THE SUCCESSFUL DEVELOPMENT OF URBANIZATION AND URBAN AGGLOMERATIONS

Yueyun (Bill) Chen
University of the West, Los Angeles, USA
E-mail: billchen@uwest.edu

Xingong Li
Henan University, China
E-mail: lglg998@126.com

Lianlian Lin
California State Polytechnic University Pomona, USA
E-mail: lindallin2@gmail.com

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Abstract

Urbanization has been increasing rapidly world-wide in the past many decades. This paper discusses important factors that affect the successful development of urbanization and urban agglomerations and examines their relationships. Based on Chen (2019)'s findings, this study included sixteen factors. Through surveys of three different groups from China - college faculty, business executives, and government officers on the importance and relevance of these sixteen factors, this paper explores how a city and an urban agglomeration can be successful. It concludes that a city's ability to influence its adjoining areas is the essential function of its existence and that the innovation and sustainability are commonly agreed factors that will lead to the cities' success. Then this paper further discusses how China can learn from other countries' experiences and lessons to better plan its future urban development.

Keywords: urbanization, urban development, urban agglomerations, China's economy.
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I. Introduction

The rise of urbanization has been a global trend. The following figure shows the change of urban population from 1960 to 2017. In 1960, about 33% of the world's population lived in the urban areas and the rate was increased to about 56% in 2017. The urbanization rate currently is about 82% in the US, 91% in Japan, 74% in Germany and almost 100% in Singapore. The urbanization rate in China was 10.6% in 1950, 17.9% in 1978 and 63.9% in 2020. According to the United Nations statistics, the urbanization rate of underdeveloped countries had risen from 16.7% to 28% during

1950 to 1975, and from 35% to 48% during 1990 to 2014. The World Bank estimated that by 2050, the urban population will be more than doubling its current size, and nearly 70% of people in the world will live in cities.

The rising urbanization is the result of a country's economic development and economic structure change. In return, it promotes and enhances the country's economic and social developments. When more cities are created and more people live there, the demand for many products and particularly services will increase significantly. The governments also need to invest much more in infrastructures and other public products and services.

Each city has its own functions and competitive advantages to attract and better serve its people and businesses. However, each city has its own limit of providing needed resources and services. As a result, nearby cities are connected and cooperate together to form an urban agglomeration as that has happened in the world. An urban agglomeration connects cities and towns as well as people among these cities/towns; and it also allocates and integrates resources, industries and businesses. As a result, the density of population that lives in cities has been increasing and more people are living in fewer lands. In the US, over 70% of people live on less than 2% of its land.

