

# **PRESENT(ING) FUTURES #2: THE FUTURE OF MOBILITY**

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## **SINGAPORE- CHALLENGES AND IMPROVEMENTS IN URBAN MOBILITY**

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**SUMMARY**

Mobility is key to livelihood and functioning of our liveable & sustainable Singapore. An efficient people-mover system is the backbone of urban planning. In the anticipation of population growth and demographic changes, transport planners should adopt a long-term appreciation of transportation issues. Envisioning ahead, Land Transport Authority (LTA) Singapore is poised with the challenge to develop an integrated and sustainable transport system that meets the diverse needs of its burgeoning population. In the way forward, the key challenges of ensuring a sustainable and people-centric transport system exists on the premises of harnessing the capabilities of info communication technologies, factoring resiliency into infrastructure planning, retrofitting existing urban infrastructure to promote cleaner commuting modes and developing innovative urban infrastructure timely to respond to the people of all age groups. The essay discusses the mobility system for the future which possesses new challenges and opportunities in the form of adapting to electric/autonomous/shared mobility. The key areas discussed here will help Singapore plan ahead for policy making and development of transport strategies to prepare for the future.

## SUSTAINABLE & SEAMLESS MOBILITY

The Land Transport Authority's land transport master plan 2013 highlights the expansion of MRT network to 360kms till 2030, which will improve much of the connectivity and bring in people more closer to the MRT network, 8 in 10 households (LTA, Annual Report , 2014/15). In line with the Singapore's broader aim to be a liveable and sustainable city, it is important to continue investing in non-motorized modes of public transport. There have been concerns over the first and last mile connectivity in Singapore and it has been a challenging situation now for few years in its overall transport system.

*“The most sustainable places to live are those places that have multi-modal transport systems. You can't be global competitive city if you don't have a robust transport network”* (Robert Puentus, 2015)

Providing people with options of multimodal transport modes is important for a sustainable mobility. If Singapore has to be car-lite, walking and cycling should be regarded as important mobility options that go beyond the narrow remit of transport to contribute to the community well-being and resource efficiency. Hence, complimentary initiatives pertaining to policy controls and soft measures should be factored into planning considerations. There is a strong need to provide active mobility amenities to make it a seamless travel. It requires upgrading the infrastructure, complimentary amenities such as showers and lockers at bike stations which could be introduced for cyclists to freshen up at arrival destinations. Thus, having the right infrastructure embedded into the urban system would enhance the attractiveness of these commuting modes, which caters mainly to the first and last-mile commute from home, workplace to major transport hub. Measures pertaining to providing more conducive walking pavements by widening footpaths and providing resting points would promote active mobility on foot. To resolve the safety to cyclists on the road, comprehensive cycling paths should be designated to ensure a healthy balance between pedestrians, cyclists and road users. Additionally, there should be sufficient parking facilities at transport nodes and surveillance measures to safeguard private ownership in the future.

## **DEVELOPING TRANSPORT INFRASTRUCTURE TIMELY TO MEET DEMANDS OF A DIVERSE POPULATION**

A rapidly increasing population exerts pressure on the existing transport infrastructure development. In the longer term, there are planned MRT lines pertaining to the Downtown Lines, Thomson East Coast Line and North South Line extensions to augment the increasing travel demands of an expanding population. To mitigate the incapacity of existing network, intermediately mitigation measures such as providing additional bus services as well as peak hour shifting and diverging could be taken to alleviate traffic burden, bus service enhancement program (BSEP) is one of the good initiatives in this regard. On the private transportation sector, the foreseeable challenge of ingrowing road length contrasted with growth of car population requires policy rethinking. While there exist congestion charges via electronic road pricing and vehicle quota system in place, there is a need for more judicious and prudent policies to curb car ownership. In the stance of distributive justice, it is pertinent to consider policies such as restricting car ownership per family. While it is recognized that there is a massive desire in individual mobility, it is necessary to combine the demand for personal mobility with sustainability. In response, public transportation should be viewed as a viable option to private cars.

## **CHANGING DEMOGRAPHICS AND EXPECTATIONS**

Like many other developed countries in the world, the population of Singapore is also ageing and it is a challenge for transport sector to meet the demands of changing demographics. Connecting people with good transport linkages will make communities stronger. In the future, there will be strong demand for providing safer, easily accessible and a transport that takes into account the needs of elderly, person with disabilities and others to account for diverse needs for the people of Singapore.

