Sustainable Urban Public Transportation: A Case Study of Chongqing Municipality

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Abstract

This research paper represents a study of the incredibly dramatic urban growth Chongqing City has undergone with special focus on Passengers’ satisfaction on Urban Public Transport. Depending on how well it is planned, handled, managed and administered, urban transportation has both merits and demerits. The aim of the research is basically to figure out the principal processes of urban transportation in Chongqing, identify the major impacts it poses not only on the lives of the urban dwellers but also on those who are living in the peripheral areas and finally draw some plausible and effective remedies to tackle the inevitable adverse effects of transportation, thereby ensure sustainable, smart, walkable and livable city where all of its residents enjoy a comfortable life. Realizing the importance of a fairly balanced development and equitable distribution of resources among rural and urban dwellers, the researcher has also endeavored to find out whether or not the rural dwellers have benefited from urban public transportation. The study has also attempted to find out the mechanisms employed by the local and central governments to alleviate the problems induced due to urban transportation and the concerted effort exerted to maintain a sustainable urban-rural development without jeopardizing the interests of the future generation.

The research methodology employed includes gathering relevant data using questionnaires, interviews and in-depth case studies, focus group discussions and participant observation. The research methodology used to select the key informants including students, teachers, common people (that is civil servants) and government officials random stratified sampling. The researcher has also reviewed a great deal of relevant secondary data sources such as books, journals, internet etc. Data analysis was made with the help of SPSS and SWOT analysis wherever applicable. The results of research work indicated that owing to the promising social service provision opportunities, the city acted as a huge magnet in attracting the desperate rural migrants. Besides, Chongqing being one of the industrial, urbanized and motorized cities is vulnerable to congestion, pollution and socio-economic problems. The most important conclusion that can be drawn based on the results described in this paper is that sustainable urban public transportation and intergenerational equity can be easily achieved through modal integration and demand management. In addition, the skyrocketed urbanization and motorization growth rates of China have partly strained the urban transportation infrastructures, caused urban traffic congestion and worsened the urban air quality. Even though Chinese urbanization in general and the overall development of Chongqing in particular have been flourishing at a very rapid rate and great deal of the citizens have benefited tremendously, inequalities between rural and urban dwellers are an order of the day.

Keywords: urban public transport, livable city, modal integration, intergenerational equity, pollution, congestion

1. Introduction

General Introduction to the Study

The rate of urbanization is accelerating dramatically in both developed and developing countries. My great desire and passion in urban and regional studies with special interest on urban transportation, emanates from the life experience I have had in my hometown, Asmara (Eritrea) as well as a more recent observation in

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Chongqing and other cities in China. These urged me realize that the infrastructural development of many
cities often lacks an all-inclusive and systematic knowledge with respect to sustainable urban planning, design
and maintenance.

“Cities, like dreams, are made of desires and fears, even if the thread of discourse is secret, their rules are
absurd, their perspective deceitful, and everything conceals something else” (Italo Calvino, *Invisible Cities*,
1972). This brilliant expression reminds us that urban areas whose bright lights act as a powerful magnet to
attract the residents into their hearts, are made in order to meet the insatiable human desires (both basic and
luxurious needs) and while doing so unless carefully planned, managed and governed, the plights and miseries
could be considerable. Urbanization brings a number of opportunities as well as challenges such as population
pressure, environmental pollution, traffic congestion, emergence of squatter settlements, social vices and so
on. The incompatibility of the physical and social infrastructures with rapid population growth mainly
instigated due to rural-urban migration results in a debilitating urban life. Urbanization is a dynamic process
by which urban areas are transformed in terms of physical size, urban functions and the number of inhabitants
among other things. The driving forces for urbanization include the movement of relatively poor rural dwellers
into richer urban areas in search of better living standards. These migrants are seduced by the perceived or
actual opportunities rendered by towns and cities. They are looking for better secured jobs so that they either
support the families they left behind or they even relocate into the urban areas permanently abandoning their
place of birth if they get what they anticipated. These pull factors urge a huge number of young and
 economically active force to leave behind the agriculture-based rural areas, their beloved ones, the soil they
were born and grew up in and many more things. Hence, many of the rural areas are left with aged people,
women and children who obviously need support desperately.

The Study Area

**Nature and Geography of Chongqing**

Geographically, Chongqing is located at latitude 28° 10' to 32° 13' N and longitude 105° 17' to 110° 11'
E, at the transitional area between the Qinghai-Tibet Plateau and the plain on the middle and lower reaches of
the Yangtze River in the subtropical climate zone swept by the moist monsoon. The average annual temperature
is around 18°C, with the lowest winter temperature averaging between 6°C and 8°C and summer temperature
averaging between 27 °C and 29 °C. It has a total annual sunshine time of 1,000 to 1,200 hours. It has mild
winter, hot summers, long frost-free periods and ample rain, as well as warm, wet and cloudy days, with rain
and heat occurring in the same season. It has an annual rainfall of 1,000 - 1,400 mm. It often rains at night in
late spring and early summer, and thus the city is famous for its "night rain in the Ba Mountains". The land
under Chongqing’s jurisdiction is 470 kilometers from east to west, and 450 kilometers from north to south. It
borders with Hubei and Hunan provinces in the east, Guizhou in the south, Sichuan in the west and north and
Shaanxi Province at its northeastern corner (Chongqing@supercity.com.cn).

On March 14, 1997, Chongqing became China’s fourth municipality directly under the Central
government. Unlike the other three municipalities of China that is Beijing, Tianjin and Shanghai, Chongqing
is prominently featured as China’s only dual economic (rural and city) municipality.

Chongqing is described as one of the largest inland cities endowed with roaring rivers and towering
mountains. It is also referred to as a “mountainous city”, surrounded by the Daba Mountains in the north, the
Wushan Mountains in the east, and the Wuling Mountains in the southeast and the Dalou Mountains in the
south. The whole area slopes down from north and south towards the Yangtze valley, with sharp rises and falls.
Typical karst landscape is common in this area, and stone forests, forests of peaks, limestone caves and valleys
can be found in many places. The Yangtze River runs through the whole area from west to east, covering a
course of 665 kilometers, cutting through the Wushang Mountains at three places and forming the well-known
Three Gorges: the Qutang, the Wuxia and the Xiling gorges. Coming from northwest and running through "the
Jialing Lesser Three Gorges" of Libi, Wentang and Guanyin, the Jialing River joins the Yangtze River in
Chongqing (Chongqing@supercity.com.cn).
Nicknamed as “Shan Cheng/山城 or the city of mountains and hills”, Chongqing is endowed with diverse breathtaking geographical and natural features such as alluvial plains, valleys, gorges, waterfalls, fountains, hot springs, roaring and meandering rivers and dense forest covers.

Figure 1.1: Location of Chongqing Municipality in China


- **Population of Chongqing**

  Han(汉族) is the dominant ethnic group inhabiting Chongqing municipality. In addition about 49 ethnic minorities including the Tujia, Miao, Hui, Man, Yi, Zhuang, Buyi, Mongolians, Tibetans, Bai, Dong, Uygur, Korean, Hani, Dai, Lisu, Va, Lahu, Shui, Naxi, Qiang and Gelao are also sparsely settled in Chongqing. These minority groups constitute for 1.75 million (5.6% of the total Chongqing’s population) out of which the Tujia alone account for 1.13 million followed by the Miao whose number reaches 520,000. The Miao are found mainly in the five autonomous counties of Qianjiang Development Zone and Fuling District. The minority groups have their own traditions. The Tujia are known for their peculiar baishou dance, Spring Festival, the Nuo Opera (a kind of drama featuring masked dancing) and Festival Lantern. Whereas the Miao people have traditions as Ganqiu Festival (to celebrate harvest in autumn), Caishan Festival (asking for blessings from God), Yangma Festival (to remember the contribution of sheep and horse), Huoxin Festival (gathering for establishing regulations), crying marriage and funeral dance. Besides, the Tujia and the Miao are famous for their suspending buildings and wax printing respectively. The various norms, values, traditions and customs of the minority groups coupled with the sharply increasing transportation infrastructure have immensely contributed for Chongqing to be an important tourist destination.

  Even though they are widely spread all over Chongqing in small numbers, the Miao(苗族) and the TuJia(土家族) are predominantly found in the autonomous counties of Chongqing such as Pengshui, Shizhu and Youyang. In addition to mandarin Chinese language, they also have their own local dialects.

  With about 50 of the 56 ethnic groups living and working together tolerating each other’s differences, Chongqing is one of the cities that have successfully maintained unity in diversity.

- **Administrative Divisions of Chongqing Municipality**

  The 82,400 square kilometer of Chongqing’s territory is divided into 40 administrative districts, counties and autonomous counties. This includes 19 districts, 17 counties and 4 autonomous counties (Chongqing@supercity.com.cn). (For further information refer to Appendix I)
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Figure 1.2: Districts, Counties and Autonomous Counties of Chongqing
Source: (Chongqing administrative map. Retrieved from www.bing.com)

Research Objectives

The main objective of this study is to understand the urban transportation growth patterns and trends of Chongqing, to draw lessons on how to better manage the spatio-temporal dynamism and implement sustainable urban transportation while at the same time protecting and preserving the very delicate physical environment.

The specific objectives of the study include:
- To identify the complex processes of urban public transportation
- To enumerate the major urban transportation related problems and figure out the causative agents, impacts and the plausible measures taken by concerned authorities in tackling those problems
- To figure out the relationship between urban transportation and other sectors
- Find out the main challenges and opportunities of urban public transportation in china in general and Chongqing Municipality in particular.
- To identify and evaluate the trends of urban public transport
- To understand whether communities in Chongqing are genuinely empowered in an effort to combat urban transportation problems
- To come up with some ideas, potentially of practical solutions to the problems related to urban transportation

Significance of the Study

Urban transportation is a transformation process, which poses immense impact upon the livelihood of human beings and the physical environment. Transportation, which is considered to be an inevitable component of any economic development, has strong and direct effect upon physical features, economic sectors as well as socio-cultural features. The provision of people with adequate transportation and communication facilities, educational institutions, sanitation and hygienic services, medical centers and other infrastructures requires a great deal of land. Owing to urban transportation the rural areas - predominantly the prime sources of agricultural products are deprived of sizeable amounts of land and the rural people are susceptible to displacement. This situation is reflected by the concept of urban-rural fringe. In this case some people are better off at the expense of others. This paper is particularly aimed at figuring out the processes of urban public transportation development, the main impacts of urban transportation and the effective measures...
taken to ameliorate the problems posed due to urban transportation. Realizing the importance of a fairly balanced development and equitable distribution of resources among rural and urban dwellers, the researcher has also endeavored to find out whether or not the rural dwellers have benefited from urban public transportation. The study has also attempted to find out the mechanisms employed by the local and central governments to alleviate the problems induced due to urban transportation and the concerted effort exerted to maintain a sustainable urban-rural development without jeopardizing the interests of the future generation.

Even though urban transportation has been extensively discussed and thoroughly studied by different scholars. However, little is known with regard to the potential impacts of urban transportation development and ramification upon the communities residing both in the core and the peripheries of urban areas. The result of the research paper will hopefully help the governmental or nongovernmental organizations, urban planners, policy and decision makers, institutions and other stakeholders who engage in the process of urbanization one way or the other re-evaluate the effectiveness of their programs. Although there exists a huge difference between Chongqing’s level of urbanization and that of the Eritrean cities, some of the appropriate approaches and extraordinary achievements of urban transportation development of Chongqing could also be adopted and applied in my country - Eritrea. The author also has forwarded relevant suggestions and recommendations believing that they could be helpful for future use by other researchers who are interested in the same subject matter as a reference.

Statement of the Problem

There is no unequivocal definition for the word “urbanity”. However, urbanization in its broader sense is a process by which agrarian rural areas are transformed into industrial urban areas. The study is basically intended to find out the major challenges of urban transportation and measures undertaken by concerned authorities in order to tackle those bottlenecks. In order to meet the aforementioned objectives, the researcher has raised some key questions including:

- What are the major driving forces for the development of transportation in an urban area?
- What are the environmental and socio-economic impacts of urban transportation?
- What efforts have been done to help the rural populations who have been deprived of their agricultural lands?
- What are the ongoing long-term strategic programs aimed at ensuring sustainable urban development in Chongqing?

