Auditing a Central Area Transit (Cat) bus service in a Malaysia's world heritage site: A case study of Georgetown, Penang

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Abstract

Moving around a conservation area can be a challenging task. Old townships were designed for minimal number of motorized vehicles. However, as time passes and rapid development takes place, a historical city such as Georgetown is facing challenges in the handling of traffic congestion. Conservation area is a protected area and road widening is not an option. Furthermore, climate change issue is becoming a global issue. The increasing number of motorized vehicles is not easing this issue. It contributes to traffic congestion and results in high temperature and high carbon emission. This is hurting the city's environment. In an attempt to address both issues, Georgetown has taken an extra effort by providing a free bus service to be utilized by tourists and also by the locals. This study assessed a tourist's transportation service that is offered in Georgetown through its free bus service. Participant observation and an audit list were the main method used to conduct this evaluation. Results showed that the free bus service was good not only for tourists but also for the locals. However, the service needed to be improved to enhance user's experience in using it.

Keywords: accessibility, heritage site, tourist bus, tourist transportation, walkability, world cultural heritage city

Introduction

Transportation is an important element in tourism planning (Inskeep, 1991). It provides accessibility to and within a destination. Transportation at a tourism destination needs to be managed wisely due to the abundant number of travelers that include not only the locals but also the tourists. Furthermore the number of tourist will be more during weekends and festival seasons. Congestion is inevitable when the number of vehicles exceeds the carrying capacity of a road network which might be due to various reasons such as poor driving habit and roadside parking (Fadairo, 2013; Jain, Sharma & Subramanian, 2012). This results in a negative impact on the environment and thus affects the livelihood of the people who live or visit the area (Beevers & Carslaw, 2005; Stokols, Novaco, Stokols & Campbell, 1978; Wall & McDonald, 2007). Therefore sustainable transportation that focuses more on using public transportation is seen as a solution to these problems. In order to promote the use of public transportation among urban dwellers, passengers' needs have to be satisfied first (Beirão & Sarsfield Cabral, 2007; Paulley et al., 2006). Easy access, no or limited transportation choice and route information are some of the reasons commuters use public transportation (SPAD, 2014). In addition, availability of cheap and good public transportation will deter car ownership and thus results in fewer private vehicles (Cullinane, 2002) and lead to less congestion. However, there are issues related to using public transportation. Long waiting time, lack of facilities for the disabled, lack of information on bus schedule and traffic congestion are among others. Therefore this study intends to audit the services provided by a tourist's bus in meeting passengers' needs.

Sustainable transportation

Sustainable transportation is defined by various definitions. Originated from the Bruntland Report of 1987, sustainable transport refers to "transport that can satisfy the current transport and mobility needs without compromising the ability of the future generations to meet these needs" (Black, 1996, p. 151 cited in Black, 2010). Daly (1992) cited in Black (2010) specifies three parameters to be considered in defining sustainable transportation. These parameters include the use of renewable resources should not exceed the rate of its regeneration, the use of non-renewable resources should not exceed the use of its substitute and pollution emission should be limited to the assimilative capacity of the environment (Black, 2010). The Europeans came up with Mobility 2001 report to highlight the notion of sustainable mobility which refers to "the ability to meet the needs of the society to move freely, gain access, communicate, trade and establish relationships without sacrificing other essential human or ecological values today or in the future" (MIT & CRA, 2001 cited in Black, 2010). The Canadian Centre for Sustainable Transportation further states that sustainable transportation should allow the basic needs of human to be met safely, should be affordable, operates efficiently, offers various modes of transportation, supports vibrant economy and limits carbon emission and waste within the earth ability to absorb (Black, 2010).

Public transportation is one of the modes that can offer sustainable transportation. It is able to carry a bigger number of passengers as compared to private vehicles. This type of transportation includes rail, bus, and tram. With the increasing fuel prices and air pollution, public transportation can help alleviate problems related to congestion and carbon emission. Congestion no only cost fuel consumption but also increases the level of pollution which can pose danger to the public (American Public Transportation Association, 2014).