Figure 1. World Urban and Rural Population

(The total number of people living in urban and rural areas. Data source: World Bank)
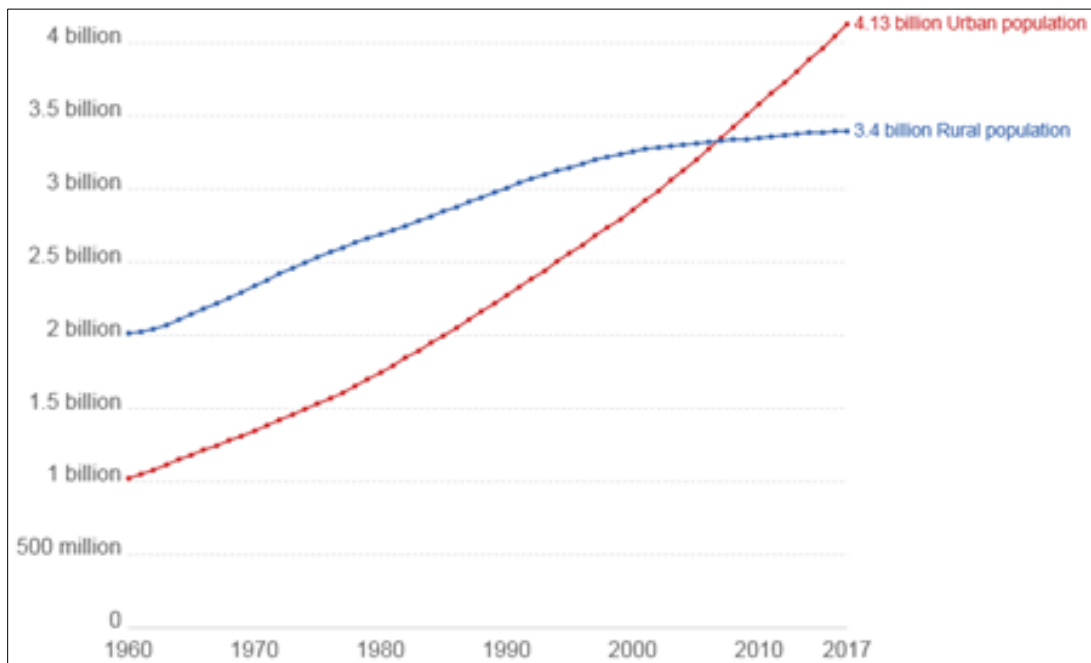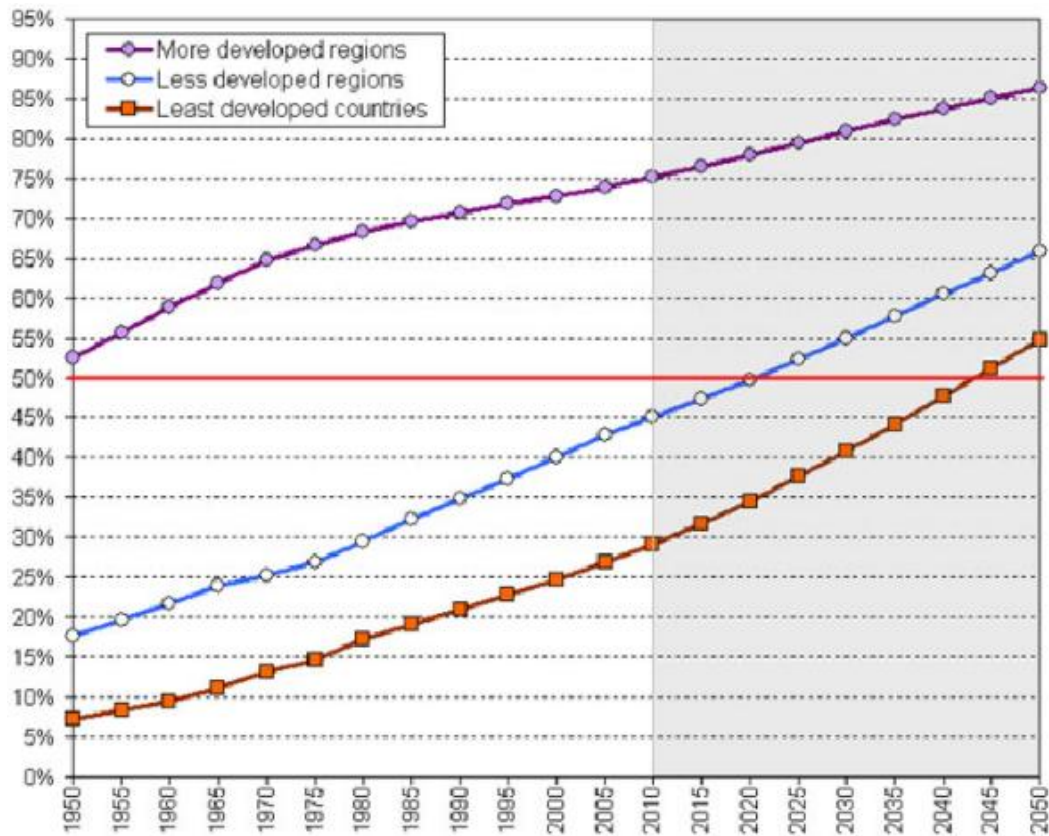
Figure 2. Urban Rates of Development Stages (Data source: World Bank)

Many cities and urban agglomerations have been very successful in its plans and developments. However, some cities and urban agglomerations have failed and its influences and population are diminishing. Given the importance of urbanization and urban agglomerations, it is interesting and essential to explore what have led to the success and failure of urbanization and urban agglomerations in the world.

