

## **Changing Dimensions of a Livable City: a Case study of Wuhan**

### **Introduction**

China's urbanization over the past more than 50 years was a journey full of twists and turns. The keywords of China's urban development have changed from *industry* in the 1950s to *economy* in the 1980s and *livelihood* in recent years.

The 2010 World Expo in Shanghai identified its theme as Better City, Better Life. The human-oriented slogan indicates a diversion in China's urban development away from the economy centered approach. The popularity of words such as green, ecology, sustainability, low-carbon and livability in cities around China in recent years also indicates that we have entered a new era of development. Various polls and surveys are published each year on livability, competitiveness or even the happiness index of cities or their residents. However, we also need ask ourselves one question: is there universal standard of livability? Is there a definite and fixed set of criteria?

By looking at China's urbanization and reflect on our own understanding of livability as an urban resident in rapid social transition, it is easy to discover that besides the shared assumption, livability can be highly specific to different historical periods and different social contexts. What as urban planners and designers need to do is to identify things we can do and can do best to facilitate changes towards a more livable city?

As a part of the top-down system in which the urban development of individual cities follows the strategic guidance of the central government, the trajectory of Wuhan's urban development can serve as an example for us to understand the past history, the current challenges and future step we need to take if we are to head towards the direction of a livable city amidst China's rapid urbanization.

### **1. Understanding livability**

#### ***1.1 Livability assessment and ranking***

In 2007, a report named the Scientific Assessment Standards of Livable Cities (Table 1) was published by the then Ministry of Construction, aimed to serve as a quantitative index system to guide and assess the development of livable cities in China.

The system comprises six major index including social civilization, economic prosperity, environmental soundness, resource sustainability, living convenience and public security; 23 sub-categories and 74 specific scores based on different weight. Among which ecological environment weighs the heaviest followed by housing, municipal facility and urban traffic.

<b>Scientific Assessment Standards of Livable Cities</b>	
<b>Major index system</b>	<b>contents</b>
Social civilization	a. political civilization; b. social harmony; c. community civilization; d. public participation
Economic prosperity	a. per capita GDP; b. disposable income of urban residents; c. per capita fiscal revenue; d. employment rate; e. percentage of tertiary industry employment in total employment
Environmental soundness	a. ecological environment; b. climate; c. cultural environment; d. urban landscape
Resource sustainability	a. per capita fresh water resource; b. recycling rate of industrial water; c. per capita urban land use; d. food security
Living convenience	a. urban traffic; b. commercial service; c. municipal facility; d. educational, cultural and sports facilities; e. green open spaces; f. urban housing; g. public health
Public security	a. completeness of life-line projects; b. facility, mechanism, precaution against natural disasters by the municipal government; c. facility, mechanism, precaution against human-inflicted disasters by the municipal government; b. rate of successful handling of public security issues in past three years by the municipal government
Negating condition	a. high crime rate; b. serious social polarization; c. serious pollution d. serious fresh water deficiency or ecological deterioration

*Table 1: Scientific Assessment Standards of Livable Cities (Source: Research project by the Ministry of Construction 2007)*

The index system is nearly all-inclusive and accords well with the generally accepted sustainability framework which comprises the environment, economy and equity. The system is supported by a weighing mechanism for contents listed under six major categories of index; a negating condition which causes a sudden-death for the livability assessment of a city when it falls into the four listed conditions.

Quite similar to this system, the Chinese Institute of City Competitiveness has also put forward an assessment system named GN Assessment Index System for Livable Cities in China which was described by the institute as: comprises 7 level 1 index including ecological & environmental health, urban security, living convenience, living comfort, economic prosperity index, social civilization index and city reputation index; 48 level 2 index and 74 level 3 index. Since 2007, the institute has published annual reports on the ranking of cities in terms of their livability among other competitive factors (Table 2).