To make it more practical Chongqing Municipality has been chosen as the study site. It has been selected for the fact that not only it possesses peculiar geographical features, ancient historical origins or for being the fastest growing city in the world, but also for its unique resource endowments among others. Therefore, key informants were selected using stratified random sampling and a considerable number of government officials have been instrumental in providing adequate information related to urban transportation. Even though urban transportation plays a vital role in the overall development of a nation, it does also have innumerable challenges unless carefully planned, managed and implemented. Transportation therefore, is one of the major burning issues of concern not only in China but also at global scale.

The author spent enough time with the respondents and created rapport so that they would be able to provide more reliable and valid information regarding urbanization in general and urban transportation in particular.

Research Methodology

The research has incorporated two approaches namely primary and secondary data collection methods. The author employed varieties of techniques including open-ended and closed-ended questionnaire surveys for public transport customers, structured and semi-structured interviews, focus group discussions with key informants, in-depth case studies and reviewing a great deal of relevant published and unpublished documents. The author has also tap into his own personal experiences and insights based on the numerous contacts made with colleagues, common local people and governmental officials. This research methodology is aimed to answer the points, which are raised under the research questions and the objectives. The synthesis, perusal and
analysis of data have been carried out whenever required to explain the trends with the outcome of results and facts. Data analysis has been carried out with help of tools such as SPSS (Statistical Package for Social Sciences), and SWOT (Strength, Weakness, Opportunity and Threats) wherever necessary.

- **Primary Data Sources**
  The field research was aimed at collecting firsthand data from sampled respondents through a questionnaire, interview of responsible elites and city officials and participant observation, in-depth case studies and focus group discussions. The researcher has also referred a number of unpublished data and documents.

- **Secondary Data Sources**
  The review of the secondary data was intended to help the primary data collection process (which was conducted by fieldworks) and to cover topics that were not presented in the questionnaire part. The secondary data sources the author referred include books, brochures, newspapers, magazines, articles, indices, and journals. The nature of the data that the research employed was more of qualitative but it also has applied quantitative approach shown with the help of pie charts, bar graphs and tabular expressions.

  The author studied standard Chinese language (Mandarin) for one year and was able to communicate with the respondents in their own language and read some relevant materials written in Chinese. Having lived for three years and travelled in many parts of the city, the author was able to witness personally the performances of public transportation in Chongqing.

2. **Literature Review**
   This chapter is the literature review, in which the researcher has gone through a number of related scholarly researches related to transportation in general and urban public transportation in particular. It is pertinent to point out here that there is virtually less materials on urban public transportation of Chongqing written in English. In fact, the best resources available are more or less news reports, newspapers, brochures, magazines and internet sources.

   **A Brief History of Chinese Urbanization**
   According to Kam W. Chan et al (2006), there are two types of urban places in China namely the Municipality (shi/市) and the Town (zhen/镇). A large municipality such as Chongqing which usually also administers a number of counties (xian/县), can be further subdivided into two parts: the City Proper (Shiqiu/市区 or shixiaqu/市辖区) and the Sub Urban Counties (jiaoxian/郊县 or shixiaxian/市辖县) (Kam Wing Chan and Xeuqiang Xu, 2006). Furthermore various studies have depicted that urbanization in China, which began with walled cities has a long traditional history. Continuity from ancient times to the present is one of the distinguishing characteristics of many Chinese cities (Annals of American Geographers, 1963, vol.53).

   After its establishment in 1949, the People’s Republic of China (PRC) embarked on a national strategy of intensive industrialization. This involved the massive flow of workers from rural agricultural areas into urban centers. By 1960, China's urban population has grown by 20%. This massive expansion of the urban population was putting pressure on cities. So to control this movement, the government implemented regulations by which all citizens of China are assigned an agricultural or non-agricultural designation ("hukou/户口") at birth, based on that of their parents. Originally, residents with non-agricultural hukou were granted ration cards for a wide range of basic foodstuffs and commodities and were entitled to be employed in cities, largely in state-owned enterprises or government agencies that provided full housing, healthcare and education services. In China's urban structure, Shanghai and Beijing are the two cities with urban populations over 10 million. The temporary or migrant population accounts for one-quarter of their combined population of 33 million. There are six smaller metropolises with populations ranging from 5 to 10 million, comprising 38 million urban residents in total - Shenzhen, Chongqing, Tianjin, Guangzhou, Dongguan, and Nanjing. There is a much larger group of
Over the past three decades Chinese urbanization has been rapid. China’s urban population rose from less than 20 percent of the total in 1978 to 52 percent in 2012, an increase of more than 500 million people. Rapid urbanization has facilitated an unprecedented economic transformation in the past 30 years, which catalyzed China’s brisk GDP growth and pulled more than 500 million people out of poverty, many of whom participated in China’s massive rural-urban migration, moving from the countryside to the cities and from agriculture into jobs in industry and services (World Bank, 2014).

According to Wang YuJian (2012), China has been confronting an unprecedented urban development ever since the initiation of economic reforms and the ‘open door’ policy in the 1980s. The same author also clarified that urbanization in China has its very own characteristics due to its special political structure and cultural and historical background.

Based on the World Bank and the Development Research Center of the People’s Republic of China (2014), China’s urbanization over the last three decades has been unprecedented in scale in which about 260 million migrants have moved from rural areas to cities, supporting the country’s rapid economic growth and development progress. The report showed that China has the largest urban population (758 million). The same report further indicated that China’s cities, with abundant labor, cheap land, good infrastructure, and competition among local governments to attract industry and investment, have created an environment that is highly conducive to rapid growth. Growing cities that have become increasingly connected with each other and with the rest of the world have added to productivity growth through agglomeration effects, and China’s mega cities now have income levels comparable to some member countries of the Organization for Economic Cooperation and Development (OECD).

The Chinese government has recognized that achieving this goal requires a new growth model that is more balanced, more productive, innovative and more equitable in the distribution of the benefits of growth, and ultimately producing more sustainable socio-economic and environmental outcomes. These objectives were well reflected in the government’s long-term plans recognizing that urbanization has an important role to play. If managed very well, urban areas provide efficient markets that support continued transformation and increase productivity through agglomeration effects; allow innovation and new ideas to emerge, spur domestic demand from a rising middle class, give the services sector space to grow, and save energy, land, and natural resources. Such efficient, inclusive, and sustainable urbanization would tremendously contribute to China’s development goals.

Researches indicated that one of the most important challenges the Chinese government might potentially encounter in the future will be the lessening of the income gap between urban and rural areas. One other area of inequality that has long existed in China is that the development gap which exists between the coastal region and inland areas. According to a 2005 report, the Chinese Academy of Social Sciences estimates that up to 40 million peasants have been forced off their land to make way for these infrastructure projects, with an additional two million being displaced every year. These millions become part of China’s “floating population”, flocking into urban areas in search of new means of livelihood.

**Transportation and Environment**

Haixiao Pan (2011), argued that motorized vehicle emissions in China have created serious environmental problems, especially air and noise pollution. According to the author, pollution created by urban transport not only has a high economic and environmental cost, but also threatens public health. Besides, the author revealed that the implicit need to establish regarding Environmental Protection, the Air Pollution Control Act, was passed in 1987 and revised in 1995 and 2000. The author also said that motor vehicle emission standards have been promulgated even before 1983. The Phase I and Phase III national vehicle emission standards were implemented in 2000 and 2007 respectively. In urban planning the author supported the idea of following the
State Ambient Air Quality Standard (GB3095-1996) when assigning air quality standards according to the planned land use. Finally, the same author indicated that the Air Protection Act provides the notion that "The State encourages and supports the production and use of high-quality fuel, to reduce the harmful substances in air pollution."

The researcher affirms that it is foolish to believe that the advancement of technology will one day come at a minimal cost to the environment. Getting rid of the root causes is one of the viable means of solving a problem. There are a number of options from which people can choose to deal with the factors deteriorating the quality of the environmental. For instance, investing more on public transport than private transport and introducing alternative sources of energy such as solar, tidal, hydroelectric, wind energy are some of the plausible means of overcoming congestion and pollution.

**Public Transport and Energy**

Robert Early et al (2011), found out that China is facing growing challenges due to the expansion of energy demand. According to them, the country depends on imports for over 55 percent of total oil consumption. Since 2009, China’s coal imports are greater than coal exports. As a result, the Chinese government has to look for alternative energy systems. The authors also revealed that transportation has been a particularly challenging sector in China. As China urbanizes, personal mobility becomes a central issue in the minds of city planners. People desire to live and work in different neighborhoods and at the same time increase the diversity in their social lives. Personal vehicles reflect important cultural values of success and status, making them extremely appealing from a consumer perspective. At the same time, the automotive industry employs millions of people, making it an essential target for government support. Besides, the authors asserted that vehicles use vast amounts of energy.

In China, over 98 percent of on-road vehicles are powered by fossil fuels such as oil and gas. While alternative fuels such as ethanol, methanol, and natural gas products are being produced and researched, getting these fuels into use is difficult. Finally, while describing about the mechanisms used to ameliorate the above mentioned bottlenecks, they came up with the idea that China has an opportunity to develop electric vehicles (EV), and at the same time make more efficient use of energy in the transport sector. Electric vehicles, according to them, help to conserve petroleum, a resource that China views as potentially limiting to its future development. For instance, their research work and other materials they referred showed that, China is the largest producer and consumer of electric bicycles in the world. In 2009, China’s production reached 23.69 million bicycles, and total population of electric bicycles reached over 120 million (Robert Early et al., 2011).

From urban mobility point of perspective, public transport is far more efficient in terms of the road it uses up and the energy it consumes. For example, a bus carrying 40 passengers use only 2.5 times more road space than a car carrying 1 or 2 people. And the same bus consumes only 3 times as much fuel as a car (Rachel Kyte, 2015).

**Public Transport and Information**

Tiffany D. Fishman (a manager at Deloitte Services LP), on her report entitled “Digital-Age Transportation: The Future of Urban Mobility”, asserted that information is as much a part of the basic infrastructure of transportation as roads and trails are. Travelers need to know where they are and how to get where they want to go, whether on foot, by bike, by car, or by transit. Traffic managers and drivers want up-to-the-minute data on accidents, weather conditions, and traffic flows. Transit passengers want to know when the next bus or train will arrive and how to get where they’re going once they’re dropped at their stop.

This position was also similarly held by Xianyao Houa and Xuewu Chen (2013), in that people may use transit information when planning a trip by public transport. They envisioned that with the rapid development of the internet, more people in China can get information with regard to public transit via website or handheld devices, TV sets, broadcasts and newspapers.
Accessibility to Public Transport (PT)

China implemented in 1989 its first trial implementation of standards for the Design of Urban Roads and Buildings aimed at improving the access of people with disability. In December 1990, the Law of the People's Republic of China on the Protection of People with Disabilities was issued. It was further modified in 2008 to emphasize the need for construction of barrier-free facilities for people with disabilities (Julie Babinard, 2012).

The researcher has a firm stance that accessibility and equity in transportation are not privileges but rather civil rights and all people are equal behind the law. Hence, providing all citizens with equal social amenities should be an obligatory duty for all countries.

Generally speaking, passengers usually look for a trip that is conveniently close to their place of departure and destination. In addition, passengers naturally have the desire to reach their place of destination as quickly as possible. Urban public transport stations must therefore, be located very close to the origin and destination of commuters preferably less than 500 meters of home and workplace. This transportation demand can easily be implemented in the case of road-based transportation system. Whereas in the case of rail-based systems, travelers might be required to walk for an extra may be 200 meters inside stations including staircases. This reduces the acceptance of rail-based system as opposed to surface-based bus systems especially for children, the elderly, people with health problem diabetes, heart diseases etc and physically challenged individuals. Such special groups of people deserve safe and accessible streets, sidewalks, traffic signals with sounds for the visually impaired, crosswalks, crossing signals, Braille markers and the like. For instance, the presence of telephone poles and big trees that block sidewalks, inaccessible bus stops and pedestrian signals that are not audible to visually impaired people are potential transportation barriers.