Chen (2019) identified sixteen factors that affect the successful formation and expansion of cities and urban agglomerations. The development of a city must satisfy certain conditions and possesses certain characteristics that make it work. The 16-factor model for this research consists of eight conditions and eight characteristics. The following eight are prerequisites for fruitful urbanization: (1) cohesion/attractiveness - a city must attract people, capital, and trade; (2) scale - a city must be big enough with economies of scale in terms of production, consumption and transportation etc.; (3) influence- a city is able to affect its neighboring areas and the economy and people's lives there; (4) humanity - a city not only is about economic activities, but also has rich cultural and social activities; (5) integration- a city must integrate industries and production chains so as to bring integrated effects; (6) share - various recourses and facilities are shared; (7) spillover - spillover of various technologies, knowhow, and

capital as well as the spillover effect; (8) comprehensiveness/multi-function - a city must have infrastructures and various facilities for the purposes of production and social life.

There are twists and turns in urban development. In order to maintain its robust development and strong competitiveness, a city must possess the following characteristics: (9) open - open for new talents, thinking/ideas, culture and education; (10) competitive - cities grow in competitions just as enterprises do; (11) innovative - a city must keep reforming and innovating in its technology, development, management and organization; (12) balanced - a city must balance among various interests, relations and functions/purposes; (13) aggressive - a city should not only just satisfy with the current situation but also keep advancing; (14) sustainable - a city must be sustainable in terms of environment, talents, and resources; (15) inclusive - a city must be inclusive to different cultures, education backgrounds, races, religions, and people at different income levels; (16) distinctive - every city is distinctive in terms of its culture and economy.

Based on the 16-factor model above, this paper focuses on whether and how much each of these 16 factors is important through surveys of three different groups - college faculty, business executives, and government officers. It further studies the relationships among these factors. In addition, it discusses how China can improve its urbanization and urban agglomerations in the future through learning of the similar experiences and lessons of other countries. The rest of the paper is organized as follows: the next section reviews the literature on the relevant fields; Section III explains the survey samples and discusses the results; Section IV examines how China can learn from other countries; and the last section concludes the paper.

II. Review of Literature

To be successful, a city or an agglomeration must stay competitive. In order to be competitive, a city must be productive. There are three economic theories about urbanization and agglomerations that explain why a city or an urban agglomeration is more productive (Ciccone and Hall 1996, Glaeser and Gottlieb 2009, and Capello 2009). One theory focuses on the cost reductions of moving goods within space (Krugman 1991, Davis and Weinstein 2005, Ellison et al. 2007, Baum-Snow 2007, and Duranton and Turner 2012). Because of high density and large demands/supplies, the transportation costs in cities will be much lower (Glaeser and Kahn 2001, and Glaeser and Kohlhase 2004).

The second theory emphasizes the human capital and its benefits of moving skilled labors across firms. Cities attract many skilled workers and that benefits all firms (Becker and Murphy 1992, Glaeser and Mare 2001, Helsley and Strange 2004, Overman

and Puga 2010, Rosenthal and Strange 2008,and Ye, et al. 2016). The third theory links to the creativity and innovations. When many skilled and professional people live and work closely together, new ideas will be spilled over fast and innovations will be rapidly facilitated (Audretsch and Feldman 1996, Duranton and Puga 2001, and Herstad and Ebersberger 2014).

There have been numerous theoretical and empirical studies on urbanization and urban agglomerations. Recently, some have focused on studying the second-rank (tier) cities (Camagni and Capello 2015, Parkinson et al. 2014, and Agnoletti et al. 2015). Many super large cities have experienced serious problems, including rising crimes, shortage of housing, outdated infrastructures and declining of population. On the other hand, the second-rank cities are blooming, which is true in many developed countries and also occurring in developing countries like China.

Chen (2019) conducted comprehensive reviews of studies on the world's urbanization and urban agglomerations and concluded that sixteen factors are the most important and relevant to the cities and agglomerations' success. This paper is based on the special surveys on how important and relevant these sixteen factors are. Then it uses the survey data to analyze how these factors are associated and correlated. It further discusses how China can learn from other countries' similar experiences to improve its future urban developments. The results from this study provide the different opinions and views on the urbanization and urban agglomerations from three different groups - the college faculty, business executives and government officers; and these results are also valuable to policy makers on how to better plan and develop their cities.