	2007	2008	2009	2010	2011
1	Shenzhen	Hangzhou	Qingdao	Nanjing	Qingdao
2	Zhanjiang	Chengdu	Suzhou	Xiamen	Suzhou
3	Shiyan	Weihai	Taizhou	Nantong	Guiyang
4	Xuchang	Shenzhen	Xiamen	Liaocheng	Hefei

5	Huanggang	Kunming	Ningbo	Shaoxing	Jinhua
6	Jiujiang	Zhuhai	Changsha	Yunfu	Weihai
7	Mudanjiang	Guiyang	Liaocheng	Ganzhou	Yunfu
8	Loudi	Jinhua	Hechi	Yinchuan	Xinyang
9	Xiangtan	Qijing	Baotou	Xinyang	Zhenjiang
10	Liaocheng	Shaoxing	Xinyang	Dandong	Suifenghe

*Table 2: Ranking of Most Livable Cities in China 2007-2011 (Source: Chinese Institute of City Competitiveness)*

An interesting fact arises in this ranking, although the index system seems to be precise, the outcome lacks consistency as many cities can be number one in one year but totally absent in the list for another year.

Despite of the minor differences, the two systems illustrates well a destination for a livable city but neither of them offers solutions to the current problems to a city, nor does it reflect the dynamic development process of a city. As urban planners and designers, we should look at livability in another light.

### **1.2 Livability: planner's perspective**

As Zhang Tingwei has pointed out in his article *Basic Principle in Urban Planning is Common Sense*: Most mistakes and wrong doings in the planning practice in China are rooted in neglecting people's basic needs or common sense. Only by understanding and satisfying residents' basic needs, could urban planners fulfill their professional mission.

The principle is especially true in our research and planning for livability.

Livability is fundamentally a concept about people's quality of life above anything else. The public is the basis and ultimate target group in the development of a livable city. From the perspective of a resident, what makes a livable city seems quite self-explanatory: a good place for living, working, travelling and recreation. So, what does it mean for urban planners and designers?

- A good living environment comprises the adaptation and adjustment to the local climate, the protection of the natural environment such as air, water, soil and urban greenery. The quality of the urban built-up environment including the provision of urban infrastructure, municipal facilities, amenities, sufficient and good indoor and outdoor spaces.
- A good working environment involves the provision of employment opportunities through the reasonable zoning and functioning of urban areas.
- A good travelling condition means not only the circulation infrastructure, the transit system and the traffic flow of the city but more importantly the compactness of a city, the reduction of commuting and traveling distances.
- A good recreational environment bears the social and cultural significance more than a mere physical space for people to relax. It is ideally the place people communicate (verbally or no-verbally) and bond with each other and a place where we can experience or build the local history and culture.

Livability should first and foremost be the perception and assessment of the city from the perspective of the urban dweller, and then the criteria and standards put forward by urban

planners and researchers and then the decision-making and objective set by the authority. It is natural that different parties may have their own perception of the term and it is important to for different parties to understand their own roles in making a city more livable by understanding the dynamics of a city when it progressed towards livability and by keeping a balance to complement the strengths and offset the weaknesses between different sides.

### **1.3 The dynamics of livability**

In a way, although the above standards may seem universal but actually there is no fixed definition and measurement as the criteria for the word *good* itself may change its meaning and shift its focus over time. The connotation of livability may evolve with time and it is always relative to different dynamics, here we may once again refer to the three major dimensions of sustainability to briefly discuss the question:

- The environmental dimension:

Climate change, deterioration of natural or built-up environment over time may render a place un-livable while technological innovation and careful planning and design may make places previous un-habitable an livable environment; Examples of the former case are plentiful around the world and the recovery of brown fields in many parts of the world can serve as good examples of the latter.

- The economy dimension:

As economic development and wealth distribution is notoriously uneven around the world, it is hard to draw a line in terms of average income or per capita GDP as a definite standard of livability; rather, the purchasing power of the average resident, the track record and potential for sustainable economic growth of the city should be the most important factor to be considered in this regard.

- The equity dimension:

Livability is always a relative term. The living standard of an ancient king may look bleak, a least in certain material aspects, in modern eyes. In the same way, the luxury house we own nowadays may just seem like a shabby shelter by the standard of our future generations. Like the old Chinese saying goes: What's dangerous for a society is not scarcity but unevenness. Whether a city is livable or not in the social sense lies in the fact that whether people enjoy an equality of material possession and social status.