Public transportation

Public transportation can be of various modes which include commuter trains, tramways, monorails, Mass Rapid Transit (MRT), Light Rapid Transit (LRT), subways, cable cars, van pool services, paratransit services for the senior citizen and the disables, taxi and bus (American Public Transportation Association, 2014). Public transportation has many benefits. These include enhancing personal opportunities, saving fuel, reduce congestion, save money, and reduce carbon footprint (American Public Transportation Association, 2014; Shapiro, Hassett & Arnold, 2002).

Experience in using these public transportations can actually change habitual drivers. By giving a one month's free ride can actually create positive feedback on using public transportation (Fujii & Kitamura, 2003).

Previous studies on passengers' satisfaction in Malaysia

Various studies were conducted in Malaysia to measure passengers' satisfaction in using public bus (Ab Ghani, Hamid, Daud & Haron, 1998; Haron, Noor, Sadullah & Leong, 2010; Ibrahim, Adji & Karim, 2013; Ismail, Hafezi, Nor & Ambak, 2012; SPAD, 2014; Yaakub & Napiah, 2011a, 2011b). No specific standards were used in the measurements of these studies. However, Ismail et al. (2012) use Benchmarking in Asian Service of Public Transport survey tool in their study. Table 1 shows the various variables undertaken by transportation related studies in Malaysia.

Overall, most studies concentrated on availability, accessibility, time and comfort. These elements are highlighted in the previous research and until to date, similar problems still persist. In addition, there is minimal focus on information, customer care and environment impact. In addition, studies on the use of public transportation by the disabled people in these literatures are absent. None mentioned about the needs of the disabled people.

Table 1. Variables in Passenger's Satisfaction Study in Malaysia

Variables	Availability	Accessibility	Information	Time	Customer care	Comfort	Security	Environmental impact
SPAD (2014)	✓	✓	✓	✓	✓	✓	✓	
Ibrahim et al. (2013)	✓	✓	✓	✓		✓	✓	
Ismail et al. (2012)	✓	✓	✓	✓	✓	✓	✓	✓
Yaakub & Napiah (2011)				✓		✓		
Haron et al. (2010)	✓	✓		✓			✓	✓
Ab Ghani et al. (1998)		✓		✓				

Quality standards on services rendered to public passengers

In providing quality services, standards are required. Three standards are described in this section, namely, the European standard, the Singaporean standard and the Malaysian standard. These standards are chosen due to being relevant in providing public transportation. European standard is used as a bench mark in this study. It has been around for more than 10 years and it covers every angle a public transportation should provide. Likewise, Singaporean standard is used due to being an immediate neighbor to Malaysia. This is to examine the difference of standards provided between the neighboring countries.

European standard

The EN13816 European standard on Transportation – Logistics and services – public passenger transport – service quality definition, targeting and measurement was approved by the European Committee for Standardization (CEN) in 2001 and is being implemented in twenty countries who are member of CEN. These countries include France, Germany, Netherlands, United Kingdom and other European countries. In this standard eight criteria are outlined to measure public passengers' service quality on using bus services which include availability, accessibility, time, customer care, security and environment (CEN, 2002). Each of these criteria has specific measurement and is divided into three different levels. Level one shows the main criteria. Level two shows the breakdown of each criteria and finally Level 3 shows the detail of each breakdown. The details of the measurement are shown in Table 2. The European standard covers passengers' quality measurement. Based on the eight criteria presented in Table 1, passengers' satisfaction on bus services can be assessed.

Table 2. Details of Criteria in European Standard, EN13816

Level 1	Level 2	Level 3
Availability	Modes	Access to modes suitable to customer's needs
	Network	Distance to b/a point
		Need for transfer
		Area covered
	Operation	Operating hours
		Frequency
		Vehicle load factor