III. The Survey Samples, Analysis and Explanations of Results

The questionnaires were conducted during 2018-2019 to delegations that visited the US from China. Three different groups are included—the college faculty, business executives and government officers. They are separated into three groups since they have had different backgrounds and experiences and so their views on urbanization and urban agglomerations could be differential. They visited the US for several weeks or months, took classes and special lectures at California State universities and had field trips. The questionnaires were given during their classes and collected by the faculty (the author of this paper). Each question on the Questionnaire is clearly explained and a Chinese version (translation) of the Questionnaire is available or as the option. Totally there were more than 400 surveys distributed, but only 100 returned and valid ones from each group were selected and used. Each participant rated each survey question with a score from 1 to 5, with 5 as the most important/relevant and 1 as the least important/relevant.

3.1 Survey Outcome Summaries

Table 1 Summary of Surveys

Group	Question	Average	Standard Deviation	Notes
College faculty	Q1	4.48	0.6739	
	Q2	3.81	0.8841	Small/Large
	Q3	4.12	0.7860	
	Q4	4.20	0.8646	
	Q5	4.06	0.8058	
	Q6	4.01	0.8819	
	Q7	3.84	0.8495	
	Q8	4.15	0.9783	
	Q9	4.53	0.6584	
	Q10	4.27	0.8147	
	Q11	4.64	0.6117	Large/Small
	Q12	3.74	0.9494	Small/Large
	Q13	4.20	0.8040	
	Q14	4.43	0.6397	Large/Small
Overall Average 4.20	Q15	4.40	0.6513	
	Q16	4.24	0.7801	
Business Executives	Q1	4.44	0.7152	
	Q2	3.91	1.0740	Small/Large
	Q3	4.02	0.8285	
	Q4	4.31	0.7063	
	Q5	4.23	0.7502	
	Q6	3.95	0.9031	
	Q7	3.78	0.9275	
	Q8	4.38	0.7756	
	Q9	4.77	0.4230	
	Q10	4.21	0.8444	
	Q11	4.57	0.7555	Large/Small
	Q12	3.77	0.8860	Small/Large
	Q13	4.29	0.8324	
	Q14	4.49	0.6276	Large/Small
Overall Average 4.24	Q15	4.51	0.6741	
	Q16	4.26	0.7992	
Government Officers	Q1	4.44	0.8447	
	Q2	3.98	0.8526	Small/Large
	Q3	4.02	0.9638	
	Q4	4.17	0.8768	
	Q5	4.10	0.8348	
	Q6	3.86	0.9103	
	Q7	3.75	0.8211	
	Q8	4.26	0.8601	
	Q9	4.62	0.6931	
	Q10	4.37	0.6614	
	Q11	4.68	0.6176	Large/Small
	Q12	3.63	0.8122	Small/Large
	Q13	4.32	0.7090	
	Q14	4.43	0.7143	Large/Small
Overall Average 4.19	Q15	4.34	0.8435	
	Q16	4.12	0.8678	

The above table shows that the average scores on 16 questions from these three groups are quite close; the business executives gave the highest average score of 4.24 while other two groups had 4.20 and 4.19, respectively. Some questions received low average scores but high standard deviations or vice versa as indicated under Notes on the above table.

Among all these three groups, Question 2 (Scale - a city must be big enough with economies of scale in terms of production, consumption and transportation) had

the lowest average score, so the least important/relevant to the city's success. Also, Question 12 (Balanced - a city must balance among various interests, relations and functions/purposes) had the low average score. On the other hand, Question 11 (Innovative - a city must keep reforming and innovating in its technology, development, management and organization) had the most high scores by two groups and the second highest score by another group. Also, Question 14 (Sustainable - a city must be sustainable in terms of environment, talents, and resources) had the high score and low standard deviation. These outcomes are interesting but also reasonable. A city's success is related to its economies of scale, but this factor becomes less important and relevant when compared with other factors such as innovation,. In the modern world, cities are competing nationally and internationally, so the innovation factor will be crucial to the successful developments of cities. Certainly, the sustainability is vital as well. All in the surveys agreed that the innovation and sustainability are the most important factors that lead to the cities' continuous success.

