, would see the time diverging between 30 minutes to 50 minutes respectively, due to the massive traffic jams en route to the CTD. Local tourist is seldom seen using bus services, while it is popular among foreign tourist, especially the backpackers. The trishaw, although available for rental, is not considered as a mode of public transport as it is used primarily for tourist sightseeing purposes.

4.2.4 Air Travel

Melaka currently has one major airport, The Melaka Airport (IATA Code: MKZ, ICAO Code: WMKM) is an international airport since its received passenger from other countries such as Indonesia and China [54]. The airport was built in 1952 and operated by Malaysia Airport Berhad. The airport is located 10 km from the town and occupies 141 acres (0.57 km^2) of land. It can accommodate Boeing 737 and Airbus A320 plane and can cater up to 1.5 million passengers annually. Currently services AirAsia, Wings Air, Sky Aviation, Expressair, Malindo Air and chartered service from China Southern Airlines. Melaka now is accessible by air from *Pekanbaru* Indonesia, Penang, Guangdong and Guangzhou China [54]. AirAsia now flies into Melaka daily, with flights from Penang. The latest available figure in 2016, shown that domestic passenger is at 25,641 passengers, while inbound international passenger rises to 33,062. The Melaka Airport is still underutilised as it can cater more than its capacity now. Connectivity by air is deemed as essential for the sustainability of tourist destination. Connectivity between the airport and the city centre and CTD are through the mean of bus and taxi services. Taxi is relatively easy to get as there is a dedicated taxi stand

located adjacent to the airport terminal. Bus, depending on the scheduling, is available towards the *Melaka Sentral*.

4.2.5 Maritime / Riverine-Based Systems

As for the marine/riverine systems, there is a few ports/jetty that operates within Melaka. Some of the port/jetties only handle freight/cargo, while some only handle passenger. Seven existing port and its niche areas are the Port of *Kuala Linggi* (Industries), Port of *Sungai Udang* (Military) Port of *Tangga Batu* (Oil and Gas), Port of *Tanjung Bruas* (Cargo and Container), *Umbai* Port (Fishery) and *Sungai Rambai* Port (Mineral). Melaka Gateway Port, which is under development and construction, will be focusing on the tourism sectors [55], [56]. The only ports and jetty that handles passenger are the Melaka River International Ferry Terminal and Anjung Batu Jetty. Both of this jetty handle's passenger departing to Indonesia and the local island of *Pulau Besar* and *Pulau Upeh.* The Melaka River International Ferry Terminal located at the opening of Melaka River. Currently, two ferry companies served the *Melaka-Dumai*, *Melaka-Pekanbaru* and *Melaka-Bengkalis*. Majority of its passengers are Indonesian from Sumatra. The terminal is equipped with immigration, quarantines and customs facilities and can accommodate up to 5000 passengers daily. Connectivity to the city centre is easy as it is located within walking distance to the CTD, as this mode is the only transportation systems in Melaka, which operates within the CTD enclave. Taxi is readily available but limited to only during operating hours. Bus service also plies the route to *Melaka Sentral*.

4.3 Issues on The Transportation Network

From the analysis and observation conducted in terms of transportation network connectivity in Melaka, there is a low level of connectivity between each modal type. The transportation network is far from being coherent and connected. The finding was clustered according to accessibility factor such as Low (Inaccessible, no connectivity between modal are observed), Medium (Some connectivity between modal is observed, but limited in number, time and services), High (Readily available with connectivity between modal and to another modality).

Table 3: Analysis of Connectivity Between Modes

Modal Type	Proximity Of Operation To CTD	Connectivity To Other Modal Type	Convenience Factor In CTD	Accessibility To Modality In CTD
Bus System - Intercity	Low	High	Medium	Low
Bus System - Domestic	Medium	High	Medium	Medium
Taxi System	High	High	Medium	High
Rail System	Low	Low	Low	Low
Air System	Low	Medium	Low	Low
Marine/Riverine System	High	Low	High	High
Road Networks	High	High	High	High

Another recurring theme that frequently found in the literature are the issues of congestion [7], [40], [57]–[62]. Traffic congestion happens when the number of vehicles on the road is more than the road's capacity. Traffic congestion is critical issues associated with Melaka as destination tourism. Due to the fluctuation in seasonal demands during extended weekends, school holidays and public holidays, Melaka has seen a resurgence in numbers of the vehicle for the past couple of years. Added to that, a sum of 560,726 number of the vehicle was registered in 2015 for the state of Melaka [63]. This contributes to traffic congestion in the CTD. Even though the number of vehicles continues to rise, the length and width of the road remain the same, especially in the CTD. Most of the roads located in urban areas and leading to urban areas, in all urban city in Malaysia, has a Level Of Services (LoS) of E and F [64]. LoS A represents 'free flow'; B and C 'stable flow' with slight or acceptable delays and 'D' approaching unstable flow with tolerable delays. 'E' and 'F' represent unstably and forced flows, respectively, with excessive delay or complete stoppage for extended periods [64]. As discussed earlier, the expansion of the road within this area is nearly impossible as it has reached its maximum capacity.