Level 1	Level 2	Level 3
	Suitability	Suitable for disable people
		Suitable for children
		Suitable for elderly users
		Suitable for commuters
	Dependability	Confidence in bus network
Accessibility	External interface	To pedestrian
		To cyclist
		To taxi users
		To private car users
	Internal interface	Entrances/exits
		Internal movement
		Transfer to other PPT modes
	Ticketing availability	Acquisition on network
		Acquisition off network
		validation
Information	General information	About availability
		About accessibility
		About sources of information
		About travelling time
		About customer care
		About comfort
		About security
		About environmental impact
	Travel information: Normal conditions	Street directions
		b/a point identification
		Vehicle direction signs
		About route
		About time
		About fare
		About type of ticket
	Travel information: Abnormal conditions	About current/forecast network status
		About alternatives available
		About refund/redress
		About suggestions and complaints
		About lost property
Time	Length of trip time	Trip planning
		Access/egress
		At b/a points and transfer points
		In vehicle
	Adherence to schedule	Punctuality
		Regularity
Customer care	Commitment	Customer orientation
		Innovation and initiative
	Customer interface	Enquiries
		Complaints
		Redress
	Staff	Availability
		Commercial attitude
		Skills
		Appearance
	Assistance	At service interruptions
		For customers needing help

Level 1	Level 2	Level 3
	Ticketing	Flexibility
		Concessionary tariffs
		Through ticketing
		Payment options
		Consistent price calculations
Comfort	Usability of passenger facilities	At b/a points
		On vehicles
	Seating and personal space	In vehicle
		At b/a points
	Ride comfort	Driving
		Starting/stopping
		External factors
	Ambient conditions	Atmosphere
		Weather protection
		Cleanliness
		Brightness
		Congestion
		Noise
		Other undesired activity
	Complementary facilities	Toilets/washing
		Luggage and other objects
		Communication
		Refreshments
		Commercial services
		Entertainment
	Ergonomy	Ease of movement
Security	Freedom from crime	Preventative design
		Lighting
		Visible monitoring
		Staff/police presence
		Identified help points
	Freedom from accident	Presence/visibility of supports
		Avoidance/visibility of hazards
		Active safeguards by staff
	Emergency management	Facilities and plans
Environmental impact	Pollution	Exhaust
		Noise
		Visual pollution
		Vibration
		Dust and dirt
		Odour
		Waste
		Electromagnetic interference
	Natural resources	Energy
		Space
	Infrastructure	Effect of vibration
		Wear on road/rail etc.
		Demands on available resources
		Disruptions by other activities

Source: CEN, 2002.

Singaporean standard

In 1994, the Singapore Government through the Public Transport Council has established basic bus service standards to safeguard its bus commuters' interest (Public Transport Council, 2014). The said quality of services standards has two main categories, the operating performance standards (OPS) and the service provision standards (SPS). The former is used to measure bus reliability, loading and safety in terms of bus route and network and the latter measures the service availability, integration and information. In 2007, the standards were further enhanced to include displaying timetables of bus services with frequency of services within 20 minutes or more. However, in 2009, it requires at least 80% of its bus services need to operate at frequencies of 10 minutes or less during weekday's peak hours. Table 3 shows the detail description of each component in the quality of bus service categories. Unlike the European standards, these standards do not include passenger's service quality measurement.

Table 3. Description of quality of service standards for bus services in Singapore

Criteria	Component	Description
The operating performance standards (OPS)	Bus reliability	At least 96% scheduled bus trips operated on each bus service At least 85% of bus service should remain on schedule of not more than 5 minutes Bus breakdown is less than 1.5% monthly
	Loading	Bus loading should not exceed 95% on each bus service
	Safety	Accident rate is less than 0.75 bus per 100000 km monthly
The service provision standards (SPS)	Service availability	Access to bus services within 400 meters radius Access to bus services between neighborhood and MRT stations Access to bus services between major employments/activities centers and MRT stations Bus services to be available at least 18 hours daily
	Integration	Bus services integration in Housing Development Board (HDB) towns; bus service to be available as early as 6.00 am at the bus interchange/terminal and the last bus to leave the bus interchange/terminal at 12 midnight daily
	Information	Up to date information to be available through the internet website for trip planning Up to date information to be displayed at all bus interchanges with passenger boarding activities Up to date information to be displayed at all bus stops using display facilities Bus services timetables to be provided at bus stops

Source: Public Transport Council, 2014.

