Towards a Sustainable Transportation System for Kuching City

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Sustainable development in the context of rapid urbanisation is important in ensuring an acceptable quality of life and a healthy environment to live in. As the city's economic growth becomes more dependent on the mobility of people and goods, poor accessibility in terms of development and management have often led to several urban traffic problems. These include congestion, air and noise pollution, traffic accidents, excessive gasoline consumption, improper land use, time loss, road rages, and health impact both mentally and physically.

Typically, like many other Asian cities, the major contributor to Malaysian urban mobility issues is the soaring rate of private motorisation. With a low uptake of the public transportation mode, such a trend is much undesired in achieving sustainable urban mobility.

According to the Annual Report of the Road Transport Department of Malaysia [1], the number of registered road vehicles had increased from more than 6.8 million in 1995 to more than 12.2 million in March 2003. Motorcycles accounted for the largest share of the motor vehicle fleet in the country closely followed by cars. Figure 1 shows the share of motor vehicle types in Malaysia as of March 2003. Private passenger cars and motorcycles have been increasing at an average rate of 10% and 4.5% respectively since 2000.

In many Malaysian cities, and Kuala Lumpur is no exception, the public transportation patronage has largely declined in the past few years. In Kuala Lumpur, for instance, the modal split for person trips on the MRR1 using private transport (car/taxi/motorcycle) is 54.3% in 1985, 64.1% in 1997 and 61.1% in 2005, while the share for public transport (bus and, later, rail in 1997) is 37.4% in 1985, 25.1% in 1997 and 28.6% in 2005 [2]. This trend has been forecasted to continue until year 2020, when public transport accounts for only 20% of the total Kuala Lumpur passenger movements as compared to 80% for private transport use [3].

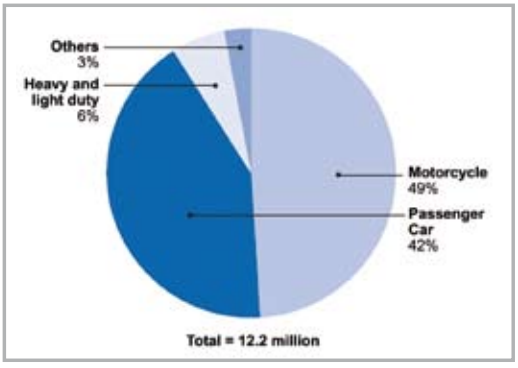

Figure 1: Percentage share of motor vehicle types in Malaysia in 2003 (Source: Ministry of Transport) [1]

A similar scenario is also experienced in other Malaysian cities. In Kuching City, for example, a study conducted by the State Planning Unit reported that public transport ridership share has dropped considerably since the 1990s to a rate of 13.3% in 2005, of which 85% accounts for bus patronage [4]. Simultaneously, the city's traffic volume has steadily increased, with car possession amounting to 0.8 cars per household which strongly justifies the study's findings on the city's average peak hour traffic flow at 20km/hr, and many junctions (roundabouts and signalised cross-junctions) have been identified as the cause of a bottleneck formation that have resulted in long queues and delays greater than 5 minutes.

The study revealed that working and home trips significantly dominate the trips proportion during peak hours (60% for AM Peak and 77% for PM Peak) in which private car use accounted for 65.5% of the mode shares. Additionally, mode share for motorcycle use is 14.7% of the total peak hours trips made. As for school trips, approximately 60% of the total trips is made by cars. Therefore, with an immense dependency on private cars for mobility, it clearly suggests that it is time a Local Transport Plan be implemented to curb the trend in order to achieve a sustainable and integrated transportation system for the city.

INTEGRATED PUBLIC TRANSPORT SYSTEM: BUS RAPID TRANSIT (BRT)

In order to reduce car dependency for mobility options, the public needs to be provided with a comparable mode choice, *i.e.* an efficient and integrated public transport system to private car use as an alternative. With a population of 579,900 (2006 census; Kuching City South–143,500; Kuching City North–133,600; Padawan–3rd Mile/7th Mile/10th Mile–302,800) [5], the BRT appears to be the most suitable and reasonable type of public transport system to be implemented as the primary mode of public transport for the city.

However, implementation of the Light Rail Transit (LRT) at an appropriate time frame also needs to be carefully considered in terms of its construction and operational stages. To make BRT a comparable alternative to attract private vehicle users, BRT services need to be delivered according to the people's needs and their affordability.

Therefore, such a system would require strong government support in the form of political will as well as monetary incentives to partly subsidise the BRT operations in order to ensure reasonable fares are offered together with reliable and comfortable services delivered to public users.