Measures taken by the authority to alleviate this traffic congestion is by initiating the traffic dispersal systems. Elements in these traffic dispersal systems observables in the numerous one-way roads within the city centre and CTD. The introduction of smart traffic lights on a major road junction in the city centre has reduced the congestion slightly [61]. The traffic congestion also affects the surrounding areas as it has a trickling effect towards traffic outside the main tourist areas. The stretch linking *Jalan Peringgit-Padang Jambu - Lebuh Ayer Keroh-Ayer Keroh Toll Plaza* (Federal Route 143) has reached its capacity. This route is the main entry/exit point to the city centre and often jammed up during peak holiday season. The number of traffic went through the Ayer Keroh Interchange is estimated to increase by 7.6% annually [65]. The state government has initiated a traffic dispersal systems to facilitate the movement of traffic by constructing two flyover project, one in *Ayer Keroh-MITC Junctions* and another in *Peringgit-Batu Berendam Junction* with a cost of RM 280 million [66].

A recent entry to the transportation network in Melaka is the e-hailing services. It offers on-demand e-hailing services through the use of mobile apps. The introduction of e-hailing in Melaka is deemed to be disruptive to the transportation systems, particularly the taxi operator, who are affected the most. Nevertheless, after being regulated and approved for operation by the government on July 2019, the negative image of its services has reduced and adapted well by the local communities. The effect, function, and role of e-hailing towards the tourism economy are yet to be studied thoroughly. Users of e-hailing welcome the service due to its innovative services, flexible and cost-effective for some routes. E-hailing also fills the gaps during the first and last mile intervention, complementing the existing mode of transportation.

4.4 Way Forwards for Melaka's Transportation Systems

As tourism industries expected to grow, the state of Melaka needs to assess their readiness and preparedness in providing supporting tourism infrastructure, especially in transportation. Future planning needs to consider the aspect of connectivity, mobility, and accessibility. To be competitive as a major tourist destination, policymaker must act now to prepare Melaka for impending tourist arrival, which is forecasted to increase. Physical facilities and infrastructures, which is detrimental in influencing tourist satisfaction for a tourism destination, need to be addressed. An earlier study has identified the lack of parking facilities and congestion are two of the major concerns [41]. This is only the tip of the iceberg, which hide underlying issues. Lack of parking facilities means that tourists are dependent on their private vehicle in accessing tourism destination. It also indicates that future inability and traffic saturation to cope with more incoming traffic in the City of Melaka [3]. Parking spaces take too much valuable land-use that could be useful for other purposes. Building bigger access road, and multiple flyovers to accommodate more incoming traffic would not solve the problem in the long run. The cascading effect would be, an increment in the carbon footprint and environmental problem within the city [3], [67].

To give better advantages over tourist accessibility is to expand the air travel systems. Melaka International Airport is now capable of handling bigger aircraft after the lengthening of its runway. The number of direct flights to Melaka needs to be increased to cater to tourist demands. Airlines, such as Expressair from Indonesia, has four weekly flights to Melaka International Airport form *Pekanbaru* Indonesia. An interesting point to note is that, through Pekanbaru Airport connection to other destination in Indonesia such as Jakarta, Jogjakarta, Medan, Palembang, and Batam [68]. The majority of the passenger that arrived from Indonesia are those seeking medical tourism in Melaka [69].

To support this, public transportation systems such as bus service need to have better routes, connecting major point of interest, with consistent time schedules. The frequency also needs to be amplified by adding more buses on the road, especially during peak seasons. *Melaka Sentral*, as a hub of transportation, also need a better first mile and last-mile connectivity. Shared mobility is identified to enable users to obtain short-term access to transportation as needed, rather than requiring ownership. E-hailing is part of Malaysian transportation systems, and available in Melaka. E-hailing's service, usage, and impact on the tourism industry are yet to be thoroughly researched and discovered. Initial research pointed out the positive impact of shared mobility towards the tourism industry [70], [71], particularly in helping the mobility of tourist for the shared mobility program in Melaka. There are scores of e-hailing services in

operation in Melaka. However, data on the usage, implementation, and impact of the e-hailing in Melaka is still sketchy at the moment due to the unavailability of research being done.

5. Conclusions

The transportation network in Melaka in general, are considered adequate but needs significant improvement in the aspect of connectivity and accessibility. The quality dimension of those services needs to be explored further as were not part of this study. The disaggregated location of transportation systems hinders the connectivity between modes, thus impede the mobility of user and passengers. This, in turn, has an adverse consequence towards the destination accessibility. The mobility of tourist in the CTD and the accessibility of attraction within the CTD are indicatively high, due to the proximity of each location. Unfortunately, mobility and accessibility to the destination beyond the CTD are seen as low. This paper aggregate all of the existing literature on Melaka's transportation systems into a systematic analysis and conceptualised the connection between transportation systems and tourism. Planning and development of future supporting tourism infrastructures and tourism products development in Melaka should consider the current transportation systems in order to create a favourable destination and touristic image.

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