A Review of Public Transportation System in the City Centre: Comparative Study between Kota Kinabalu and Changsha City Centre

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Abstract- ***This article compares the urban public transportation systems in Changsha and Kota Kinabalu. Both cities are critical economic cities in their region. In the following article, the comparison of public transport, its facilities, and management are made. The target vehicle is bus. We analyzed the type of bus, convenience and comfort, and the characteristics of green intelligence. In addition, this article also compares e-hailing operation management mode, service type, technical support, and customer satisfaction. Comparisons of traffic management between two cities are carried out and the suggestions are given to solve the problems faced. The result shows that the technology in Kota Kinabalu is in behind of Changsha which the transportation in Changsha produce less environmental pollution, more comfortable for the passengers and more convenience because of the use of electronic system. In the end of the article, advice and improvement measures for the shortage of the Kota Kinabalu transportation facility system relative to Changsha City are provided.***

Indexed Terms- ***Public Transportation System, Public Transportation Vehicles, E-hailing, Transportation System Management, Transportation Facility***

I. INTRODUCTION

With the development of the urban economy, the continuous development of scale and the continuous improvement of people's living standards, the traffic pressure of large and medium-sized cities are rising. As an integral part of the urban system, the urban public transport is truly important. Urban public traffic is vital as it influences the development of the city and the quality of life [1].Therefore, the urban public transport system should provide better traffic flow as the imbalance of the urban public transport system will have a detrimental impact on the country's economic and social development.

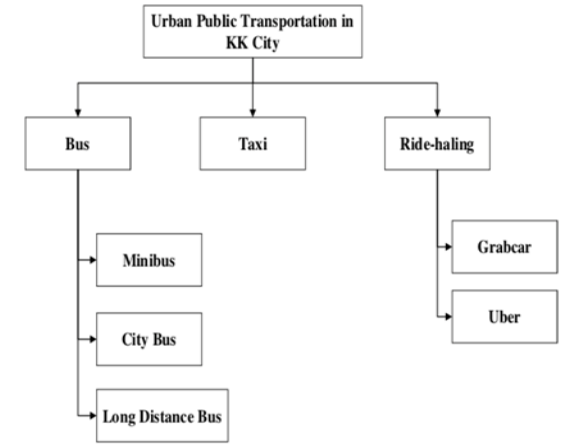
Changsha and Kota Kinabalu are the examples of urban cities as these cities are the capitals of the province or state. With the development of economy, the population of the city centre is proliferating, and the demand for transportation is getting higher and higher. The government of China had paid attention to the development of the public transportation in order to solve the traffic problems [2]. As a provincial capital and a tourist city, Kota Kinabalu and Changsha have similar needs and problems in transportation.

Both cities implement public transportation to solve their needs and can contribute to the urban development. In addition, public transportation brings many benefits. The passengers can relax as they do not need to drive and can chat with others in the vehicle. Besides, the public transportation produces less pollution to the environment and less cost to the passengers [3].This article is aimed to compare the public transportation system of Kota Kinabalu and Changsha City for urban public transportation vehicles, public transportation facilities and public transportation management to find out the problems and give suggestions.

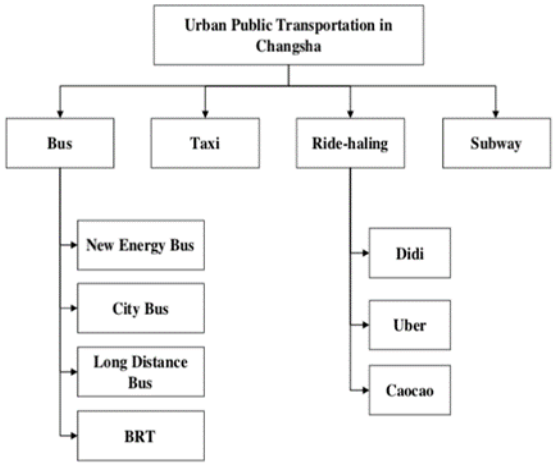
In addition, this article will briefly explain about the E-hailing system in Kota Kinabalu and Changsha. Nowadays, both Kota Kinabalu and Changsha start to use E-hailing which the most famous mobile application of transportation service in Malaysia is Grab while in China is DiDi. Both app allows the users to make the payment easily and to get the transport via online platforms. Most of the users agreed that this electronic system is usability [4].

II. URBAN PUBLIC TRANSPORTATION VEHICLES

The bus system of Kota Kinabalu city and Changsha City is slightly different.



(a)



(b)

Fig 1. Urban Public Transportation in KK City (a) and Urban Public Transportation in Changsha (b)

From the figure 1, we can understand the buses of the two cities are different in type and there are many types of buses in Changsha. Changsha has subways, urban light rails and BRT to be used.