It is generally agreed that cities such as Chongqing with high-rise buildings, denser settlements and very large Central Business Districts (CBDs), need to have a very high capacity and accessible transport system that can carry a great deal of people per hour per direction at a time. Being surrounded by mountain ranges, long undercut tunnels (with a length of 5 kilometers or so) are common in Chongqing. This entails that elevated or underground rail systems are indispensable transportation features in many parts of the city. In addition, studies that are in favour of public transportation particularly of railway transport, indicated that proximity is perhaps the strongest determinant of a resident’s likelihood of riding rail transit. Similarly, the use of two wheelers (bicycle or motorcycle) gives freedom in mobility for the fact that it is easy to park at home and workplace. This argument supports the idea that public transport should be accessible to all beneficiaries.

Transportation in Chongqing

Currently, Chongqing ranks third amongst China's most important automotive manufacturing industrial bases (after Shanghai and Jilin) as the largest automotive producer in western China and China's second largest exporter of cars and motorcycles. Chongqing started producing cars, trucks, motorcycles and components almost 50 years ago in 1965. Ever since, the automotive sector has formed one of the city's backbone industries. In 2012, 22% of the city's GNP was generated by or related to the automotive sector. That year, the total output reached 1.9 million finished units (passenger and commercial), representing a year-on-year increase of 11.5%. The total output value grew by 14% reaching 224 billion in 2012.

Based on the reports made by the Netherlands Economic Network in China, Chongqing contributes one-third of the total number of motorcycles produced in China and is the 2nd biggest producer in China. The report further elaborated that in 2012, there were 20 manufacturers located in Chongqing that together created an industrial output of CNY103 billion. The same report figured out that Chongqing currently has a production capacity of 15 million finished motorcycles and 20 million engines (The Netherlands Economic Network in China, 2014).
Table 2.1 - Civil Motor Vehicles in Chongqing

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</tr>
</tbody>
</table>

Source: (Chongqing Statistical Year Book of various years)

The above table shows that the number of civil motor vehicles in Chongqing has dramatically increased from 781250 in 2003 out of which 549179 were privately owned to 3898647 in 2012 in which 3,458,210 were privately owned. The number of buses and cars combined together and motorcycles increased by 8% and 16% respectively in just ten years time. Hence, the significant increase in number of population and a boom in the socio-economic standards of Chinese followed by the desire and ability to own a number of private or public vehicles posed tremendous pressure on the already available road infrastructure.

Kenichi Inazawa, an external evaluator of the Chongqing Urban Railway Construction Project (Japanese ODA Loan Project), asserted that Chongqing City has a very uneven topography which gives it a multi-polar and dispersed urban structure comprised of 12 small urban districts. He also added that before the project implementation, traffic congestion was getting much worse in the central city areas of Chongqing City as a result of economic development, 95% of city residents relied on public transport to move around and public transport attained a passenger volume of over 600 million passengers per year, with approximately 500 million people using buses. Besides, he mentioned that approximately 70% of the arterial roads in the central city area suffered from constant traffic congestion, and at peak times 70% of the passenger volume of the entire city and 80% of the buses were concentrated in the central city area. Furthermore, due to the traffic congestion, huge volumes of automobile exhaust green house gases were emitted, causing air pollution and water pollution to increase and leading to a worsening of the living environment. Constructing a subway which could provide reliable and environmentally-friendly transportation to large numbers of people became one of the suitable options.
This figure shows that the passenger traffic has increased from 58,290 in 2003 to 157,798 in 2012. Similarly the passenger volume per kilometer has increased by threefold from just 2,526,100 in 2003 to 7,551,314 in 2012. Therefore, based on this finding, it can be deduced that there was a sharp increase in the number of passengers traveled using both private and public vehicles. (Note: All units are expressed in terms of 10,000 persons). Based on Table 2.1 and Figure 2.2 there was a considerable increase in the number of vehicles (privately or publicly owned) and the number of passengers who travelled using those modes of transport. That is to say both motorization and mobility have increased simultaneously in the last decade. This partly testifies that public transport use increases with increase in settlement size.

3. Research Results and Findings

Questionnaire Design

A questionnaire was chosen as an important tool for data collection for its efficiency in terms of time and ease to evaluate data. A total of 100 questionnaires consisting of 44-item questionnaire were distributed. The questions, divided into three major sections namely the general information of the respondents, trip characteristics and the use of public transportation were disseminated, completed and returned. The largest number of surveys came from university students. Bearing the amount of time in mind, the questionnaire was restricted to only four pages.

However, it should be noted that not all respondents answered every question. Some of the respondents left the last three open-ended questions unanswered probably due to lack of enough time or lack of interest. In order for the acquisition of data to be convenient and successful, one of the questionnaires was written only in Chinese language, while the other (filled by students) was written in both Chinese and English alternatively.

Table 3.1 – Questionnaire Items on Respondents’ Perception

<table>
<thead>
<tr>
<th>No</th>
<th>Description</th>
<th>No</th>
<th>Description</th>
<th>No</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Safety</td>
<td>9</td>
<td>Transportation Facilities</td>
<td>17</td>
<td>Kinds of Trips</td>
</tr>
<tr>
<td>2</td>
<td>Reliability</td>
<td>10</td>
<td>Comfort</td>
<td>18</td>
<td>Ticketing and fare system</td>
</tr>
<tr>
<td>3</td>
<td>Accessibility</td>
<td>11</td>
<td>Availability of Seats</td>
<td>19</td>
<td>Walking</td>
</tr>
<tr>
<td>4</td>
<td>Sustainability</td>
<td>12</td>
<td>Frequency</td>
<td>20</td>
<td>Cycling</td>
</tr>
<tr>
<td>5</td>
<td>Punctuality</td>
<td>13</td>
<td>Traffic Congestion</td>
<td>21</td>
<td>Pedestrian’s Mobility</td>
</tr>
<tr>
<td>6</td>
<td>Information</td>
<td>14</td>
<td>Pollution</td>
<td>22</td>
<td>Attitude of drivers and customers</td>
</tr>
<tr>
<td>7</td>
<td>Waiting Time</td>
<td>15</td>
<td>People with special needs</td>
<td>23</td>
<td>Reasons for Travel</td>
</tr>
<tr>
<td>8</td>
<td>Location of Stations</td>
<td>16</td>
<td>Sidewalks and public spaces</td>
<td>24</td>
<td>Overall evaluation of PT</td>
</tr>
</tbody>
</table>

Interview

An oral interview was conducted in order to enrich substantially the data gathering process by discussing some relevant areas not covered by the questionnaires. The interviewees themselves have raised a number of issues during the discussion sessions. The author asked various travel related information such as travel time, purpose of travel, modes of transport they use, level of satisfaction, environmental situation of Chongqing and plausible measures to alleviate traffic congestion and pollution. The key informants were instrumental in providing adequate and reliable information.

Over 50 people including students, teachers, civil servants who use bus and train regularly and drivers, aged 18 years and above, were interviewed from 1 to 15 November 2015 at bus stations, schools, in the streets, inside buses while traveling with them, during peak hours (7:00 A.M. – 9:00 A.M. and 5:00 P.M. – 7:00 P.M.) and off-peak periods. Initially it was necessary to create a good rapport and make them feel at ease in order to
get reliable information and know their degree of satisfaction with respect to transportation in Chongqing. Most of the respondents and the key informants who took part in the questionnaire survey and the interview were between 26 and 30 years old and unemployed university students.

**Demographic Characteristics**

![Figure 3.1: Age and Gender of Respondents](image)

The above figure shows that majority of the male and female respondents were 19 to 25 and 26 to 30 years old respectively.

<table>
<thead>
<tr>
<th>Ethnic Groups</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Han</td>
<td>88</td>
<td>88</td>
<td>88</td>
<td>88</td>
</tr>
<tr>
<td>Miao</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>94</td>
</tr>
<tr>
<td>Tibetan</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>96</td>
</tr>
<tr>
<td>Others</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
Figure 3.2: Ethnicity of Respondents

This figure shows that majority (88%) of the respondents were Han Chinese followed by Miao (6%), Tibetan (2%) and others (4%). This entails that the Han ethnic group inhabits Chongqing dominantly.

<table>
<thead>
<tr>
<th>Level of Education</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>No formal education</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>1-6 Grade (Primary School)</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>7-9 Grade (Middle School)</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>10 - 12 Grade (High School)</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>14</td>
</tr>
<tr>
<td>University</td>
<td>61</td>
<td>61</td>
<td>61</td>
<td>75</td>
</tr>
<tr>
<td>Postgraduate</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
<td></td>
</tr>
</tbody>
</table>

Figure 3.3: Respondent’s Level of Education
The above figure depicts that majority of the respondents were university students accounting for 61% followed by postgraduate (masters) accounting for 25%, and there was only one primary school student. This entails the variability of the subjects as well as the representation of people from all walks of life having different levels of education, knowledge and life experiences.

**Trip Characteristics**

<table>
<thead>
<tr>
<th>Trips</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Trips</td>
<td>14</td>
<td>14.0</td>
<td>14.0</td>
<td>14.0</td>
</tr>
<tr>
<td>Social Trips</td>
<td>42</td>
<td>42.0</td>
<td>42.0</td>
<td>56.0</td>
</tr>
<tr>
<td>Shopping</td>
<td>24</td>
<td>24.0</td>
<td>24.0</td>
<td>80.0</td>
</tr>
<tr>
<td>Other</td>
<td>20</td>
<td>20.0</td>
<td>20.0</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>100.0</strong></td>
<td><strong>100.0</strong></td>
<td></td>
</tr>
</tbody>
</table>

From table 3.2, it is apparent that most of the trip purposes are related to social activities (42%) that is to say activities such as visiting families, friends and relatives, attending meetings, marriages and funerals etc., followed by shopping (24%) while other activities including going to schools, medical centers and recreation accounted for 20%. The fact that the percentage of respondents going to work is less than that of social trips indicates that most of the respondents were unemployed university students.

All the survey respondents revealed that they had access to multiple transportation modes such as buses, trains, metros, boats and non-motorized modes such as walking and cycling. The study found out that males use public transport frequently more than their female counterparts. This disparity in the frequency of use may partly be attributed to the fact that females feel relatively unsafe while traveling in buses and trains than males especially in the evening.

According to the respondents, one-way expenditure on bus transport ranges from CNY 1 to CNY 70 of course depending on the residential area and the distance of travel. The respondents total monthly expenditure on transportation ranges between CNY 10 and 2000. It was figured out that 87% of the respondents started their daily trip between 5.00 A.M. and 7.00 A.M. and return home usually between 5:30 P.M. and 7:00 P.M. in the evening, 90% using public means of transport such as buses, trains, taxi, rickshaws, motorcycles, bicycles and walking during their travel and the rest using personal vehicles. The respondents’ feedback also showed that the duration of waiting time ranges from 10 minutes to 1 hour depending on whether or not the road is congested. Moreover, it was found out that the respondents’ modal choice is primarily determined by safety, accessibility, convenience, affordability, frequency and the speed of travel.

**Mobility Behaviour**

The researcher found out that household income significantly determines people’s mobility behaviour. This implies that the low-income households travel occasionally using non-motorized modes such as walking, cycling or public transport modes, which are affordable and easily accessible. High-income groups on the contrary tend to travel faster, more frequently and for longer distance trips. Public transport remains to be the dominant mode for work, study and personal affair trips whereas private modes are preferred for recreational, commercial and social trips, particularly on weekends and holidays. This is against the principle of sustainable mobility.

People may travel to work, to school, for leisure, to visit families, friends and relatives, to attend social activities such as conferences, marriages and funerals, for business reasons and so on. Studies showed that Chinese are very mobile people. It is not uncommon to notice in the bus and subway stations a host of people waiting in a very long queue.

Transportation is an important means by which people meet their different ends. Many adventurous people travel for pleasure. Travelling has recently become one of the most popular hobbies. For instance, during big national holidays such as the Chinese Spring Festival (春节), there is a family reunion whereby all members
of the family return home and spend several days together with their beloved ones. During this particular time, the airports, railway stations and bus stops are crowded with millions of people travelling for either short or long distances.