To put it in a simple way, a city is livable only when the quality of life constantly improves and it can satisfy or even exceed the expectation of the people. So the key is change, and change for good.

## **2. Wuhan's Urbanization: shift of key words**

Take Wuhan as an example, we need to look into the strengths and weaknesses of Wuhan in becoming a livable city as a dynamic and ever-changing process amid rapid urbanization and social development. Here is a brief account of Wuhan's urbanization.

- In the 1950s to the 1960s, the key word of urban development in cities all around China was *industry*. Shortly after the founding of the People's Republic of China, the strategy of the central government was to boost industrial development in the cities as a measure to

enhance the overall strength of the nation. Wuhan, which was historically famous for its industry ever since the Qing Dynasty when the Hanyang Armory and manufacturing plants were set up around the city saw its status as an industrial city more than reinforced when factories mushroomed in the city during this period such as the iron and steel industry, heavy machinery, ship and boiler making along with many others. But due to the lack of the technical, financial resources as well as environmental awareness, the natural and ecological environment was severely damaged as a by-product of industrial development during the time.

- After the Cultural Revolution, the focus of urban development began to shift towards the improvement of living condition of the urban residents. Housing area was greatly improved; schools, stores and other services were built in residential areas; large shopping centers, banks began to emerge; urban infrastructure for transportation, communication, power and water supply witnessed unprecedented development. Of course, Industries were not overshadowed by the improvement of people's livelihood and continues to expand except for the relocation of certain factories with severe pollution to further away areas, such as the then urban fringe areas. The key word of the time is predominantly, the *economy*.
- Entering the 21<sup>st</sup> century, urban development, backed by a strong growth momentum of the economy, has taken a further leap forward. With the transition from welfare allocation of housing to a market-oriented commercialization of housing since late 1990s, the housing sector soared in recent years, which in turn led to the rapid development of municipal infrastructure and facilities. The sprawl of the urban area has caused enormous increase in consumption of water, land and other resources as well as the worsening of environmental deterioration, urban traffic. With the improvement of their living condition inside their households, people are more and more concerned with the issue outside of their houses. The key word of the time is more a concern and an ideal than a summarization of the real situation: *livelihood*.

The change of keywords may assist us in the understanding of the term livability and people's changing conception of it over time.

When material wealth is in scarcity, livability is about the survival of the people, thus the economic growth and the life sustaining ability of a city; when relative prosperity is realized in the city, the focus on livability shifts to the environment which was sacrificed for economic development; when the society further progresses, the concept of livability is further extended to social equity in terms of wealth distribution, equal rights and opportunities for different social groups.

### **3. Livable Wuhan, the changing dimension**

To address livability of Wuhan, it is not possible and necessary to have an all inclusive analysis of all aspects, a more pragmatic and efficient approach is to see like an ordinary resident and think an urban planner. The paper aims to identify the most dramatically changing dimension and thus the problems most relevant to people's lives at the moment and to propose the possible steps we can take to turn Wuhan into a more livable city as urban planners.

### ***3.1 Thermal comfort of the oven city***

The perception of livability is highly specific to the natural environment which is closely related to the natural environment and resources. But since these factors are quite vulnerable in a sense, whether a city is livable or not may be an issue which changes with time. First let's look at the climate of Wuhan.

Though located in the temperate zone, the climate in Wuhan is far from physically comfortable due to the significant temperature difference in seasons. According to the Wuhan Statistical Yearbook 2010, in 2009, the highest recorded temperature was 39.1 Centigrade Celsius on July 18<sup>th</sup> with an average temperature of 30.3 Degree for the month; the lowest was -4.6 Degree on January 31<sup>st</sup> with an average of 4.5 Degree for the month. The temperature range of the year amounted to over 43 degrees. In summer Wuhan is known as one of the three ovens in China, referring to its torrid weather; in winter, due to the high humidity and lack of heating in many offices and apartments, the city goes into another extreme.

In recent years, climate seems to have become a less important issue in people's mind regarding the overall livability of the city because rapid economic development and the income increase of the residents have rendered it possible to have air-conditioning or heating system in both offices and homes.