A. Types and Difference of Buses

Vigorously developing public transportation and promoting the uses of public transportation are the most critical ways for cities to solve traffic congestion problems. Overall, the type of buses are generally similar, and the city bus has the greatest impact on people's daily commute

The next part will discuss comparison of the types of buses, convenience and comfort, and green intelligence.

The types of regular buses in Kota Kinabalu and Changsha city centres are almost the same. Those are regular buses, airport buses, coaches, and express trains. Among them, the difference is considerably large. The overall type of bus in Changsha is like the city bus of Kota Kinabalu. It is large in size and has a large passenger load. The bus of Kota Kinabalu is mainly mini-bus with a capacity of 16. The number of bus passengers in Changsha is about 46.

(a)

(b)

Fig. 2. Mini-bus in KK City (a) and New energy bus in Changsha(b)

The most notable differences between the buses in the two cities are: 1. Changsha City has planned to construct 7 rapid transit routes. The main body and decoration of the first express bus line in Changsha has been basically completed, but it has not yet been put into use; 2. Changsha's buses are being upgraded to new energy vehicles. The replacement of electric vehicles in the past is expected to be replaced by clean and clean new energy vehicles in 2020.

B. Convenient and Comfortable

At Kota Kinabalu, they still employthe traditional carrier model. Buses travel along fewer lines and require passengers to wait for their carriers at a small number of stations. Passengers cannot know in advance the arrival time of the vehicle, and the waiting time is very unpredictable. At the same time, tickets can only be bought by cash, not credit card or electronic payment, which is not so convenient compared to other cities. The mini-bus has a small cabin space, becomes s quite stuffy without air conditioning. It does not meet the requirements of the modern bus system and makes passengers feel very uncomfortable.

Citizens and tourists in Changsha can take the bus and subway to most of the destinations.Taking a private taxi or car is not the main option. Changsha buses can use bus cards or electronic payment to avoid the trouble of forgetting to bring money. When the temperature reaches a certain level, air conditioning is used in the car to provide more comfort to the passengers.

C. Green Intelligence

KK's buses are traditional vehicles burning fossil fuels which cause pollution. At Kota Kinabalu, buses face a big operational problem with regards to the line and route. The use of electronic systems and the Internet can be used by the passengers and enable them to know the information of vehicles in advance which can increase the use of buses by citizens and tourists and is helpful to the development of public transportation.

85% of buses in Changsha are using new energy vehicles, and it is planned to use new energy vehicles in 2020 in response to the green development concept.The information or status of the bus in Changsha can be obtained through the mobile app and the payment can be done online by using the app.

D. Problems and Suggestions in Kota Kinabalu

1) The number of bus stops is limited, and bus routes and operating hours are not clearly defined. After the actual investigation, the number of stations should be significantly increased, and the operation route and time of the relevant lines should be displayed to facilitate the public and tourists to understand and use.
2) Vehicle models are old, and the facilities are outdated. New energy or green energy vehicles should be used to reduce environmental pollution. Update the equipment on the bus, such as air conditioning, to cater passenger comfort.
3) Buses operate traditionally without electronic payment technology and disconnected. Install the appropriate smart facilities to connect the bus system to the Internet. Apply intelligent bus systems to facilitate people's travel and maximize the use of existing road systems.

E. Problem and Suggestions in Changsha City

(1) During the holiday period, the traffic volume is enormous, and traffic jams are severe. The construction of intelligent transportation should

be strengthened to solve congestion in particular situations.

(2) Speed up the update of clean energy vehicles and reduce environmental pressure.

(3) Pavement construction seriously affects regular traffic and needs to be solved.

III. CHINA AND MALAYSIA E-HAILING SERVICE COMPARISON

A. China E-hailing

DiDi, a well-known Chinese taxi platform, has grown from taxi software to a one-stop travel platform covering taxis, private cars, express trains, drivers and buses. The DiDi app has changed the traditional method of taxi service and established a modern way of travel for users in the era of big mobile internet. Instead of traditional telephone call and roadside hailing, DiDi taxi has changed the traditional taxi market, transformed the concept of roadside hailing, and used the advantage of mobile internet to integrate its users both online and offline. The price of a DiDi taxi fare fluctuates around a standard price in combination with specific factors such as driving, road conditions, and waiting time.

Fig.3.Economic values of DiDi

In order to implement the company's vision of "To Redefine the Future of Mobility", DiDi has established a professional, scientific, rigorous and transparent responsibility management system “to fulfill our social responsibilities, creating social values for investors, the government, employees, drivers, passengers and partners, and promoting the sustainable development of the society”.

DiDi has been improving the safety of transportation by technology. Adhering to the philosophy of "Safety First", the entire process of a request on the DiDi platform is automatically executed and protected through its enhanced safety protection system. Also, DiDi has launched user safety functions and collaborates with government agencies. By intensively applying advanced technologies including internet and big data, DiDi significantly outperformed traditional transportation enterprises in security management through profiling drivers, filtering irregular orders, accurately training and managing drivers, and carrying out extensive safety education.