When passengers choose from various means of transport different issues such as time, distance, price, comfort, safety, luggage needed, age etc. are often taken into consideration. Finally, they make the decision to travel by any of the modes of transport namely air, land or sea according to their convenience and affordability.

People usually differ in terms of the way they plan and organize their trips. Those who own private vehicles would like to travel comfortably. There are those who seek help from travel agencies and tour operators for their travel. Such people usually are those who travel with small children, older people or people who seek comfort and relaxation during their holidays. They want everything including food and accommodation pre-arranged and ready for them. Travel agencies offer different kinds of accommodation including hotels, apartments, and camps and so on. In such cases the travel agencies arrange a passenger’s stay at a hotel, visa, buy a ticket and often provide the traveler with suitable insurance. The comfort of the passengers however, depends on the amount of money they are willing to spend during their travel periods.

When asked as to why she travels, Miss YaoYao 耀耀 explained as follows:

“I love traveling. Traveling has been in my blood. I have been too many places around China, and other countries. I enjoy colourful life, beautiful sights, landscape, nature, culture, rural life of different minorities, because I am Han Chinese. I want to be different from others. I am a girl. I like a colorful life, adventure, interesting things, and meeting foreigners. I don’t like to stay in a confined place. If I have time, and money I will travel the whole world. I want my dream, and my whole life to travel a thousand mile. I hope I can make my dream come true. I know, whenever I travel I can learn new languages, some skills, knowledge from local people from different peoples’ cultures, exhibition, eat different delicious foods, and buy different things such as souvenirs. I am lucky that my family gave me what I wanted. So far I have travelled so many places in China by airplane, ship, and used other modes of transports. I have travelled to Sichuan, Xi’an, Beijing, Hong Kong, Macao, Taiwan, including Singapore, Thailand, France and many more. My dream is to circumnavigate the world. To do so, I need to save enough money. I hope my dreams will come true.”

It should be recalled that the research has involved different people from all walks of life including pedestrians (both nationals and foreigners), cyclists and riders. When asked whether or not they feel safe, 5 out of the 53 females and 8 out of the 47 males felt very unsafe and only 3 of the females and 1 of the males felt very safe during their travel using any of the public transport modes (Figure 3.5). In an effort to make the analysis sensible, they were asked as to why they felt unsafe. Some of the reasons given by the respondents were unsafe crossing roads and illegal acts such as pickpocket inside public buses and trains (caused mainly due to overcrowding) and pedestrians occupying major road sections. In this juncture, we should be aware of
the importance of people’s safety and security during travel. It is only when they feel safe, that people will be encouraged to use a particular mode of transport.

<table>
<thead>
<tr>
<th>Opinion</th>
<th>Females</th>
<th>Males</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>82%</td>
<td>84%</td>
</tr>
<tr>
<td>No</td>
<td>18%</td>
<td>16%</td>
</tr>
</tbody>
</table>

The above table portrays the respondents’ perceptions on whether or not the overall service quality of the public transport system in Chongqing specifically of bus and train transportation has improved in the last five years. As shown in Table 3.4, there was a slight difference in the perception in that 82% of the female respondents and 84% of the male respondents perceived that the quality service for bus transportation of Chongqing has improved in the last five years. Whereas with regard to the service quality of train transportation in Chongqing, 85% of both male and female respondents perceived that it has improved considerably in the last five years.

The Role of Public Transport in Chongqing

Chongqing municipality has invested a whole lot of capital and human resources in order to meet the transportation demands such as building and improving roads, streets and bridges, erecting traffic signals and lights and the like. Public transportation dominated by bus rapid transit, generating significant economic benefits is considered as a backbone for Chongqing’s current level of development.

Almost all of the key informants (98%) agreed that the Chinese government is shifting its orientation from an investment and export oriented sector towards more of service providing sector. Currently, Chongqing’s transportation construction has been greatly transferred from highways to railways which are capable of transporting more people at a time. In relation to this, Chongqing municipality has drawn a great deal of attention by the central government.

Some of the benefits of public transportation in Chongqing specifically are as follows:

- **Public Transport promotes Social Interaction**

  According to Enrique Penalosa (former mayor of Bogotá), a developed country is not a place where the poor have cars; it’s where the rich use public transport. This famous quote disproves the misconception that public transport is confined only to the poor sections of the society, those that can’t afford to own a private car. Enrique realized that the earlier the right choices about land use are made, the better off in the long run, and the happier people would be, potentially for hundreds of years. It is discerned that public transport is instrumental in helping every member of a society including the young or the aged, the poor or the rich, physically fit or physically challenged, females or males, educated or illiterate and so on to travel indiscriminately irrespective of their socio-economic status. On one hand, it offers people with the most favorable and independent mobility options. On the other hand, using public transport also creates conducive environment for travelers of various ethnic, cultural, political, and economic backgrounds to intermingle.

- **Public Transport and Employment**

  Public transportation plays a pivotal role for both Chinese workers and their companies. As brilliantly expressed by Mr. Wang, a local resident, the municipality of Chongqing will continue to invest in innovating and developing the transportation infrastructure thereby create varieties of jobs to anyone who is willing to work. These jobs might include manufacturing, construction, accounting, auditing, finance, insurance and real
estate, retail and wholesale trade, and services. For instance, they can work as derivers, conductors, security guards, police traffic etc.

Apart from maintaining and creating jobs, public transportation also moves people to and from their jobs. Businesses located near public transportation hubs experience more employee reliability and less absenteeism and turnover. Employers have a larger labor pool from which to choose, and employees are happier because they are not driving in congestion delays. Hence, public transportation has a multiplier effect.

- **Public Transport and Economy**

Various studies showed that public transportation use lowers household expenses and frees up more income for other needs. A considerable amount of expenditure terms of purchasing, repairing and maintaining is often incurred on private vehicles. Whereas, investing in public transport (that are more spacious and relatively cheaper), saves a great deal of capital. Governments or municipalities can spend less on building and paving roads and the extension of different utilities due to public transportation. In this case the valuable resources can be properly allocated to other social services such as education, medication, sanitation, recreation etc. Therefore, a huge investment in public transport is crucial in improving significantly the socio-economic situations of Chongqing inhabitants in the years to come.

- **The Role of public Transport in connecting the Core and Periphery**

It is common for many suburban commuters to ride public transportation on their way to their work places in the city sometimes even on daily basis. With the passage of time, the demand for public transport has increased. In an attempt to fulfill the riders demand, therefore, Chongqing municipality has extended the transit lines to outlying suburban or rural communities. Besides, there are bus shuttles and bus services that carry workers from rail lines to their respective work places. For service and entry-level employees with limited mobility options, transit acts as a key link to suburban-based jobs.

Some of the respondents who reside in Beibei District (北碚区), confirmed that the opening of the new subway system (Line 6) has enabled them to travel to Chongqing city center conveniently. They further mentioned that it is relatively fare, faster and comfortable. They expressed their gratitude to the government for connecting them with the other parts of the municipality and for being able to transport themselves and their commodities with the help of the available and relatively accessible public transportation including buses and trains. However, with the increase in the number of people due to migration, there is still a need to upgrade the standard of subway system in the city by opening new stations and reducing the number of transfers thereby connect the rural and the urban areas through a web of transport network.

- **Public Transport and Energy**

The use of public transport plays a central role in conserving a huge amount of energy and reducing dependency on non-renewable natural resources such as fossil fuels.

In order for Chongqing to continue growing as an international cosmopolitan megacity, sustainable public transportation is one of the viable solutions not only for its role in reducing dependency on exported energy sources but also for greatly lessening the adverse impacts of transportation on climate change and global warming.

- **Public Transport Relieves Congestion**

With the tremendous increase in the number of car ownership, traffic congestion is an order of the day in many cities of China including Chongqing. According to most recent findings, congestion caused travel delays, public discomfort and wastage of huge amount of fuels. Researches have revealed that the desire and ability to travel has always been an important part of the Chinese lifestyle. That is to say Chinese are among the most mobile people in the world. However, as more and more vehicles crowd the nation’s roadways, traffic congestion is having an increasingly debilitating effect on the people’s quality of life. To remediate traffic congestion and guarantee all-embracing sustainable development, it would be more advisable, for the government to allot a huge investment on public transportation.
Public Transport and Environment

Through a systematic interview, the researcher found out that the car-oriented transportation system has impacted the cultural and natural environment of Chongqing. Some of the effects include resources (extraction of construction materials), land take, climate change (due to the emission of toxic gases), vehicle wastes, noise, and air pollution. The author recognized that a great deal of land has been taken by transportation in Chongqing. The ramification of the city towards the agriculture-based rural areas has resulted in grabbing a huge size of land by the urban area. The respondents indicated that the rural farmers are compensated in the form of money depending on the size and strategic location, economic value of the land taken by the city, even though some are not satisfied with this compensation.

Public transport unlike private transport can play a vital role in creating a pollution-free environment. Astonishingly enough, the respondents were conscious with regard to the importance of public transportation in reducing toxic pollutant elements, greenhouse gases and spillover wastes, and conserving natural habitat. Not only does public transportation reduce pollution, but also it lowers the degree of passenger’s exposure to respiratory and heart disease, traffic accidents, and fosters a healthy and prosperous society.

The Role of Public Transport during Emergencies and Disasters

Even though it is better to hope for the best but it is still crucial to be prepared for the worst. It has been extensively researched that public transportation having enormous capacity, plays a central role during anthropogenic and natural disasters such as volcanic eruption, earthquakes, flooding etc. not only by providing basic comfort, access, quick mobility, safety, shelter and rescue to victims but also moving rescue workers such as fire brigade, police and other experts to the emergency sites.

Public Transport in Chongqing Municipality

The public transportation in Chongqing currently offers a variety of modes of travel such as road vehicles (bus, minibuses etc.), rail and other fixed guideways (heavy rail, light rail, commuter rail, automated transit, inclined plane, cable car, monorail) and water (ship and boats). Being situated at the confluence of the Yangtze River and Jialing River, Chongqing municipality has boats and ships that transport both people and goods from one place to another place. Some of the key informants who have traveled at least once along the two rivers expressed that on their ways they have enjoyed the infrastructural developments underway in Chongqing and the aesthetics of the breathtaking natural landscape.

Although the availability of stairs might be a little tiring, walking along the colourful streets of Chongqing is the best and pleasant optional transport mode. Those who are not willing to walk on foot of course for various reasons however, have a number of other options such as taxi, bus, subways, bicycles, motorcycles, cycle rickshaws, coaches and so on.

Public Buses in Chongqing

Chongqing city transport has been dominated by buses of various grades namely ordinary-grade, medium-grade and high-grade. Most of the big and relatively clean buses that are well equipped with TV, radio, air conditioner and comparatively comfortable seats run in the city center normally from 5:30 A.M. to 9:00 P.M. Asking a number of local people with regard to the bus fare, the author found out that it is fair (usually between 1 and 2 RMB). These good qualities therefore, create suitable environment for the customers who are lucky enough to get a seat to relax, read or watch TV news or take a nap as per their wish. Such entertaining, informative and educational facilities have played a fundamental role in attracting and motivating more passengers to use buses during their travel.

Chongqing Rail Transit (CRT)

Chongqing rail transit system also referred to as Chongqing Metro consists mainly of subway and straddle monorail components. The transit crosses rivers and mountains, includes frequent bridges, and combines overhead and underground lines and is the fastest mode of transport in Chongqing. Chongqing metro system, which started operation in 2005, is serving transportation needs in the core city’s main businesses and entertainment areas. It is one of only three urban rail metro systems in operation in the west of China, the others
being Chengdu Metro (Sichuan Province), and Xi’an Metro (Shaanxi Province) which opened in 2010 and 2011 respectively.

Currently, Chongqing Rail Transit consists of four lines, with a total track length of about 202 kilometers (126 miles). Lines 1 and 6 are conventional heavy-rail subways, while Lines 2 and 3 are monorails. Line 1 is the system’s backbone connecting the most densely populated areas and Central Business Districts namely Jiefangbei, Lianglukou, Daping, and Shapingba. The two monorail systems extending for about 80 kilometers form the world’s largest monorail network while Line 3 stretching for a length of more than 55 kilometers is considered to be the world’s longest single monorail line.