Statistically, the Analysis of Variation (ANOVA) indicates that among these three groups, there are no significant differences in terms of the importance and relevance of these 16 factors. In other words, all had the similar opinions regarding the importance and relevance of these 16 factors to the success of the cities and urban agglomerations, although as discussed above, they did view some factors like the innovation and sustainability more important than the others.

Table 2 ANOVA

Source of Variation	SS	MS	F	P-value	F critical
Between Groups	0.0256	0.0128	0.1590	0.8535	3.2043
Within Groups	3.6289	0.0806			
Total	3.6546				

3.2 The Correlations of questions/factors

The following tables give the correlations of answers to the 16 survey questions by three different groups.

Table 3. College Faculty Questions/Factors Correlations

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16
Q1	1.00															
Q2	0.17	1.00														
Q3	0.20	0.15	1.00													
Q4	-0.01	-0.28	0.10	1.00												
Q5	0.17	0.16	0.33	-0.02	1.00											
Q6	-0.04	-0.11	0.25	0.38	0.14	1.00										
Q7	0.10	0.23	0.49	0.02	0.20	0.35	1.00									
Q8	-0.13	0.22	0.03	0.23	0.10	0.14	0.14	1.00								
Q9	0.15	0.21	0.19	0.10	0.03	0.03	0.01	0.00	1.00							
Q10	0.02	0.10	0.14	0.04	0.04	0.12	0.18	0.08	0.33	1.00						
Q11	0.13	0.36	0.18	-0.02	0.17	-0.01	0.12	0.11	0.33	0.34	1.00					
Q12	-0.20	0.00	0.08	0.33	0.01	0.17	0.02	0.19	0.21	0.13	0.03	1.00				
Q13	0.04	0.17	0.28	0.32	0.04	0.31	0.14	0.21	0.12	0.24	0.39	0.25	1.00			
Q14	-0.01	0.00	0.12	0.26	0.01	0.17	0.07	0.23	0.15	-0.03	-0.07	0.27	0.22	1.00		
Q15	0.02	0.08	0.12	0.16	-0.07	0.15	0.28	0.19	0.21	0.02	0.14	0.10	0.14	0.14	1.00	
Q16	0.09	-0.01	0.04	0.17	-0.01	0.17	0.17	0.02	0.14	0.07	0.12	0.25	0.10	0.22	0.13	1.00

Table 4. Business Executives Questions/Factors Correlations

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16
Q1	1.00															
Q2	0.09	1.00														
Q3	0.14	0.33	1.00													
Q4	0.17	-0.06	0.08	1.00												
Q5	0.15	0.30	0.12	0.11	1.00											
Q6	0.27	0.12	0.27	0.37	0.32	1.00										
Q7	0.36	0.31	0.47	0.27	0.33	0.61	1.00									
Q8	0.01	0.17	0.22	0.00	0.18	0.27	0.24	1.00								
Q9	0.17	0.09	-0.02	0.04	0.14	-0.03	0.18	0.08	1.00							
Q10	-0.10	0.36	0.47	0.13	0.16	0.24	0.37	0.19	0.11	1.00						
Q11	-0.08	0.08	0.24	0.29	0.14	0.19	0.21	-0.03	0.10	0.57	1.00					
Q12	0.13	0.13	0.28	0.24	0.25	0.30	0.32	0.28	0.13	0.50	0.26	1.00				
Q13	0.09	0.11	0.46	0.31	0.33	0.21	0.33	0.17	0.05	0.52	0.55	0.46	1.00			
Q14	0.12	0.20	0.21	0.13	0.40	0.20	0.33	0.17	0.24	0.36	0.17	0.37	0.42	1.00		
Q15	0.10	0.06	0.33	0.05	0.13	0.26	0.31	0.05	0.13	0.24	0.28	0.16	0.29	0.12	1.00	
Q16	0.05	0.00	0.34	0.39	0.20	0.40	0.38	0.16	0.06	0.41	0.30	0.30	0.42	0.37	0.37	1.00