Yet the problem should not be overlooked as the homes can be air-conditioned but the city can not. Heat island effect has become a serious problem in the city because it is not only a thermal comfort problem it may also cause the concentrating of harmful gases in and around the heat island thus affect the health of people.

### ***3.2 Water, asset or liability?***

Wuhan's urban development has always been linked with water.

Wuhan is known as a city of a hundred lakes, meaning its abundant water resource. Besides the Yangtze River and Han River which run through the city, Wuhan also has the largest inner city river in all Chinese cities, the East Lake, among nearly 70 other lakes.

Water is a great asset universally for a livable city not only because it is a necessity to support life but also of great value as an environmental amenity. And Wuhan is particularly favored in this sense.

Wuhan boasts an extensive waterway network and abundant water resources. The per-capita water resource stands at 91,953 cubic meters, which are 39 times the national average and 10 times the world average. With a total area at 2187 square kilometers, water area accounts for 25.8% of the total metropolitan area. As for the urban area, water account for 11% of the total area at normal water level, the highest among all cities in China.

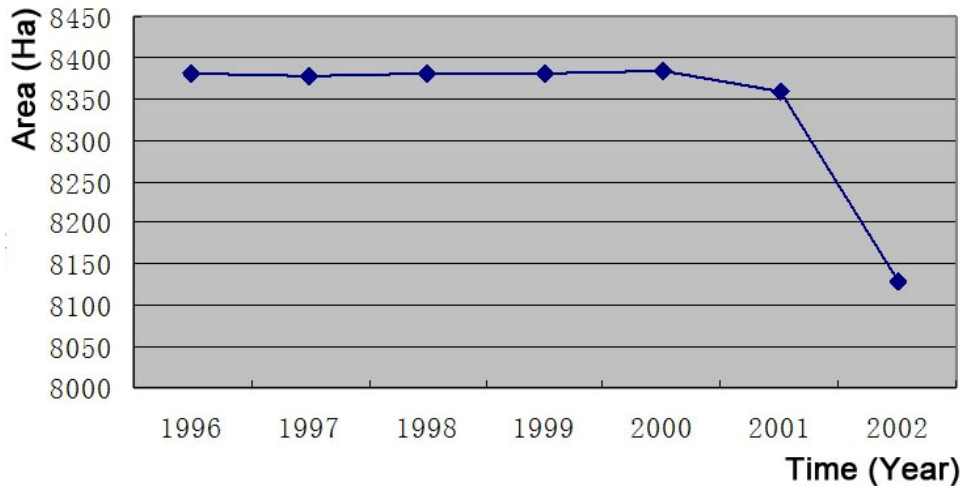
The Yangtze River and Han River also divide the city into three towns, namely Hankou, Wuchang and Hanyang, which gives the city a unique urban structure in China or even the world at large.

Water resources bear great significance for the city in terms of regulating air quality, climate, pollution, flooding and nutrients cycle, but also great enriches the urban landscape and tourism development.

However, the relationship between city and water has undergone a lot of changes. The city

originated around the Yangtze River as an important hub for transportation, therefore the riverside area was regarded as one of the most livable area for residents in the city and some of the earliest settlements were built along the river; but the area can also become highly risky in rainy years or seasons because of flood; the city authority built up enormous embankments along the river to protect the city from being flooded.

Since the 1980s, with the fast expansion of the urban built-up area, large number of water-front areas have been transformed into development land. Sewage disposal and the deposit of silt have also caused encroachment the water area (Fig. 1).



*Fig.1 water area changes in Wuhan, 1996-2002 (Source: Preliminary Research on the Revision of Mater Planning of Wuhan2006-2020)*

Another example is the East-Lake, with a picturesque view, the lake area seems obviously livable by today's standard, but in fact, the lake was seriously polluted during the 1980s and 1990s; the dark color, foul smell and unpleasant sight of dead fishes floating on the surface persuaded many people that the lakeside area was un-livable and large part of it was infilled and turned into land area.