The four subway systems currently under operation in Chongqing city are as follows:

- **Chongqing Subway Line 1**
  
  Chongqing subway line 1 which is designed with red color extends from Chaotianmen(朝天门) to University Town (DaXueCheng/大学城) covering a total length of more than 40 kilometers. Currently, only 19 stations situated between Xiaoshizi(小什子) and University Town are giving service. Subway Line 1 stretching East – West from Xiaoshizi(小什子) to University Town (DaXueCheng/大学城), was constructed in two phases. The construction of phase 1 started in 2007 and was opened in 2011. This line runs from Xiaoshizi to Shapingba(沙坪坝) covering a length of 16 kilometers. Whereas, Phase 2 which runs from Shapingba to University Town for a length of about 20.2 kilometers, started in 2009 and was put into operation in 2012. It took about four years for this line to be completed, which entails that even though it plays a vital role in providing a quicker service to a huge number of customers, subway construction takes time.

- **Chongqing Subway Line 2**
  
  Chongqing subway Line 2 also referred to as Light Rail Line 2 or Chongqing Rail Transit Line 2, is identified with green color and runs from east to west similar to line 1. It is the first rail transit line in Chongqing. The first phase of Subway Line 2 which extends from Jiaochangkou to Zoo was put into service in 2005 while the second phase from Zoo to Xinshan Village started to serve the public a year later. With 25 stations, this line extends from Changning Avenue in the west to Dazhong Road in the east for a total length of about 31.3 kilometers. Currently, only the section between Jiaochangkou and Xinshancun with 18 stations is in service.

<table>
<thead>
<tr>
<th>Figure 3.6: Monorail Train Line 2</th>
</tr>
</thead>
</table>

Such low-floor light rail vehicle enables people with disabilities travel without much difficulty. Besides, it plays a crucial role in transporting low-income passengers reach their homes, workplaces or other destinations quickly and easily.
Chongqing Subway Line 3

Chongqing subway line 3 is a light rail which starts from Yudong in the south and ends at Jiangbei Airport in the north with a total length of 55.5 kilometers and 39 stations. Identified with blue color, this line runs through five districts namely Ba’nan(巴南), Nan’an(南岸), Yuzhong(渝中), Jiangbei(江北) and Xincheng. Together with lines 1, 2 and 6, it shapes the mainframe of the city’s rail transportation, playing a key role in relieving traffic pressure. It was initially put into effect in 2011. At that time, only the section between Lianglukou and Yuyang was under operation. It has been able to transport passengers between Yudong and Jiangbei Airport since 2012. Currently, the 38 stations located along this light rail have been put into practice. According to the Chongqing news of 21/03/2014, having 6 carriages, this subway line currently has a maximum capacity of holding 1,340 passengers at a time.

Chongqing Subway Line 6

Chongqing subway line 6 is an important link between southeast and northwest Chongqing City covering a total length of about 61 kilometers and 28 stations. Crossing the Yangtze River once and the Jialing River twice, it is playing a significant role in conveying a great deal of people. Running through 5 districts namely Nan’an(南岸), Yuzhong(渝中), Jiangbei(江北), Yubei(渝北) and Beibei(北碚), line 6 connects five business circles, airport, railway station, long-distances bus stations and some other major passenger transfer centers, relieving the traffic pressure of the main urban area and the areas along the line. The construction of the first phase which started in 2008, started to give service in 2012. Currently, it runs between Wulidian and Yuelai with 13 stops and stations.

Table 3.5 - Summary of Chongqing Subway System

<table>
<thead>
<tr>
<th>Line</th>
<th>Terminals (District)</th>
<th>Opened (Year)</th>
<th>Extension (Year)</th>
<th>Length (Km)</th>
<th>Number of Stations</th>
<th>Identification Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line 1 (Heavy-rail)</td>
<td>Xiaoshizi (Yuzhong)</td>
<td>Jiandianpo (Shapingba)</td>
<td>2011</td>
<td>2014</td>
<td>38.9</td>
<td>22</td>
</tr>
<tr>
<td>Line 2 (Monorail)</td>
<td>Jiaochagnagkou (Yuzhong)</td>
<td>Yudong (Ba’nan)</td>
<td>2005</td>
<td>2014</td>
<td>31.3</td>
<td>25</td>
</tr>
<tr>
<td>Line 3 (Monorail)</td>
<td>Yudong (Ba’nan)</td>
<td>Jiangbei Airport (Yubei)</td>
<td>2011</td>
<td>2012</td>
<td>55.5</td>
<td>39</td>
</tr>
<tr>
<td>Line 6 (Heavy-rail)</td>
<td>Chayuan (Nan’an)</td>
<td>Yuelai (Beibei)</td>
<td>2012</td>
<td>2014</td>
<td>75.9</td>
<td>28</td>
</tr>
</tbody>
</table>

Source: (http://en.wikipedia.org/wiki/Chongqing_Rail_Transit)

Subway Ticket in Chongqing

Types of Subway Tickets:

The four kinds of subway tickets adopted by the Chongqing Subway are as follows: First, Single Journey Ticket which is valid on the date of purchase and can be used for one time. The holder needs to get on the train on the purchase station and the ticket will be recycled when getting out of the destination station. Second, called the Souvenir Tickets are well designed tickets usually issued on holidays and when holding some important activities. The valid period may differ according to different souvenir themes. The ticket will not be recycled after being used. Third, Fixed Journey Ticket is a kind of ticket in which the holder can take subway for fixed times within the ticket’s valid period. Fourth, Chongqing Public Transportation Card (Yiju Changtong Card), can also be used on other public transport tools such as city bus. Holders can enjoy a 10% off the ticket fare while taking the subway (www.travelchinaguide.com).
ii. Ticket Fare

Fare is one of the fundamental factors affecting transportation because it is related to the income level of
the travelers. Generally the propensity to travel tends to decrease with an increase in fare.

The Chongqing subway ticket fares range from CNY 2 to CNY 10 depending on the distance traveled. It
is noteworthy that passengers are anticipated to finish their journey within the stipulated timeframe otherwise,
they might be charged an extra ticket fee. The table below shows Chongqing subway ticket fares.

<table>
<thead>
<tr>
<th>Distance (Kilometers)</th>
<th>Fares (in CNY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 6</td>
<td>2</td>
</tr>
<tr>
<td>6 – 11</td>
<td>3</td>
</tr>
<tr>
<td>11 – 17</td>
<td>4</td>
</tr>
<tr>
<td>17 – 24</td>
<td>5</td>
</tr>
<tr>
<td>24 – 32</td>
<td>6</td>
</tr>
<tr>
<td>32 – 41</td>
<td>7</td>
</tr>
<tr>
<td>41 – 51</td>
<td>8</td>
</tr>
<tr>
<td>51 – 63</td>
<td>9</td>
</tr>
</tbody>
</table>

iii. Ticket Vending Machine

The ticket vending touch screen machines for the CRT are easy to use, since they can be operated both in
Chinese and English and conveniently display an up-to-date route network. Passengers are required to keep on
hand a supply of 1 yuan coins and small bills less than CNY 20 to use in these machines. Otherwise, every
station has a ticket counter (ticket booth) where passengers can change money or purchase tickets using larger
bills. Passengers can easily get assistance from the operators working inside the subway. Up on request, these
operators also help passengers who are not familiar on how to use the machines. Besides, prioritizing the safety
of passengers, they also check everything inside the baggage or luggage, bottles and the like of each and every
passenger by placing it on top of the baggage and luggage inspection scanner. Some of the things that are not
allowed inside the subway of Chongqing include gun, knife, liquor, balloons, bicycles, pet animals etc.
Smoking inside the metro is also strictly prohibited.

Route maps are available inside each subway station. This entails that keeping maps that show routes and
transfers are of paramount importance not only in directing passengers reach their respective destination on
time but also in creating a quicker communication between passengers and the operators transportation system.

In September 2012, the Chongqing Transportation Commission informed that great importance has
always been attached to safety emergency management associated with rail transit operation. Considering this
as a treasure, the commission added that due to conscientious practice and effective measures, there has been
no accident.

About 84% of the respondents rated Chongqing metro as efficient, clean and cheap albeit crowded.
Whereas the rest expressed that there are still many problems that need to be addressed in the long run. Firstly,
in order for the subway system to be more efficient, the number of unnecessary transfers should be reduced.
Secondly, comfortable and attractive waiting areas and furnishings should be available to transit users. Thirdly,
owing to a long queue, buying tickets can be very time-consuming both for the passengers and operators.
Hence, contactless smartcard and mobile ticketing are more advisable. Fourthly, as information is one of the
most powerful prerequisites for the use of public transport, all passengers should be provided with concise,
clear, readily available, uniform and reliable information because lack of proper information may deter the
frequency of travel. Finally, constrained by landform some of the subway lines such as Line 2 and Line 3 are
built along mountain waists with many high and inaccessible overhead sections that might make rescuing
passengers in case of emergency difficult.
Taxis in Chongqing

Taxis are sometimes considered as semi-public transport and play an important role in transporting people. Generally speaking, taxis are highly preferred for their flexibility, speed, and comfort. The legal taxis in Chongqing which normally accommodate four people, are identified with a bright yellow color.

Chongqing taxis, which usually work 24 hours, have a standardized fare of CNY 10 for the first three kilometers and for an increase in distance of 0.97 kilometer, the fare increases by CNY 2. Passengers are also supposed to pay CNY 5 toll upon crossing the bridges of either the Yangtze or the Jialing River. The rate however, tends to slightly increase (about 2.3 RMB per kilometer) from 11:00 P.M. to 6:00 A.M.

Evidences showed that those who wear seatbelts are more likely to survive during accidents. With respect to Chongqing’s taxi transportation, the respondents expressed that even though the taxis are well-equipped with seatbelts for safety purposes, some drivers and passengers are reluctant to use them. According to them, seat belts are rarely worn only upon seeing police traffic.

Based on one report, in order to overcome the deficiency in the number of taxis, the Ministry of Communications in Chongqing has allowed passengers to share taxis. Hence, some stations have an organized system for taxi sharing. Passengers often take a direction card and the staff helps them in arranging taxi sharing. For instance, two passengers sharing a taxi and one gets out, he just pays 80 percent of the price on the meter. When the other gets out he pays the same amount as the first person plus for the extra distance travelled since the first person got off.

Both the Chinese and foreign respondents have confirmed that going around in Chongqing by taxi is faster and convenient but more expensive than bus transport. When asked about their safety, however, about 10% of the respondents agreed that sometimes some taxi drivers talk on the phone while at the same time driving extremely fast to an extent that their safety and comfort was jeopardized. In addition to this, some foreign passengers who were unable to negotiate with the taxi drivers due to language barrier, have complained for been charged more than they should and for taking the longest route especially during night time. On the contrary, during the interview two of the taxi drivers indicated that they comply with the rules and regulations of transportation. Besides they mentioned that there were times where they quarreled with some customers for misbehaving inside the taxi. They added that two-wheelers who ignore the red traffic lights and crash with taxis, cars or buses or pedestrians who violate traffic rules are the ones against which a serious measure should be taken.

4. Research Analysis

Focus Group Discussion

The author prepared clear guidelines in order to facilitate the focus group discussion. The key informants were asked questions pertaining to their transportation usage: how and when they travel; how transportation affects various aspects of their daily lives; and their opinions, pros or cons, about the present state of transportation in Chongqing. The participants were also asked what they anticipated transportation to be like in the future, what new technological improvements they expected, and the effect they thought these improvements would have on their livelihood.

Some of the different needs and perspectives of the participants can be summarized as:

- To ensure optimum transportation services, the participants agreed that the municipality should spare no effort to invest hugely on public transportation. Not only should the government improve the transportation infrastructure but also the means of transport should be upgraded both in quality and quantity.
- Travel distance and time intervals between bus and train stations should be less.
- There is a need for the information inside the buses and subways to be written and conveyed at least in Chinese and English. The foreign respondents particularly emphasized on the importance of information such as the signs and announcements to be delivered in different languages so that they can get the right
information at the right time and place.

- Some of them pointed out that most of the bus stops are exposed. Hence, there is a need for shelters to shield the passengers from the sun, rain, dust and pollution while waiting for bus.

- With regard to traffic congestion and pollution, they all agreed that unless extraordinary precautions are made and pragmatic actions are taken, they might get worse in the future.