Table 5. Government Officers Questions/Factors Correlations

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16
Q1	1.00															
Q2	0.24	1.00														
Q3	0.25	0.15	1.00													
Q4	-0.02	0.14	0.32	1.00												
Q5	0.32	0.12	0.29	0.22	1.00											
Q6	0.13	0.00	0.42	0.42	0.34	1.00										
Q7	0.20	0.06	0.43	0.24	0.36	0.52	1.00									
Q8	0.27	0.12	0.04	0.17	0.33	0.28	0.16	1.00								
Q9	0.48	0.23	0.28	0.24	0.36	0.04	0.04	0.18	1.00							
Q10	0.27	0.34	0.21	0.19	0.24	0.12	0.13	0.26	0.31	1.00						
Q11	0.35	0.16	0.16	0.23	0.28	0.12	0.10	0.16	0.47	0.27	1.00					
Q12	0.17	0.09	0.33	0.27	0.31	0.23	0.27	0.21	0.21	0.28	0.35	1.00				
Q13	0.17	0.08	0.21	0.22	0.13	0.32	0.23	0.23	0.35	0.15	0.33	0.24	1.00			
Q14	0.32	0.25	0.49	0.25	0.32	0.22	0.10	0.18	0.44	0.30	0.29	0.42	0.38	1.00		
Q15	0.28	0.01	0.35	0.28	0.14	0.12	0.04	0.06	0.41	0.12	0.27	0.41	0.32	0.36	1.00	
Q16	0.27	-0.02	0.25	0.40	0.26	0.37	0.16	0.20	0.18	0.10	0.28	0.34	0.22	0.34	0.33	1.00

Although all correlations are not too high, given the sample size of 100 for each group, the most factors, in fact, are significantly correlated with one another. It can be easily verified that if the absolute value of the correlation is 0.20 or larger, its correlation test will be significant at 5% significance level; and if the correlation is 2.5 or larger, then it will be significant at 1% level. The significance of correlation tests means that two relevant factors are associated significantly. Also, there are several negative correlations. The government officers had the least negative correlations. But virtually all negative correlation coefficients are insignificant because its absolute value is smaller than 0.20. One more implication of small correlation coefficients (less than .50) is that although most of these factors are associated, each factor is not the duplicate of the others; therefore, each factor has its unique and independent impact on the urban development and its success.

Another interesting result from the correlation analysis is that all three groups surveyed gave the high correlations of Question 3 Influence with several other factors. This result indicates that the respondents believed that a city's influence to its neighboring areas is the essential function of its existence and success. This is true

because a city's attractiveness and competitiveness stem from its influence. Due to the limited space, only three correlations and their hypothesis tests are provided here. From the government officers group surveyed, the correlation between Question 3 Influence and Question 14 Sustainability had a high score of 0.49, and its t-statistic =5.62 and p-value =0%, so these two factors are significantly correlated. From the business executives group, the correlation coefficient of Question 3 Influence with Question 10 Competitive was 0.47, its t-statistic =5.32 and p-value =0%, so these two factors are significantly correlated, and from the college faculty group, the correlation of Question 3 Influence with Question 7 Spillover was 0.49, its t-statistic =5.62 and p-value =0%, so these factors are associated significantly as well.

IV. Development Experiences of Cities and Urban Agglomerations in the US and in the World

Many countries, especially western countries started their urbanization and urban agglomerations many decades earlier than China. So China can learn from the following trends, experiences and lessons of urban development in the US and in the world:

First of all, it is observed that more super-cities (megacities) have been formed and more population has gathered there. According to the UN report in 2014, there were more super-cities (megacities) in the world and more people have moved to such cities. There were ten "super-cities" (with 10 million residents or more) in 1999, about 7% of the world's urban population at that time. There were 28 megacities with about 12% of the world's urban population in 2014. By the year 2030, there will be 41 megacities in the world.

Second, the medium and small cities are more stable and they grow rapidly. Since 1969, the GDP growth of eight urban agglomerations in the US has been only one third of the annual growth of the other three types of small cities. After the world economic and financial crisis in 2008, most big cities in Europe have undergone shock and decline while the neighboring small cities have stayed unaffected and have grown stably.

Third, the population in many big cities has fallen sharply. Jean Gottmann forecasted in 1960 that more than half of the population in the US would live in three major urban agglomerations by year 2000. However, the population in these three urban agglomerations has seen fallen in the past five decades. Now in the US, about 30% of population is living in big cities, 25% in super-cities, 18% in big towns, 13% in small cities, and the rest is in small towns and villages.