Till late 1990s, the municipal government decided to clean up the lake and put it under strict protection by turning it into a scenic and natural reserve; the lake has since become an important livable feature or at least an show-piece for many property developers that any new apartment built around the lake with a view of it can easily sell at a price over 10,000 Yuan per square meters, nearly twice the average housing price of the city.

Still, many lakes in the city are seriously polluted. In the survey by the Wuhan Environmental Protection Bureau on the water quality of the 69 major lakes (reservoirs) in the city in 2010, 4 lakes or 5.8% of total water area are classified as level 2 (a high quality); 12 are level 3, 17.4%; 18 are level 4, 26.1%; 12 are level 3, 17.4%; the remaining are level 5, the lowest quality as being seriously polluted, at an worrying percentage of 33.3%.

The fate of the Yangtze River and the East Lake is clear demonstration that naturally occurring or human-inflicted changes over time to the environment can easily turn an asset of livability into a liability; the key here can be technological or engineering innovation, or simply the change of political will and administration, but most importantly, the economic growth mode and the industrial composition of the city.

### ***3.3 Travelling in and between the three town***

Like in most Chinese cities, traffic congestion has been a headache for the residents and city authority thus a detriment to the livability of the city.

Besides the commonly seen reasons such as ever-growing number of automobiles and the never-sufficient-enough road infrastructure, some problems lie deep in the geographic composition and the functional structure of the city.

Geographically, Wuhan is divided into three towns by the Yangtze and Han rivers, namely Hankou, Hanyang and Wuchang with a relatively clear-cut urban function assigned to each. The Hankou district in the north is predominantly a commercial center; Hanyang, the industrial center and Wuchang in the south an educational and cultural center. The geographic and functional division has led to the uneven distribution of housing and employment, the northern part homes 46% of the population but offers 61% of the total employment. The uneven coupling of housing and employment results in large numbers of commuter across the Yangtze River. During rush hours, it is common place to see the he two most-used bridges and the newly built underground tunnel saturated or congested with traffic.

To ease the problem, the municipal government resorted to the widening of the current streets, the building of new elevated expressways, a new urban subway system, several new bridges etc. According to a Wuhan local newspaper, The Chutian Metropolitan Daily, around the city there are over 5000 construction sites simultaneously in operation in Wuhan. This has further worsened the traffic congestion.

Another attempt has been the high charges on vehicles go across the rivers beginning from July 1<sup>st</sup>, 2011. The move was widely complained by urban residents especially commuters and was criticized by major media for its unreasonable pricing and the possibility of hurting the overall business development of the city and the connection between the three towns.

### ***3.4 The fading image of a people's city***

Compared with other name-card cities such as Beijing, Shanghai and Guangzhou, Wuhan is relatively lagged behind in terms of economic development but in many aspects more livable in its history, especially in the 1980s and the 1990s when the development gap was much less evident.

Wuhan was known for it low consumption price, especially for food and housing, a leisure life style characterized by little work pressure and slow pace of daily life; in this sense, it was quite similar to Chengdu, the capital city of the south-west Sichuan province.

Wuhan is traditionally a important transportation interchange in its history due to its location by the Yangtze River, the second largest river in china and also approximately in the geographic center of the nation. In its more than 3000 years of history, the city served as an important hub for the flow of goods and population. Culturally speaking, the city is less prominent politically like Beijing and less socially differentiated like Shanghai and Guangzhou. Thus, the local population is basically more homogeneous in their cultural background and wealth distribution. The city enjoys a worldly local culture which suits the lifestyle of a large number of relatively lower class working population and local residents.

After the founding of the People's Republic of China in the year 1949, the city was deemed an



industrial city with the allocation of various heavy industries such as iron and steel production, ship-making, boiler manufacturing etc. Before the reform and opening-up in 1978, the society was organized in a highly centrally planned manner.

In the old districts of the city, people live in crowded traditional Linong (alley houses), while new urban developments at the time are closed related to and based on the working unit (or Danwei as in Chinese).

A working unit normally comprises the working area (factories and plants), the residential area for employees, service and amenities. Basically, a working unit serves as a module community which makes up most areas of the new urban development at the time.