Malaysian standard

Malaysia has a customer satisfaction standard and that is ISO 10002:2014 Quality management – Customer Satisfaction Guidelines for complaints handling in organizations which handles customer's satisfaction. However, in Malaysia the public transportation companies do not employ this ISO standard in their organizations. The only measure that is being looked into now is the adoption of universal design into bus services (Wong, 2010). Seven principles of universal design are considered in the improvement of bus services in Malaysia. The principles include equitable use, flexibility in use, simple and intuitive

use, perceptible information, tolerance for error, low physical effort, and finally, size and space for approach and use. Wong (2010) highlighted that in order to provide easy accessibility of bus services to the people with disabilities, several criteria need to be followed namely low entrance, ramp, wheel space, safety seatbelt, stanchion, handrail, low positioned lever bell push, priority seating for the disabled, audio and video announcement system, signage, accessible bus stops./stations and finally specially trained drivers. Currently some of the public buses in Malaysia provide these services.

Benchmarking in Asian service of public transport

A framework to benchmark the service of public transport was developed through Transport Research Transport program,a joint venture initiative between the World Bank and the by the Department for International Development (Henning, Essakali & Oh, 2011). Its main focus is to deal with emerging issues related to transportation sector. Five key performance indexes with specific variables were outlined. Table 4 shows the details of the key performance index in benchmarking public transportation.

Table 4. Key Performance Index for Benchmarking Public Transport

No.	Key Performance Index	Variables
1	Uptake of public transport	Travel mode
		Passenger kilometer travelled
2	Travel efficiency including reliability, effectiveness in operation and coverage	Public-transport patronage
		Speed of journey
		Travel time
		Vehicle fuel consumption
		Reliability departure and arrival time
3	Accessibility	Catchment area-time
		Catchment area-distance
4	Affordability	Cost of travel
5	Travel experience including safety and comfort	Road safety
		Personal security
		Comfort

Source: Henning et al., 2011.

From this table it is noted that the benchmarking criteria cover five major elements. These elements are similar to that the European standard except for information and customer care component.

Methodology

This study employed a qualitative approach in its data collection and analysis. Participant observation is the main method used. Data are collected through observation and through the use of an audit list drafted according to EN13816. This standard is comprehensive since it includes all elements in assessing passenger's satisfaction on using bus services. In this study only the Hop-On Free Central Area Transit (CAT) bus service is being audited. This shall be an initial study before embarking into a more detail research.

Study area

This study was carried out in Georgetown, Penang, Malaysia. Georgetown, the capital of the state of Penang, Malaysia was founded in 1786 by Francis Light and named after Britain's King George III. Located on the north-east Penang Island, it has a population of 529,400 (Penang Institute, 2014; SERI, 2011). Georgetown was declared a UNESCO World Heritage site in 2008 together with Melaka. With

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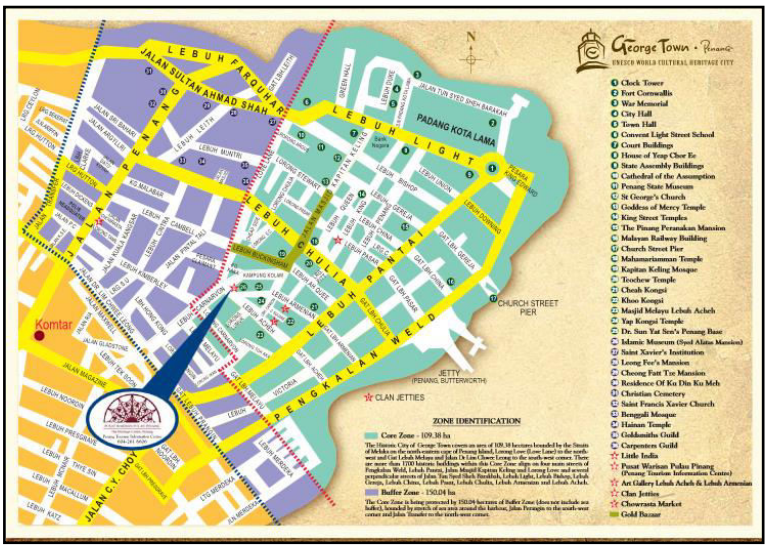
this status, it received about 0.952 million tourist arrival in 2010. The area gazetted under the world heritage site is about 259.42 hectares comprising of 109.38 ha for Core Zone and 150.04 ha for Buffer Zone. Figure 1 shows the core and buffer zones in Georgetown, the World Heritage Site.