At the same time, effective governance is needed to revamp and implement as well as to regulate, monitor and ensure that the level of services provided by BRT operators is able to meet public satisfaction. In terms of infrastructural support, BRT requires the following new facilities and improvements:

1. *On-road priority for public transport*
   This can significantly improve the reliability and speed of the service to avoid delays while waiting to move back into traffic. Other priorities are special bus turns/jumper lane; bus activated traffic lights, bus lanes, bus ways and etc. This priority has been successfully implemented in many

cities around the globe such as in Curitiba, Taipei, Kunming, Zurich and many more.

2. ***Efficient and integrated ticketing system or speeding up of boarding and exit***
   Provide better ticketing arrangements. For example, open or barrier-free ticketing systems (with sufficient roving inspectors to deter free-riders) can significantly speed up the loading and unloading of vehicles by allowing entry through multiple doors. A daily pass or monthly pass which is integrated among the different operators and other public transport mode, for instance, the LRT, can make the system more attractive.
3. ***'Universal Design' for bus stops and interchanges***
   Provision of facilities that is accessible to all population groups including the frail and elderly, parents with children in prams, people using wheelchairs and people with intellectual impairments. For example, ultra-low floor, articulated and double decker buses can provide benefits in terms of easy access as well as a bigger capacity to cater to a large demand (see Figure 2).
4. ***Attractive and reliable bus scheduling***
   Aiming to attract riders through better, reliable services rather than be content with serving only the existing demand.
5. ***Complimentary Policies***
   Complementary policies such as transit-oriented land-use planning, demand management of private vehicles, pro-pedestrian, pro-bicycle policies and trimmed road building programs to support the BRT system.

Figure 2: Articulated bus (Source: UK bus London)

In 2005, Resdiansyah and M. Raduan [6] conducted a stated preference survey to evaluate the public's perception on the current performance of bus services that serves the Central Business Districts (CBDs) of Kuching City. It was found that comfort was the most significant factor which discouraged the use of buses among city commuters and which failed to attract car users to shift their mode to public transport.

Surprisingly, a significant increase in bus fares appears to be not a major concern as long as the travel time can be kept within 20 minutes per journey and frequency can be maintained at 15-minute intervals [6]. Thus, the findings strongly suggest that the implementation of integrated bus services is highly desired and awaited for the city.

TRANSPORT DEMAND MANAGEMENT (TDM)

One way to attract more people to use the existing BRT system, which has proven to be efficient and reliable, is to make car

use less attractive and more expensive compared with the BRT. Thus, many potential TDM demand policy can be used to support such a goal. Parking Pricing (cost and availability) is one of TDM's policies that can reduce automobile travel especially for working trips.

In Malaysia, the majority of parking spaces for government offices are free or paid by the employer.

Wilson and Shoup (1990) [7] deduced that free parking at work does have a consistent effect on commuter mode choice, whereby it invites commuters to drive to work alone. They suggested that by ending employer-paid parking, the number of solo drivers could reduce by between 19% and 81%, and the number of autos driven to work would reduce by between 15% and 38%.

Significantly, they also found that estimates of the price elasticity of demand for solo driving range between -0.10 and -0.68, which means that as the after-subsidy price of parking is doubled, solo driving is likely to decrease by between 10% and 68%. In a later study, Washbrook (2002) [8] also discovered a negative correlation between parking pricing and travellers mode choice, whereby a US$3 increase in parking fee reduced the probability of driving to work alone by about 10% (which simply means that 10% of private car users would shift to carpooling or use public transport).

A similar study to measure travelers' perception on the parking pricing scheme was conducted at Satok Area (one of Kuching's CBDs). The findings suggested that with a considerable increment of parking charges as well as limited parking availability, commuters would change their travel behaviours (shift mode to public transport and changing time of travelling) [9].

However, a fairly low number of shopping and leisure commuters would not respond similarly when subjected to the same parking pricing conditions, instead, preferring to change their destination, time of travelling and cancel their trips as a result. Therefore, the parking pricing should be devised meticulously and used as one of the TDM strategies to mitigate urban congestion at Malaysian CBDs. Other effective and potential policies include limiting car ownership per household and staggering working hours.

On the other hand, the provision of bus lanes with a proper enforcement system can also be used as the Heavy Occupancy Vehicle (HOV) lane. Such a strategy can promote more car sharing, and thus reduce Single Occupancy Vehicle (SOV) during peak hours.

CONCLUSION

Rapid motorisation has become such a common phenomenon in Malaysian cities that it has caused many problems associated to urban mobility such as congestion and air pollution. To reduce private car dependency, an efficient and integrated public transportation system (particularly the BRT), which is comparable to private car usage, should be provided to public users as an alternative mode.

In addition, the implementation of TDM policies is seen as a must in order to support the public transport system and, at the same time, make car use less attractive and more expensive. This includes parking pricing, limitation on car possession per household and staggering working hours. A shared lane between buses and HOV is also identified as a crucial measure to reduce SOV on the road during peak hours. ■

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