DiDi officially launched the Safe Driving System (SDS) in July 2017. With the SDS, the platform can identify drivers' dangerous driving behaviours through GPS, gyroscope, and other built-in sensors within the smartphones. In the case of erratic driving behaviour, the SDS will trigger, and a warning message will be sent to the drivers and warn them to drive safely. The new system makes DiDi the first on-line car-hailing company in China to put the technology into practice. What is more, DiDi is the pioneer in spurring drivers to enhance safety awareness and providing passengers a safe riding service.

Future urban transportation will surely develop towards a comprehensive smart system. Accumulation of massive transportation data provides a basis for DiDi to participate in building the future smart transportation system. We cooperate with urban traffic administrators and build a smart traffic system featuring smart travel, smart regulation, smart operation and smart decision-making based on the "Internet + traffic big data", which will help urban traffic departments master traffic patterns, improve traffic management and meet people's transportation needs.

B. Malaysia E-Hailing

GrabCar was launched in Malaysia in 2012. By 2015, the GrabCar app has been downloaded by 4.4 million people, with an average of seven bookings every two seconds, and today 13 million people have downloaded the app in more than 30 cities including Malaysia, Singapore, the Philippines, Vietnam,

Indonesia and Thailand. GrabCar operates 24 hours a day, and it promotes the flow of people, a role that is more pronounced for urban residents. GrabCar combines supply and demand, starting point and destination, driving and other factors to determine the fixed travel cost by the vehicle system calculation.

Fig.5. Quick user guide of Grab

Comparisons of the E-hailing operation have been made in Malaysia. Based on the figure below, it shows that the most applicable system in Malaysia is in Klang Valley about 66%, compared to Kota Kinabalu, it only contributed approximately 6% out of 100% in Malaysia. The Malaysian Communications and Multimedia Commission (2017) found that smartphone usage in Malaysia increased dramatically from 12.0% in 2011 to 75.9% in 2017.

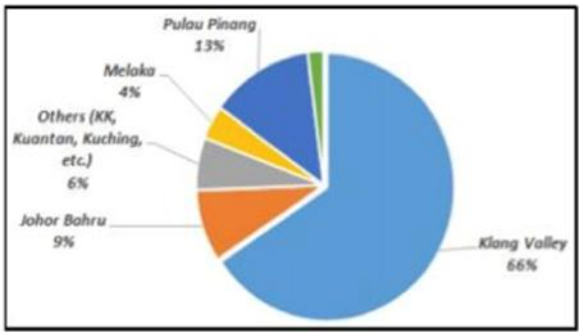


Fig 4. Proportion of Grab users

Grab's mission is to develop a good source of income, enhance safety, provide passengers with smooth and comfortable travel services, and address the imbalance between demand and supply of existing public transportation inefficiencies. Grab is also part of the "sharing economy", which enables fast payment and service delivery. Even if the two parties are unfamiliar with each other, passengers and drivers can verify identity and reputation to enhance travel security. The Grab app has many features in providing transportation services to customers.

It has to be kept in mind that Grab is a service that moves cars from one point to another, and it affects the total numbers of cars on the road. When the demandincreases, the number of cars also increases on the road. As a result, traffic congestion will affect the inhabitants' livelihoods, especially from the environmental and psychological aspects of the population.

Grab has always prioritised safety at the top of the platform development. On June 26, 2018, Grab completed the setup of all driver self-timer authentication functions in Singapore. Before the passengers book a ride through the Grab app, each of the standby drivers has passed the three-step self-timer authentication function twice a day. If the verification fails, the driver will not be able to carry out the follow-up work. This function strictly controls the identity of the driver and blocks the mismatch between the vehicle information and the driver's identity. For security reasons, Grab has introduced innovative features such as "Share My Ride" and "Hide Mobile Number". Passengers can share their itinerary information with friends and family, and the phone numbers of drivers and passengers are hidden for privacy purposes. Also, Grab offers an emergency S.O.S functionality in every country involved in the business, making it easy for passengers to alert when they are in danger.

IV. DISCUSSION AND CONCLUSION

Both cities are facing common problems in the management of transportation systems: too many cars, too few roads, and imperfect public transport systems.

In response to the above-mentioned traffic system management problems, the government choices for both Kota Kinabalu and Changsha City are the same. They are all vigorously developing the public transportation system, controlling the travel of private cars, implementing the preferential policies of public

transportation, and advocating people to take public transportation as the primary travel way.

It was discovered that in Kota Kinabalu, the primary mode of transportation is via cars. Compared with Changsha, the facilities are regressive, and the public transportation system is underdeveloped. In efforts to solve the traffic congestion and improve the efficiency of public transportation, both cities has implemented an intelligent taxi system, however, in Changsha, the public transportation network is more developed as compared to Kota Kinabalu.

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