Source: Penang State Government, 2014.

Figure 1. *Core zone and buffer zone in WHS Georgetown, Penang and its attractions*

Traffic congestion in Penang and in Georgetown in particular is inevitable. Due to the influx of tourists in Georgetown, the Central Area Transit (CAT) or also known as the MPPP rapid Penang was introduced in 2009. It is an initiative of the Penang Island Municipal Council (MPPP) and Rapid Penang. It operates within the core and buffer zones of Georgetown, The World Heritage Site, to and fro from Pengkalan Weld to Penang Road. It makes 19 stops and runs from 6am until 12 midnight. CAT is an air-conditioned bus and painted with CAT livery for ease of recognition. Its LED panel runs the tag "CAT bus". Bus stops are numbered to assist visitors to identify their location and attractions available within the vicinity (Penang Tourism, 2009). Figure 2 show the CAT Bus route.

Source: Penang Tourism, 2015

Figure 2. *CAT bus route*

Data collection

An audit list is used to carry out the participant observation survey. Only CAT bus service is audited. This is due to its availability along the heritage site of Georgetown. Information on its services is well-known to tourists and placed at various hotels.

The audit list used in this study was drafted using the European standard, EN13816. It consists of eight criteria and twenty eight sub components. The content of the audit list is as shown in Table 5.

Table 5. Content of audit list

Criteria: Sub Criteria	Criteria: Sub Criteria
Availability:	Accessibility:
Modes	External interface
Network	Internal interface
Operation	Ticketing availability
Suitability	
Dependability	
Information:	Time:
General information	Length of trip time
Travel information (Normal conditions)	Adherence to schedule
Travel information (Abnormal conditions)	
Customer care:	Comfort:
Commitment	Usability of passenger facilities
Customer interface	Seating and personal space
Staff	Ride comfort
Assistance	Ambient conditions
	Complementary facilities
	Ergonomy
Security:	Environmental impact:
Freedom from crime	Pollution
Freedom from accident	Natural resources
Emergency management	Infrastructure

The audit was conducted using participant observation. Two different rides on CAT bus were carried out. One was during late morning (10 am until 12 noon) and the other was in the evening (5pm until 7pm). An audit list was used during these rides. The audit was carried out based on compliance to the sub-criteria stated in Table 5.

Result and discussion

CAT bus services are favored by many passengers regardless of whether they are locals or foreigners. This can be observed through the passengers' profiles that board the bus. Although it is meant for tourists, the local also ride this bus too since the bus stops at bus stops nearby. School students also ride on this bus.

It is available one in half an hour. However, information about time interval of the bus service is only available at the hotel if it is provided by the hotel or else it is nowhere to be found. Its route is quite prevalent. It can be found in many tourist brochures. Tourists who board the bus must have prior knowledge on where to stop and where to go once off the bus. On the bus, photos of destination can be seen. These are quite informative. There is an LED information panel in the bus and at the side of the bus.

However, it doesn't give any other information except stating "bus stopping". There is no information on where the bus is heading and where the bus will stop. In addition, there is no announcement made on arrival at any stops or at the terminal which is along Pengkalan Weld.

Two completed audit lists were analyzed. One is for the late morning session and the other is for the evening session. Table 6 shows the outcome of the audits.