- Some of the optimistic participants mentioned the introduction of new technologies such as Global Positioning System (GPS) in determining location and direction and cell phones for their role in transmitting information such as weather conditions, service changes and delays to users might help Chongqing transportation system to improve a lot in the future.

- Finally, they opined that let alone the complex urban transportation problems of such a big city, but even problems of a small locality cannot be solved overnight. According to them, changes will come, life of inhabitants will definitely improve, congestion and pollution will be mitigated and Chongqing will continue to be the best city in the world of course with active participation of the concerned authorities and the community.

**Evaluation of Chongqing Transportation system**

People can travel within and outside Chongqing through various means of transport including airplane, trains, bus, minibus, private cars, bicycles, motorcycles, rickshaws, boats, ship, cableways, elevators and sometimes people. However, this research was primarily focused towards public passenger transportation in the city

- **Public Bus Transport**

  The bus rapid transit of Chongqing is considered as effective in rapidly moving a great deal of passengers. Chongqing public buses have two doors where the first (front) door is for entrance while the second (back) door is for exit. Despite the effort Chongqing municipality has shown in making the interval between bus stops or stations shorter thereby enabling people to walk only for few minutes to get the transportation service a lost should be done in the future. With the ramification of Chongqing municipality and improvement in transportation facilities, rural farmers can bring their perishable products to the city markets at a much cheaper price. For example, one farmer from JinYun(缙云山) mountain of Beibei district(北碚区) mentioned that public bus is more accessible to his farm land, much cheaper (spending only CNY 4 for big buses and CNY 2 for minibuses for a round trip ) and faster than before.

  A number of the participants complained that some bus drivers take the longest distance unnecessarily when a multiple optional shortcut roads to drive on are available. According to them, it wastes time especially for some passengers who should arrive at the work place, school, and hospital or attend important social activities such as marriages, funerals or visiting families, friends and relatives. This leads to the deprivation of the service that the traveler should get or give.

  However, other things being equal, they all expressed their appreciation for the municipality’s role in providing them with public buses that are equipped with Air Conditioners, TVs and comfortable seats.

- **Passengers’ Safety during Travel**

  A manual named “Shanghai Manual – A Guide for Sustainable Urban Development in the 21st Century”, forwarded that urban managers have to take road safety seriously as it is a universal problem. The importance of focusing on road safety has reached such a degree that 2011-2020 has been defined as “the Decade of Action for Road Safety” by the World Health Organization. In addition, the article also mentioned that over 90 percent of the deaths on the roads occur in low-income and middle income countries, which have only 48 percent of the world’s registered vehicles. The same article further indicated that more than 1.3 million people die annually on the road in the world and another 20 - 50 million people are injured. This accounts for around 46 percent of global road traffic deaths. Similarly, this proportion is greater in low-income countries than in high-income countries. Less than one-third of countries have taken necessary measures, for example by applying low-speed zones so as to reduce speed in urban areas.
Safety is a very crucial integral part of any transportation system. While Chongqing has shown a considerable qualitative and quantitative progress in the last three decades with respect to urban transport and more specifically urban public passenger transport, a number of challenges still remain unaddressed. Researches ascertained that pedestrians, cyclists and the poor who commute on daily basis are the most vulnerable travelers to road accidents. When asked about safety during travel, majority (85%) of the key informants commented that Chongqing bus drivers seem more careful while driving compared to taxi and car drivers. Bus drivers usually drive slowly and more carefully, following the signs and traffic lights and respecting pedestrians while crossing roads. Sometimes pedestrians, cyclists and drivers however, are exposed to horrific traffic accidents which result in serious injuries, deaths and colossal property damages. During certain fatal accidents, it is customary to see some volunteers working together hand in hand in order to give immediate assistance by uplifting toppled vehicles to rescue trapped or injured pedestrians.

Apart from traffic accidents, lack of facilities such as shelters and comfortable seats for those who have to wait in the bus stops has a significant implication for customers’ safety and health.

In order to ensure a safe urban public transport, therefore, the municipality must step up to improve pedestrian crossing facilities and equip bus stops and stations with all facilities. Besides, as reduction in driving speed not only minimizes the probability of being crashed but also the severity of the victim’s injury, there should be zero tolerance towards those who break the rules.

- **Bus fare and Service provision**
  - **Public transport IC card**
    - Chongqing has issued four types of public transportation IC Cards for various age groups with different levels of fares. They are explained as follows:
    1. **Card for the Aged**
       - Such types of cards are used by people that are 70 years old and above. They are required to get their permanent residence registered in the bus company by paying 25 Yuan (CNY). Once they get this card, eventually they can travel to any part of the city in a bus, minibus or subway for free.
    2. **Card for Students**
       - Paying the same amount of money like that of the card for the elderly (that is 25 Yuan), to the bus companies, the students can obtain their transportation cards. Taking their economic status into consideration, discount is given to students as a special privilege. For instance, by depositing 20 Yuan in the transportation card, a student can get 90 times bus or rail service at half price of the actual fare.
    3. **Cards for the Disabled**
       - This card is given to groups of people including visually impaired, physically challenged, people with hearing defects, diabetic etc. Even though it varies depending on the severity of the disability, special privileges are given to the disabled to an extent that they take buses or trains for free.
    4. **Cards for Adults (Youth)**
       - These groups of people are the economically active and productive sections of the society, of course without disability implying that they don’t have problems with mobility. In a similar manner, i.e. bringing their residence certificate to the transportation company in charge and paying 25 Yuan, they are entitled to get a transportation card. Having this card, they can take bus or subway with a discount of 9 Yuan.

In principle all citizens regardless of their ethnicity, age, gender, educational status, place of birth and the like are supposed to be provided with accessible and affordable public transportation at the right time in the right place.

Chongqing buses are categorized as high grade, medium grade and low grade levels based on the income level of passengers. This enables each customer to choose the grade which is easily accessible, affordable and suitable. The researcher realized there is a positive and direct correlation between personal income and the
means of transport used that is to say those passengers with low income (have-nots), prefer to use the cheaper means of transport such as subway and vice versa. For instance, some of the commuters who usually commute for work from the countryside to Chongqing city strive hard to save as much as they could so that they can support their dependents financially. To this end, they are obliged to take the cheapest public transport no matter how long they have to be in a queue waiting for public bus sometimes for more than half an hour which is against the law of sustainable development.

One of the respondents works and lives in Yongchuan (永川) and travels to Chongqing city every weekend. He responded that the fares for public bus are relatively fair compared to that of private bus fares. Even though they are efficient, private buses charge CNY 5 - 6 extra using different external factors such as the price of fuels as a pretext. According to him, government buses unlike private buses have specified fares, schedules, stops and stations. He added that public buses should have stop operation where customers can get an easy and direct access to services. Moreover, the respondent pointed out that, public buses sometimes take a long distance route in an attempt to avoid traffic which according to him doesn’t make sense as it wastes time almost equivalent to the amount of time they could have spent by following the regular route. Many drivers from different directions converge in the routes known by everyone as the “quickest or less encumbered” and worsen the degree of congestion.

Another major concern with regard to the public bus provision was the insufficiency of seats. The respondents have clearly explained that the sharp increase in the number of the urban dwellers of Chongqing in general and public bus users in particular, have left the passengers with no option but to be “squashed like sardines” reducing customer’s comfort. Hence, some of the passengers are forced to stand. Especially long distance travelers are exposed to suffocation, stress, fatigue and other discomforts.

It was rarely evident that some passengers fail to give seats to the physically challenged, the elderly, children or pregnant women. Being curious, the researcher has asked many of the native settlers including his teachers and classmates whether such phenomenon is common all over the city. But they strongly objected that many young people respect the elderly, their seniors, pregnant women, children and people with any impairment. They further elaborated that in every country there are always exceptions and those who do so are very few and don’t represent the hospitable and kindhearted Chinese society. Besides, one key informant mentioned that there was a time in which he stood up and gave his seat to a pregnant woman in her 30s out of sympathy but not only did she refused to take the seat but also yelled at him for his good deeds.

Nowadays, many young and old people agree on the facts that the youngsters, who are exposed to too many responsibilities in order to take good care of their beloved ones, are also getting tired. Hence, there is no universal guideline as to who exactly should give up the seat (the young or the old). Similar to many of the respondents, the author strongly believes that giving up a seat is a voluntary gesture. Apart from such minor incidents, however, the researcher would like to underline the importance of cherishing and preserving the extraordinary peculiar Chinese norms, values and traditions of mutual respect for generations to come.

David, 32 years old, is a British who has lived in Chongqing for more than seven years. He confidently claims that he is familiar with the ins-and-outs of the city. He has witnessed the dynamism in terms of population number, infrastructure, economy and physical size that Chongqing has undergone. Working as an English teacher, he was able to make many friends during the frequent travels to and from his work place. Some of the passengers are familiar with him and wonder with his ability to communicate in Mandarin (普通话) or Chongqing local (重庆话) dialect easily. Surprisingly enough he mentioned that they even ask him as to where he has been in case he didn’t travel with them for some time. He immensely appreciated the passengers’ respect and attitudes towards foreigners. This indicates the advantage of public transport in promoting social interaction and solidarity among users.

When asked about the future of public buses, about 90% of the interviewees, were too optimistic. According to them, public buses are the best options in densely populated cities such as Chongqing for their capacity, and for being environment friendly as opposed to private cars that are energy inefficient and huge
contributors to environmental pollution. Furthermore, they pointed out that public buses are great equalizers and crucial engines for social interaction.

However, a few of the interviewees were pessimistic when asked about the future of buses. They affirmed that traffic congestion prompted due to too many cars will continue to increase the route length taken by public buses thereby steadily reducing the travel speed. According to them, to avoid traffic congestion, short-distance travelers might prefer to walk or ride bicycles and motorbikes, as they are more flexible and relatively faster. At the same time long-distance passengers would prefer train to buses as it is more comfortable, safe and relatively faster. On the contrary, the researcher believes that success in any sector is about changing attitudes, overcoming hopelessness, using technologies effectively and organizing institutions.

The use of private cars, which are the prime reasons for traffic congestion, energy consumption and environmental pollution, therefore, should be restricted and the more attractive public transport should be encouraged. To sum up, the researcher suggests that buses in Chongqing should be accessible to all; with priority seating, having low-floor ramps and equipped with lifts so as not to exclude the needs of customers with disabilities.

- **Bus Driver – Passenger Relationship**

It is difficult if not impossible to conclude about the attitude of all drivers towards the customers or vice versa. Majority of the key informants have been satisfied with most of the bus drivers’ attitudes and treatment towards passengers. However, some of them pinpointed that some bus drivers mistreat passengers by ways of shouting, nagging or saying some offending words, which sometimes may result in unnecessary fighting. They also added that when frail old people or disabled people are entering into the bus, some drivers don’t often slow down and let them take their seats first. Some customers said that there are times when some drivers fail to follow the normal routes and continue driving without stopping at the specified bus stop or station while many people are waiting. This results in resentments and complaints among the bus users. In addition, the interviewees expressed that sometimes the bus conductors are also too rude and unfriendly. Similarly some customers also fail to abide by the rules and regulations of transportation. The drivers themselves also didn’t hide that they had been assaulted by some aggressive and impolite passengers. For instance, when there are too many people in the queue waiting for the bus, some passengers usually prefer to enter into the buses through the exit (second door) which is usually inappropriate. In this case it becomes very difficult if not impossible for the conductor or driver to distinguish those who did or didn’t pay which may result in confrontation. Mr. Li (李) in his 30s, a humorous bus driver who has worked for 6 years, “all people are unique, some are very obedient while others are rude but it is my moral and professional duty to be patient and serve them” he said.

With regard to the quality of buses, some of the customers mentioned that some buses such as Bus – 510, Bus - 518 are older, uncomfortable and unattractive. Therefore, the researcher highly recommends that the concerned authorities should replace such outdated buses with new, more spacious, energy-efficient and safer public buses and meet the needs of the public.

Both the drivers and customers have depicted their optimism over the future of public buses in Chongqing. According to them, the use of public buses will flourish and bloom if stakeholders exert tremendous effort in building and improving infrastructure, introducing energy-efficient buses, giving proper training and education for travel agents, motorists and nonmotorists.