It was conceived as high livable then. Firstly, as the workplace and residence are located within the distance of walking or bicycles, the commuting in the working-unit is usually quite comfortable for the employees and generally inflicts very little traffic on the urban circulation system. Secondly, it is a community which is highly homogenous in that most of them are co-workers in the same factory so they are similar in terms of cultural background, education, income and social status.

People have also had a strong sense of belonging because they work in the same enterprise and they are closely bonded by their good neighborliness. People usually know each other very well and there are frequent contact with each other. Despite of the relative low living standard of the people, a sense of equity in the community made life inside of a working-unit at the time quite satisfying for most people. One of the most representative and memorable urban life images of the time is families spending summer nights outside of their houses on bamboo bed (Fig 2).



*Fig 2. Wuhan summer night, 1990  
(Source: photograph by Xie Guoan)*

Following the transition from welfare allocation of housing to a market-oriented commercialization of housing since late 1990s, a lot of these working-unit based neighborhoods are relocated or demolished and replaced by high-rise, gated neighborhood where the bond between people is almost non-existent.

Certainly, what's valuable is not the substandard quality of life at the time but rather the close bond and the sense of equity between people; also the working-unit based mode may also give us some new enlightenment in today's Wuhan if we were to build a livable city of true compactness, less traffic and more social connections.

#### **4. Towards a more livable Wuhan**

To address the livability concerns in Wuhan, it is important for us to rethink the way of our urban development and the major steps to be taken in term of urban planning and design.

##### ***4.1 Plan and design with nature***

The harsh climate and polluted water in Wuhan gives us two examples.

We may be able to control or block out nature as we do with the climate by using air-conditioning and other technologies, but the overall impact in form of urban heat island effect remains and may hit us even harder.

We may abuse nature as we do with the water resource of Wuhan in assuming that it is an infinite carrier of human-inflicted pollutions. But reality has taught us a lesson otherwise at the expense of money, health, time and the quality of our lives.

Therefore, the way is to preserve nature: making use of it within its sustainability.

Excessive sunlight can be blocked out side of our house through passive design, but they can be important energy source if actively utilize; water resources in Wuhan bears great potential for recreational and tourist development which can be a viable source for economic development and employment opportunities.

An ecological approach in its development is therefore a necessary path for Wuhan to achieve true livability

##### ***4.2 Rethink the module of urban development***

The old working-unit module may have been the closest thing we have had to concepts such as Compact City and Smart Growth; it may offer enlightenments on how to solve the traffic dilemma or even the economic, social problems of the city.

In Wuhan and many other Chinese cities the old working-unit still exist mainly for government institutions, state own enterprises, higher educational institutional etc, which still employ the old working-residential combine mode thus provide employment, housing, social bond in a relatively compact community.

Of course, it is not right to fall into nostalgia of the past or go into the argument of a socialist mode of urban planning is the best solution. The lessons we can learn from this mode are:

- We need to facilitate the transition of economic growth mode from the highly location-sensitive secondary industries into the less location-sensitive tertiary industries so that the employment center of a city can be divided into smaller scale and be more evenly distributed; thus the urban blocks can be reduced to smaller sizes, which may help realize the true compactness, mixed-use of urban communities and
- Traffic may then be greatly reduced by the decreasing need for commuting or long-distance travelling. Besides building more roads and imposing strict traffic control measures, this approach seems more promising as it can reduce the need for travelling from the very basis by placing housing and employment with walking or bicycling

distances.

- The new mode may also help re-establishing of the social ties between people and the building of a sense of community which is of great significance in making a place more livable. Smaller communities and the chance to work together are certainly quite promising in this regard.

## **Conclusion**

Livability may bear no absolute definition but it is surely should be the pursuit of every city in the world. Livable issues can be address from the environmental aspects, but comared to other aspects it is just the easy part; more profound issues lie with the change of urban development module and the related economic growth mode, social connection and equity, among others. While Chinese cities such as Wuhan are seldom found on the list of world's most livable cities, no one can deny the improvement and potential of these cities. Few countries in the world may build a new city from scratch like many Chinese city do, therefore it is also safe to bet that in China, changes may come faster than elsewhere in the world, but of course, the precondition is that we understand livability correctly and make changes towards the right direction.

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