From the perspective of evolving demographics, the impending silver tsunami requires design of barrier-free accessibility particularly for public transportation. This relates to installation of ramps and lifts for wheelchairs users at strategic points of access proximate to transport hubs and bus stops. These measures would enhance the mobility of the elderly population and increase accessibility to affordable transport modes.

## **ELECTRIC MOBILITY- DECARBONISATION OF URBAN TRANSPORT**

In a highly developed society like Singapore, the demand is more likely for a door to door service and it is expected to grow more in the future. The past few years has seen a significant demand for the electric vehicles in cities globally. The car makers are already in partnerships to bring the electric vehicles and autonomy to cities at a fast pace than before and in the future will affect significantly. It has been discussed before, Singapore can be an ideal situation to such adoptions given its land size, it doesn't have distances too long to travel. A feasibility report by Energy Market Authority (EMA) & Land Transport Authority (LTA) suggests the average distance travelled by Singaporeans is about 46kms which is well within the range of EV's average of 156kms (Jianyue, 2014). It also supports the idea of smart city initiative by the government, and thus Singapore can be a model for such major changes to the urban mobility in the future. To embrace progressive urban living, transportation planning should factor in the needs of electric vehicles, and explore the possibility of self-piloted cars in the longer term. Currently, BlueSG has been implementing the nationwide car sharing programme for operation of 1000EVs along with more than 2000 charging stations island wide by 2020. (Padmakshi Rana, 2016) However, it is critiqued that supplementary measures which include reducing barriers to entry in terms of cost and accessibility, should be introduced to channel demand for the take-up of carbon-neutral vehicles. This relates to providing on-site charging stations and discounted parking rates for new-generation electric powered vehicles.

With the rising popularity of electric vehicles, there has been a slow progress catering to such high demand. Also, the subsidies provided by the government is not significant enough to attract the buyer to shift to such sustainable modes, thus government needs to rethink on how to make it more attractive for people to use such vehicles. It is understood the initial fixed cost of the electric vehicles is the battery, but if these electric cars are used as shared/taxis in Singapore the km travelled by them can be more cost competitive as the cost of electricity is still cheaper than fuel and it requires less maintenance.

## **FROM SHARED MOBILITY TO SHARED AUTONOMY**

*There's a clear trend already forming that car ownership will decline across cities and megacities in the future. There's also a convergence around the idea of paying for a trip, not for a car, which represents a considerable change in consumer behaviour” (Kate Roberts, 2016)*

Singapore has big aspirations to be a leading smart, sustainable and liveable city. To achieve these aspirations, the government aims to develop an innovative society and export the solutions in the Asian region and beyond (Kiong, 2016). As there are growing number of shared cars on the roads of Singapore with the likes of services from Uber, Grab and others, Singapore is likely to move soon to shared autonomy which will eventually avoid the current labour coast of the on demand service and might change the whole scenario of driving and owing a car thus affecting the fuel and energy consumption.

### **Singapore as a ‘Living Laboratory’ and Test Bed for Autonomous Vehicles**

The future of autonomous vehicles is already established in Singapore with the likes of nuTonomy, Delphi, Beeline and others. It is understood that along with the cars, government is also looking to speed up the launch of the autonomous buses, recently announced (Reuters, 2016). This will enable to bring down the potential cost savings, time and labour cost for the user with more innovations lined up. The driverless and travel on demand mobility services is all set to challenge the car ownership and the flow of these driverless cars on the streets may cause a nightmare. Tapping on to the ICT technologies across the island, presence of sensors and smartphone users, it can transform the mobility in Singapore by serving as a service rather than owning it.

## **HARNESSING ICT CAPABILITIES FOR TRAFFIC MONITORING AND INTELLIGENT CONTROL**

In tandem with the greater national directive of developing a Smart Nation, the tapping of information communication technologies for transportation planning is veritable in the milestone achievement of My Transport mobile application. Commuters are able to plan their travel more efficiency by having real-time updates for bus and train arrival information. The development of a world-class

transportation infrastructure entails the provision of information in allowing commuters to make informed decisions. Hence, signage, information systems, displaying timing of bus arrivals could be installed at respective bus stops and information could be accessible via mobile applications. Hence, the service reliability of bus operating system could be enhanced through ensuring timely bus arrivals to develop a more efficient travel system for commuters.