Finally, other things being equal, the respondents commit themselves to continue using public buses for being flexible, lower capital costs, greater capacity,

- **The Role of Private Cars in Chongqing**

Although the research is geared to studying specifically urban public transportation in Chongqing, briefly describing the pros and cons of private cars in the city for the sake of comparison is of paramount importance.

Chongqing is a municipality of cars. Residing in the center of automobile production, the luxurious people, those who can afford own different brands of cars. The researcher figured out that many households
own more than two cars while many still don’t have even one which shows that there is still a wide gap between the haves and have-nots.

While describing her opinion about private cars in Chongqing, Mrs. YaoYao (瑶瑶), a resident of GuanYinQiao (观音桥), pointed out that many car drivers drive so fast as if they are in a race and end up in a derailment resulting in car damage, injury or death of the driver and other people, blockage of road thereby disrupting the smooth operation of transportation. She further commented that the municipality should look for a long lasting solution to overcome the vicious cycles of transportation by way of creating a favorable environment for people to walk freely and safely or by promoting the use of public transportation services.

Inhabited with too many people, having too many cars contributing to traffic jams quite often and emitting lethal green house gases such as carbon dioxide and sulfur dioxide to the atmosphere and consuming a huge amount of the finite energy, the municipality of Chongqing needs to tirelessly work to either minimize the severity or eradicate such problems completely. Some of the effective mechanisms to do so include bus-only lanes, flyovers, park-and-ride options, introducing electricity-powered cars and public transits.

• **Railway Transport in Chongqing**

  The two main railway stations in Chongqing are Chongqing Railway Station （重庆火车站） and Shapingba Railway Station (沙坪坝火车站) with trains connecting Chongqing with all major cities in China. Like Beijing, Shanghai, Guangzhou, Shenzhen, Nanning, Guilin as well as main attractions within or surrounding Chongqing.

  Trains are more preferred as they accommodate more passengers at a time and they run on time more than any other means of transport because they are controlled by computers. They are relatively fast and comfortable. With advancements in technology, some trains especially those that connect Chongqing with other provinces such as Sichuan(四川) and Guangzhou(广州) have comfortable spacious legroom, seats and beds where passengers can sleep.

➢ **Subway System in Chongqing**

  About 80% of the respondents described Chongqing subway which entertains many passengers at a time, as the fastest, relatively safe, more efficient and very comfortable. The subway fares are fare ranging from 1 to 7 Yuan depending on the travel distance. Besides subways systems stick to fixed schedules. Currently, they are confined to Chongqing city. Hence the customers hope Chongqing municipality to open the proposed subway lines including lines 4, 5 through 18 as soon as possible and connect the remaining counties, prefectures, districts with a network of subway system.

  One of the respondents commented that after the introduction of the subway, Chongqing became a typical international and modern city. However, some of the respondents have some concern with respect to the absence of inspectors inside the train. Once the customers get into the subway, it appears as though there is no law and order. Nobody is asking whatsoever inside the train. People govern themselves and feel a little insecurity. Similar to public bus transport, the proportion of passengers in Chongqing exceeds the carrying capacity and number of trains available. Overcrowding is an order of the day. Normally there are no enough seats for each passenger. Some customers are compelled to stand being exposed to suffocation and discomfort. Such circumstances may sometimes encourage crimes such as pick pocketing.

  When it comes to the overall satisfaction with respect to Chongqing’s metro system, a number of the respondents expressed their appreciation and optimism. However, some are ambivalent and somehow hopeless simply describing the subway system as expensive, inefficient and unsustainable. Similar to the other metros of the developing cities, Chongqing metro is currently confined to the heart of the city and is encountering a strong competition from buses, cars or other vehicles.

  From the researcher’s point of view, Chongqing subway has a great deal of advantages including its speed, cleanliness, comfort, information with regard to routes and transfers clearly written in Chinese and English and operator reminding passengers about their safety such as not to pinch hands and call the names of each station. Moreover, dangerous objects are prohibited.
• Minibus in Chongqing

Studies showed that minibuses sometimes referred to as paratransit system have been serving in China since the 1980s. Minibuses are flexible and can stop at any place along a more or less fixed route to pick up or drop off passengers. The minibuses in Chongqing charge 1 Yuan. They are small in size and often transport people between the city center and outskirts. Similar to the other means of transport, it is common for many minibus passengers to stand holding the hand rollers. This shows that they are relatively uncomfortable and less spacious. Recently, however, many of the minibuses for instance that of Beibei District are being replaced by bigger and new buses.

• Taxi in Chongqing

Chongqing has a number of yellow colored taxis with a capacity of 4 passengers that are relatively comfortable, flexible and faster. These taxis are confined to the urban centers. One of the local respondents keenly noticed that there was no difference between the old and new taxis and the fact that there was no progressive taxi upgrading for a very long time and some of the taxis were damped without considering their contribution.

No doubt, sharing taxi lessens the fare, saves energy, shortens waiting time and enables customers arrive their destination on time. Even though it is rare, there are some greedy taxi drivers who indulge themselves in cheating by way of charging the passengers who share the same taxi an extra amount. For instance, if the actual amount of money to be paid during the day time is 10 yuan and Mr. John and Mr. David who don’t know each other are sharing the same taxi, they paid 20 yuan instead of paying 5 yuan each. This act of breaking rules happens especially to strangers or foreigners. In this respect there is an urgent need to enact strong rules and regulations that forbid passengers and drivers from smoking inside the taxi and heavily punish transgressors for being engaged in illegal acts such as driving fast, smoking inside taxi, charging unfairly extra payments. Moreover, the implementation of such laws seeks continuous follow up by concerned authorities. By doing so, Chongqing will definitely continue to be one of the best places in the world to live and work.

• Motorcycles in Chongqing

Chongqing is a mountainous city with so many ups and downs. Motorbikes are more flexible, faster and cheaper than taxi but more expensive than public buses. Motorbikes are often owned by the relatively poor sections of the society who can’t afford to buy cars. It is very common to see many motorcyclists wearing their helmet and gloves queuing and waiting for passengers in every corner of the city streets.

• Non-Motorized Transport (NMT) in Chongqing

Non motorized transport systems which are useful for door-to-door transport of people and goods include walking, bicycle, tricycle, human porterage, wheelbarrows, animal- drawn carts and human-drawn vehicles. These modes of transport which don’t virtually cause noise or air pollution are ideal means of to get around cities. They require less space compared to the other modes of transport. Chongqing is a city where porters play a vital role in transporting people (especially in the mountainous areas such as the Black Valley, Wulong) and goods from one place to another. They usually use bamboo to carry goods on their shoulders.

○ Cycling (Non Motorized Transport)

Studies showed that even though it is sometimes constrained by climate and topography, bicycle acts as an alternative for walking in many poorer countries.

An article by the name “Revitalizing China’s Urban Pedestrian and Cycling System” (2014), revealed that China Sustainable Cities Program (CSCP) in partnership with China’s Ministry of Housing and Urban- rural Development (MOHURD) and the ministry’s think tank, the China Academy of Urban Planning and Design, has launched the “National Urban Non-motorized Transport Pilot Project” in 2010. The same pilot project designated Chongqing as one of the first six cities chosen to launch and promote pedestrian and/or cycling facilities. Chongqing has launched or expanded rental bike system accordingly.
Robert Earle et al (2011), on a study entitled “Electric vehicles in the context of sustainable development in china” found out that China is the largest producer and consumer of electric bicycles in the world. The study found out that in 2009, China’s production reached 23.69 million bicycles, and total population of electric bicycles reached over 120 million.

Biking is one of the most preferred methods of transportation for short-distance trips especially in congested urban areas such as Chongqing. Even though bicycle riding has many advantages, it is slower and has caused some problems for some roadway traffic. Large volumes of vehicle traffic have resulted in serious problems at street intersections and bicycles were identified to have contributed to traffic jams significantly during rush hours. A number of studies argued that some planners and government officials consider the widespread use of bicycles as incompatible with the ideal image of a modern city.

The absence of pedestrian – only and bicycle – only lanes in some streets of Chongqing coupled with the prohibition of bicycle use on major city roads or in the city center, has compelled cyclists to look for new long-distance routes as an alternative to reach their destination. In this case the pedestrians and cyclists are vulnerable to the wastage of a great deal of time and energy.

Launching bike rental system which charges at least CNY 5 per hour, is not enough by itself, rather it is crucial for the municipality to provide cyclists with adequate infrastructure where they can ride bikes freely and safely. Many of the customers who have rented a bike at least twice, uncovered that they felt scared not to be crashed because they share the same road with cars, buses, motorbikes and rickshaws.

In spite of these problems, many studies asserted that biking continues to be a major transportation mode in Chinese cities because it is cheap, environmentally-friendly, flexible, faster than buses and cars in very congested central cities particularly during peak hours and for the fact that it keeps riders healthy. In this regard Chongqing Municipality needs to realize the importance of constructing separate and spacious bicycle-only streets so that accidents, traffic congestion and pollution are minimized or avoided considerably.

- **Walking as a mode of Transport**

According to Enrique Penalosa (former Mayer of Bogota, Columbia) “deer need to run, fish need to swim, bird need to fly and we need to walk.” This prominent quotation uncovers the reality that almost every human being is a pedestrian. Apart from being easily accessible to everyone who is willing to walk for free, walking is entertaining and improves our physical fitness. It is the best, original and most natural mode of transport and the most important for its role in maintaining good health and for being environment friendly among other things. Health related studies showed that not only are walkers less susceptible to heart diseases, cancer, diabetes and other diseases but they also have the chance to live longer and spiritually and mentally stable lives.

The author witnessed that many of the inhabitants of the city are fond of physical exercises. It is common to see people of all ages walking, jogging, running and dancing. Most of the females in Chongqing involve themselves in doing physical exercises including walking several meters so as to lose weight(减肥) believing that it makes them healthy and look more beautiful. This partly ascertains that although walking is constrained by a number of manmade and natural factors, it is still a very popular mode of transport in Chongqing. However, Chongqing being one of the busiest cities where time is money, those who are willing to walk are constrained due to lack of time, shortage of safe and attractive places and sometimes unfavorable weather conditions.

Some of the respondents complained had encountered troubles while crossing roads and intersections. The respondents further elaborated that they often feel scared not to be run over by some irresponsible drivers while crossing roads. Chongqing municipality has played a central role in constructing safer crossing bridges in many places. But some of the key informants expressed their dissatisfaction and complaints with the insufficiency in the number of crossing points and sidewalks. They said that the relatively safer crossing bridges and pathways are mostly confined to the city center and those that exist are not enough especially with the dramatic increase in the number of both population and vehicles. This has resulted in a dramatic increase
the number of traffic accidents. In such circumstances, people share the same road with automobiles and risk their lives in case some drivers are speeding up.

Photo 4.1: Pedestrians running for their lives while crossing the road in Chongqing

Owing to the hilly topography, pedestrians are forced to climb very long and exhausting stairs (sometimes up to 100 steps or so) while traveling within the city. The presence of such stairs has been described as a barrier to pedestrians such as disabled persons, people carrying goods and cyclists. In addition to this, the existing sidewalks are frequently occupied by street vendors, parked cars, motorcycles and bicycles. Such encroachment of the footpaths which are primarily devoted only for pedestrians creates inconvenience in the movement of people.

Therefore, the urban transportation system of Chongqing to a greater extent could be characterized by the presence of mixed transport modes along a relatively limited network. That is to say, in some parts of the city, the buses of different sizes, taxes, motor cycles, bicycles, three-wheeler vehicles and the people use the same line. During such circumstances, people usually get caught in traffic jams which result in longer commuting hours, delay to work places and unnecessary stress. This partly depicts the failure of the city’s public transportation infrastructure to keep pace with the newly developing activities.