Table 6. Audit results

Criteria	Sub Criteria	Audit time: 10am – 12 noon	Audit time: 5pm – 7pm
Availability	Modes	✓	✓
	Network	✓	✓
	Operation	✓	✓
	Suitability	✓	✓
	Dependability	✓	✓
Accessibility	External interface	✓	✓
	Internal interface	✓	✓
	Ticketing availability	N/A	N/A
Information	General information	○	○
	Travel information: Normal conditions	○	○
	Travel information: Abnormal conditions	○	○
Time	Length of trip time	✓	○
	Adherence to schedule	✓	○
Customer care	Commitment	○	○
	Customer interface	○	○
	Staff	○	○
	Assistance	○	○
Comfort	Usability of passenger facilities	✓	✓
	Seating and personal space	✓	✓
	Ride comfort	✓	✓
	Ambient conditions	✓	✓
	Complementary facilities	N/A	N/A
	Ergonomy	✓	✓
Security	Freedom from crime	○	○
	Freedom from accident	○	○
	Emergency management	✓	✓
Environmental impact	Pollution	✓	✓
	Natural resources	✓	✓
	Infrastructure	✓	✓

Results show generally, CAT bus is in compliance with four main criteria and those are availability, accessibility, comfort and environmental impact. In both situations, the services provided by this bus are according to the standards used in this audit. However, on the other three criteria, in both situations, CAT bus service fails to comply with the standards. The said three criteria include information, customer care and security. With regards to time, CAT bus services comply with the time in the first situation but fails in the second one. This is due to congestion at Kompleks KOMTAR and Pengkalan Weld.

CAT is incompliance with availability, accessibility, comfort and environmental impact. This can satisfy commuters. Since the journey is not too long and there are lots to be viewed along the journey, commuters are seen to enjoy the ride. This can be observed from their behavior. It is easily accessible at its designated bus stops. The bus is not crowded and provides comfort that is needed by commuters. Since this bus is an air-conditioned bus, passengers are not exposed to air or noise pollution. Its choke point is at KOMTAR and Pengkalan Weld, where commuters will transit to another destination. This is consistent with studies by previous scholars (Beirão & Sarsfield Cabral, 2007; Paulley et al., 2006).

Four major issues need to be highlighted and measures in overcoming these issues must be laid immediately in order to promote the use of public transportation in day to day activities. First issue is reliability and availability of buses on time and as scheduled. Passengers are sensitive towards reliability and availability of bus services (Liu & Sinha, 2007). Congestion and high passengers' demand can reduce bus service's reliability and availability. This can lead to dissatisfaction among passengers and can have high impact on their future use of bus service.

Secondly is issue related to information provided to passengers. Information is vital to passengers (Balcombe & Vance, 1998). From the audit, information on the bus route is available at the bus stops and also at the hotels. However, when on board of the bus, information on bus route, destination and next stop is not available. Passengers who are new to the bus service need to be caution and on alert all the time while boarding the bus. They also must have prior knowledge on where and when to stop. From the authors' observation, there is a LED panel provided to disseminate information to passengers, however, it was not fully utilized. Therefore, it needs to utilize to enhance passengers' experience in using this bus (Vance & Balcombe, 1997).

Customer care is the third issue. Although using a bus service does not require a relationship with the transport personnel, a friendly bus driver will surely affect passengers' riding experience (Jen & Hu, 2003). From observation, it was noted there is signage on customer care service counter. It is quite difficult to communicate with the unfriendly bus drivers. Experience being in the bus will affect the future riding among passengers (Hine & Scott, 2000; Thompson & Schofield, 2007).

Finally is security issue. Feeling secure is top priority to bus passengers especially among women, be it secure from crime (Eboli & Mazzula, 2009; Newton et al., 2004; Smith, 2008; Wallace et al., 2007) and feeling secure from accidents (Fruin et al., 1994). From observation, it was noted that there is no one monitors security on the bus and the bus was driven in a safely manner.

Summary and conclusions

In this paper, it can be concluded that it is timely for Malaysia to adopt to a standard that looks into and protect passenger's satisfaction on the quality Public Transports. This measure will not only increase public transport users but also reduce congestion and protect the environment. In conclusion, it can be noted that the bus service providers are advised to provide services based on the eight criteria which have been audited in this study. The criteria on availability, accessibility, comfort and environmental impact have to be further enhanced. Issues such as availability of information, punctuality, care for customer and security will have to be dealt with wisely in order to increase high ridership of public bus as one of the measures to alleviate negative impact on the environment and provide a more livable environment.

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