**Table 1. The 4 focal areas for Information Technology System (ITS) vision**

<b>INFORMATIVE</b>	<b>INTERACTIVE</b>	<b>ASSISTIVE</b>	<b>GREEN MOBILITY</b>
High Quality Transport Information to meet diverse needs	Enhanced Traveller Experience	Towards a safe and secure roadway environment	Towards a Sustainable and Environmentally Friendly ITS

Source: (Land Transport Authority and Intelligent Transport Society Singapore, 2014)

To enhance personal mobility for private cars, optimal journey could be achieved through ICTs capabilities by allowing drivers to make informed decisions about their routes and where they will be able to park their vehicles through installation of ground sensor. Additionally, traffic information could be attained by installing road sensors to detect traffic conditions and presence of vehicle breakdowns. A large part of sustainability is focused on achieving efficiency. Also, to avoid crowding and disruptions the old system and infrastructure needs to be upgraded without disrupting the current system which is a huge challenge for authority for short term. Intelligent control and safety technologies should be employed complimentary to initiatives such as car sharing and journey sharing. Over the next few years, there will be need to upgrade the infrastructure to enhance the vehicle to infrastructure(V2I) intelligent transport system, along with vehicle to vehicle (V2V) technology, which is slated to be the future for mobility to be more interactive and responsive. (Mckinsey & Company, 2016)

## **CONCLUSION**

Discussed here in this essay are few of the challenges faced by Singapore`s transport system, but it is also remarkable to know that Singapore is preparing itself to be a car-lite society and has tremendous

future plans to provide people of Singapore with better quality of services. As a thriving global city, it is critical to develop a people-centric transport system that enhances the attractiveness and reliability of services to travel around more efficiently with different options at an affordable cost. The transport authority needs to work more closely in consultation with people to know the user demands early and meet up with their expectations over time to help them serve with a more interactive, improved mobility system and responsive enough to adapt to the new technology inventions to stay ahead. Thus, implementation of punitive measures that support the development of an integrated and sustainable transport system are vital to meet the diverse commuting needs of its residents.



<b>SEAMLESS MOBILITY</b> <i>Multimodal transport options to serve the people of all age groups</i>	<b>SHARED MOBILITY</b> <p>More shared vehicles to be deployed on the roads.</p> <p>Electric cars to be more popular and to be used as shared mobility, due to the capacity of travelling more than 150km at one charge.</p>	<b>SELF DRIVING CARS</b> <p>With the development of self-driving cars, together with shared mobility, there can be a competition between private cars and public transport.</p>	<b>ELECTRIC CARS</b> <p>People will tend to travel more, this will enable to bring the electric vehicles for cost reduction with cheaper and easily available batteries.</p>	<b>EFFECTS/ CHALLENGES</b> <p>Infrastructure will be required to upgrade to sync with the 3 options for future mobility.</p> <p>Charging stations, Drop offs, smart sensors.</p> <p>Singapore will need to look for more efficient and productive renewable energy resources to support the mobility as demand for electricity increases.</p> <p>Self-driving cars will require mega upgradation in ICT sector and applications related to Internet of Things (IOT). There will also technological improvements for Vehicle 2 vehicle and vehicle 2 infrastructure communication.</p> <p>Personal Mobility Devices poses a challenge to people's safety and requires to set clear and consistent rules, public education and their adoption.</p>
	<b>PUBLIC TRANSPORT (MRT &amp; BUS) AS A BACKBONE</b> <p>Extension of MRT network to 360kms will bring in more people close to public transport along with providing mobility for 6.9 million or more residents by 2030.</p>			
	<b>WALKING</b> <p>Upcoming new MRT stations and covered walkways will bring people much close to mass transit, thus encouraging walking in Singapore for short distances.</p>	<b>CYCLING &amp; PERSONAL MOBILITY</b> <p>Cycling paths and development of cycling routes in towns will give people an option to switch to non-motorized transport for first &amp; last mile connectivity. Upgradation of walkways and cycling tracks will allow people to use their Personal mobility devices more easily.</p> <p>Pedal assisted electric bikes can be deployed in the cycling towns.</p> <p>Bike sharing program can encourage more people to take bicycles for short trips.</p>		

Source: Author's compilation

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