RanYanFei(冉艳飞), is a 21 years old, university student from Chongqing Municipality, Pengshui(彭水). She has a mixed feeling with regard to the urban transportation system in Chongqing. She described both the blessing and the curse that transportation has brought with it to the society. In her original words:

“Being a naturalist, I love living in Chongqing for the fact that it is a mountainous city endowed with green, breathtaking and aesthetic landscape and relatively less polluted environment (as the trees sequester CO₂), and is much easier for me to get a job. However, with a substantial increase in the average household income of Chinese in general and Chongqing people in particular, there is a corresponding increase in the private vehicle ownership far beyond the carrying capacity of the existing infrastructure. This has immensely contributed to traffic congestion, environmental pollution and traffic accidents. The domination of the roads by less energy efficient, small capacity and more pollutant cars adversely affects our wellbeing. I usually pay more than 16 Yuan for train and more than 60 Yuan for bus transport when I travel from Chongqing to Pengshui to visit my parents. In my point of view even this one is expensive. Personally, quality of life is more important than standard of living. Transportation system has to keep us moving whenever and wherever we want. It must be designed to protect our lives while at the same time making Chongqing the cleanest, walkable, livable and sustainable megacity.”

Undoubtedly, not all urban transportation problems can be addressed altogether in a blink of an eye. The integration of different land uses, the involvement of various developers, participation and empowerment of the public is a gradual process. For residents to walk freely and safely in the streets of Chongqing, the municipality in collaboration with the central government should take into account the importance of very
spacious, easily accessible streets and less tiring pedestrian-only lanes, bike-only and bus-only lanes. Last but not least, the transportation system of Chongqing should connect all places where people live, learn, work, shop, and play by providing them with convenient walking and bicycling facilities and other means of public transportation such as subway systems eventually creating harmonious relationship between the society, energy, environment and economy.

The researcher carried out SWOT analysis for the purpose of assessing and evaluating the strengths, weaknesses, opportunities and threats related to the current transport services in Chongqing. The following table is attempted to summarize the current situation as well as the prospects of urban public transportation in the city:

<table>
<thead>
<tr>
<th>Strength</th>
<th>Weakness</th>
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<tbody>
<tr>
<td>- Workaholic population (Human resources)</td>
<td>- High traffic exceeding road capacity</td>
</tr>
<tr>
<td>- Rich expertise and experience in terms of bus operation</td>
<td>- Financial pressure</td>
</tr>
<tr>
<td>- Cheaper price as opposed to the private sector</td>
<td>- High initial and operation cost</td>
</tr>
<tr>
<td>- Special attention by the central government towards transport in</td>
<td>- Relatively superseded bus services</td>
</tr>
<tr>
<td>Southwest China, “Go West”</td>
<td>- Dispersed settlements causing long travel time</td>
</tr>
<tr>
<td>- Rich natural resources endowment</td>
<td>- Topography</td>
</tr>
<tr>
<td>- Good accessibility of urban public transport</td>
<td>- Lack of service provision integration</td>
</tr>
<tr>
<td>- Local, regional and international railway lines</td>
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<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats</th>
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<tbody>
<tr>
<td>- Increased population number and density due to natural births and</td>
<td>- Transport or car culture</td>
</tr>
<tr>
<td>migration</td>
<td></td>
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<tr>
<td>- Rising demand for public transport due to rise in motorization and</td>
<td>- Dramatic increase in population and cars</td>
</tr>
<tr>
<td>traffic jam</td>
<td></td>
</tr>
<tr>
<td>- Government’s special attention towards public transport</td>
<td>- Aging population</td>
</tr>
<tr>
<td>- Government’s concern for environment</td>
<td>- Competition from other modes</td>
</tr>
<tr>
<td>- The new bus routes would increase accessibility and mobility</td>
<td>- Poor enforcement of laws and regulations</td>
</tr>
<tr>
<td>- Rising demand for public transport</td>
<td>- Increasing staff costs</td>
</tr>
<tr>
<td>- Rising cost of fuels to deter private car use</td>
<td>- Transport safety issues</td>
</tr>
<tr>
<td>- Geographical location (confluence of Yangtze and Jialing river)</td>
<td>- Deterioration in the quality of the environment</td>
</tr>
<tr>
<td>- The metro system would increase public transportation options</td>
<td>- Sprawling may result in temporary or permanent displacement of people</td>
</tr>
<tr>
<td></td>
<td>- Rise in fuel cost</td>
</tr>
</tbody>
</table>

By using these strengths and opportunities effectively and minimizing and avoiding the weaknesses and threats associated with transportation system, Chongqing could achieve a sustainable urban development where all residents are better off because basically sustainable and prosperous cities by and large focus on people not cars.
Sustainable urban public transport should be aimed at achieving equitable, accessible and affordable transportation, environmentally friendly (E.g. clean air and water) and yield a great deal of economic benefits. The ultimate goal of sustainable transportation system is that the adverse environmental impacts, traffic congestion and accidents related to transportation should be minimized or avoided if possible and citizens should be provided with equitable and easily accessible transportation facilities.

Transportation Related Challenges in Chongqing

By reviewing various literatures related to transportation, conducting in-depth case studies, interviewing key informants and through participant observation, the author has managed to identify some of the constraints that hinder urban transportation development in Chongqing. In addition to natural population growth due births, rural to urban migration is one of the daunting problems in Chongqing. This movement of people from rural areas to town and cities is partly attributed to the uneven economic development. Endowed with relatively advanced social service provision such as education, medical care, transportation etc. the glittering skyscrapers of the city attracted a great deal of migrant laborers. Such enormous flock of people into the city has posed a huge pressure on the existing resources and services such as transportation implying that there are too many people wishing to travel from their homes to their workplaces, schools and other service providing centers. That is to say, with a staggering increase in the number of population, the demand for transportation has increased simultaneously. Consequently, both the successful migrant workers and the better-off native settlers bought a number of motor vehicles that are not eco-friendly. Industrialization, urbanization, motorization and globalization could be either an opportunity or a threat depending on how they are handled. Chongqing unfortunately has not been spared from the vices of the complex urban problems including traffic congestion, greenhouse gas emissions, huge energy consumption and pollution among other things triggered due to the rapid rate of motorization. Thus, to mitigate these intricately related problems, the local government has to pay a special attention towards providing residents and visitors with accessible, affordable and environmentally friendly public transportation because mobility is crucial to the vitality of Chongqing. Besides for Chongqing to be a sustainable city, people should either live closer to their work or they should bring their work closer to their homes.
Chongqing’s Current Achievements in Transportation

The researcher strongly agrees with the widely used expressions “avoid the causes not the symptoms” or “prevention is better than cure”. As suggested by various studies, Chongqing has adopted avoid (superfluous travel), shift (to sustainable public and non-motorized transport) and modify (technologies) approach as a viable means of mitigating the transportation related problems. The government has realized that steady increase in the rate of motorization will inevitably continue to pose traffic congestion during rush hours irrespective of the size of the city road network. Thus, Chongqing once dominated by minibuses, buses, trains, planes and ships, has recently introduced the socially equitable, environmentally friendly, and economically efficient subway system. Currently, the four subway lines namely 1, 2, 3 and 6, are playing a central role in comfortably and safely transporting hundreds of thousands of passengers per day. In the last decades, Chongqing has achieved quite a lot in trying to meet the mobility and accessibility needs of its people.

With steadily increasing rate of urbanization, industrialization and motorization, Chongqing seems to have proved that it is a typical municipality of double happiness or double celebration where majority of its inhabitants are reaping the fruits of their hard work.

5. Conclusion and Recommendations

Conclusion

The findings of the research have brought the author to the conclusion that having its own merits and demerits, the transportation related urban problems are inevitable while their negative effects can be minimized by promoting urban public transit. Sometimes the development of megacities comes along with mega messes such as traffic congestion, development of squatter settlements, pollution, crimes and so on.

The skyrocketed urbanization and motorization growth rates of China have partly strained the urban transportation infrastructures, caused urban traffic congestion and worsened the urban air quality. Even though Chinese urbanization in general and the overall development of Chongqing in particular have been flourishing at a very rapid rate and great deal of the citizens have benefited tremendously, inequalities between rural and urban dwellers are an order of the day. Special attention need to be paid towards maintaining the peculiarly rich culture by which extended families up to four generations live under the same roof helping and caring each other. In doing so the government is required to provide the economically active sections of the population with well paid jobs, and all citizens with sustainable social amenities.

A meticulously designed, well-focused and planned urbanization promotes inclusive, efficient and sustainable development where the citizens can enjoy the benefits of the unparalleled developments without compromising the needs of the future generation ultimately ensuring intergenerational equity.

In the nutshell, the inquiry concluded that strengthening comprehensive rural and urban planning, encouraging efficient growth of smart cities and good governance not only help in minimizing or eradicating many of urban transportation related problems but also act as catalysts to promote continuous and environment-friendly economic development. To that end, the government, city-planners, decision and policy makers and other stakeholders need to work hand in glove to tap the available opportunities, predict and plan in advance the potential threats of urban transportation and work tirelessly to resolve the prevailing challenges.

Recommendations

Normally given the extraordinarily impressive level of transportation service provision Chongqing municipality has achieved in a decade, there would be no need for any recommendation. However, in human nature there is always room for improvement and for the fact that urban transportation is dynamic, some suggestions are provided in this segment of the research. These recommendations are meant to consolidate and where necessary, improve on the successes recorded.

Having referred to various literatures and through in-depth discussions with residents and participant observation, the researcher is optimistic that the economy, urbanization and transportation of China will show...
H. Y. Tekle

an overwhelming growth in the years to come. This will enable the country to narrow down the inequality between the rich and the poor, the urban and rural and create middle-income class. Similarly, being strategically situated in the southwest part of China, getting special attention by the central government, being wedged between the Yangtze River and the Jialing River and surrounded by beautiful green capped mountains, Chongqing will continue to be the leading and most successful city in the world provided that all these opportunities are properly utilized.

Apart from meeting the basic necessities, the smooth flow of goods and people, safety of people, equal access for all and environmental protection are among the basic requirements of any urban transportation system. There has been an incredible achievement so far in making Chongqing a symbolic hub by way of augmenting various kinds of infrastructure and improving the living standards of the inhabitants.

Bearing all the constraints and opportunities in mind, the following recommendations are suggested:-

• Safety and security of people is very important. Therefore, the presence of enough road crossings, pathway-networks, public elevators and escalators are efficient.

• To alleviate traffic jam triggered mainly due to the dramatic increase in the number of private cars, there is an urgent need for Chongqing municipality to charge fees on private cars during rush hours and impose parking restriction.

• People’s malpractice including smoking in public places, driving fast, not respecting traffic lights, driving while drank should be strictly dealt with by taking proper actions at the right time. For instance, in case there is an accident, the transgressor should be heavily penalized in the form of snatching a driving license or charging a considerable amount of money to deter others from violating transportation rules and regulations.

• Reduce greenhouse gas emissions from automobiles by encouraging the use of energy efficient vehicles and optimizing alternative source of energy such as solar, geothermal, wind, hydroelectric energy.

• Encourage people to use public transport and non-motorized transport modes instead of motor vehicles because it is environment friendly, solves congestion and consumes less energy and accommodates more people at a time.

• For Chongqing to be a sustainable city (wasting the least and conserving the maximum of the available resources), a coordinated effort is required from the part of all stakeholders.

• Public involvement in decision-making, planning, operation and management processes of transportation is crucial as it creates sense of belongingness.

• The municipality of Chongqing needs to preserve the already existing iconic historical and cultural features and ensure the presence of safer, calmer and spacious residential streets.

• To ensure the best connections between different modes of transportation a very detailed master plan and urban design is required.

• Chongqing municipality in collaboration with the central government should learn a lesson from the experience of other cities where the well-to-do usually escape to places where they can enjoy a better quality of living while the needy are left with no option but to remain under poverty trap and marginalization. Instead the gap between the haves and have-nots should be kept at its narrowest level because income inequality begets unhappiness. That is to say any service provision program should first take the needs of all beneficiaries into consideration.

In order to achieve the above stated basic goals, however, Chongqing municipality should exert a concerted effort on innovation, financing, planning, transport demand management (TDM) and modal integration.

This study has both its strengths and limitations. It is expected that both ends would be explored further for the improvements, as the case may be, of Chongqing’s urban public transportation. Therefore, thorough
researches should be conducted to further identify the spatio-temporal variations in the distribution of transport modes in the municipality and come up with concrete measures to attain equilibrium between the demand and supply for transportation.

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