Fourth, the rapid and stable development of suburban areas and the decline of downtowns in big cities and super-cities have taken place in the US. Although most of

the population and economic growth in US are still in large urban areas, in many resource-based states or areas, due to lack of groundwater storage, their economies and population have dropped substantially. For instance, Philadelphia, Baltimore, Pittsburgh, Cleveland, Detroit, St. Louis and New Orleans have all lost one third or more population since 1960. In the past century in the US, it is the suburban areas that have seen the most increase population, from 31% in 1960 to 51% in 2010, while the downtown population has only increased from 30% in 1960 to 33% in 2010. Some downtowns in big cities and second-tier cities have also experienced downturn for several decades, such as in Philadelphia, Baltimore, Pittsburgh, Cleveland, Detroit, St. Louis, and New Orleans. These places have lost their residents as the base for tax and economic activities and poverty has become a common problem in those areas.

Last, the polarization of regional development and wealth gaps in big cities has been widening. The unbalanced development and growth in the regions has been a worldwide problem. The income gaps among different groups of people have been increasing and have caused serious consequences. Social uprising or riots are not rare but occurring frequently in big cities. The developed countries like the US have experienced all of these social problems associated with the unbalanced developments and income disparities.

Based on the above development experiences of cities and urban agglomerations in the US and in the world, it is suggested that China should pay attention to and address the following issues in its development.

There is still some potential for the formation and development of more megacities and urban agglomerations, particularly because China has a large population and people love to live and work in big cities. Furthermore, China's super-cities such as Beijing, Shanghai, and Guangzhou still have a lower population density as compared to other super-big cities in the world. Therefore, China should further improve and develop those megacities, attract more people, transfer out unnecessary production and manufacture functions to make them more livable. China should speed up the development of medium and small cities, especially the development of the satellite cities of big cities and the cities with distinctive features, so as to provide appropriate conditions and basis for the accelerated urban development. China's suburban areas are unlikely to attract too many people to live there at the current time due to the traffic and different preference for lifestyle, but those places will become more and more attractive as the urban railway develops. It will be of significance to the development of big cities and urban agglomerations to properly plan and develop the suburban areas, especially those between big cities.

Most of China's big cities have not seen the decline of downtowns. But it should prepare for the future, accelerate the investment, planning and construction of the downtowns in big cities to keep them dynamic and attractive. It is of vital importance to

the social stability and harmonious development to pay attention to and address the issue of differentiated population and income gaps. The key to address this issue includes reasonable and balanced investment, suitable strategies and measures, and construction of infrastructure, and social welfare. The development of cities and urban agglomerations shall be balanced. That means there should be the balance between different cities, make suitable layout, plan distribution and coordination. Each city also needs the balance in terms of the arrangement and installation of facilities of various productions, daily life, social activities, education and scientific research. It also includes the balance between different levels of resources and talents, and the balance and coordination between the environment and people's daily life and production.

The development of cities and urban agglomerations calls for innovation and entrepreneurship. Without innovation, there will be no dynamics and development. Many cities shrank due to lack of innovation. Entrepreneurship is the driving force of social and economic development. Not only the development of enterprises needs entrepreneurship, the social and urban developments also call for such spirit. Even the leaders at various levels of the cities need such spirit to stay adventurous and hungry, dare to try, and seek innovation and change. The development of cities and urban agglomerations calls for competition, between different urban agglomerations, between different cities within one urban agglomeration, and within a city. Not only the competitive industries need competition, public product industries and their services also need competition. Just as enterprises and people grow in competition, the society and cities also develop through continuous competition. The development of cities and urban agglomerations needs to be people-oriented. Cities are the places where people inhabit, live and work. Its development depends on people, especially the attraction and cohesion to various excellent talents. A city will become more attractive and dynamic by better satisfying various demands from different classes of people, by creating and providing conditions for various talents to realize their dreams, and by developing into an overall environment that is harmonious, convenient, safe, green, open, inclusive and dynamic.The development of cities and urban agglomerations needs tobe based on education and scientific research. Nearly all the big cities and super-cities in the world have world-renowned institutions in higher education and scientific research. In other words, all successful big citiesmust have super or famous universities and scientific research institutions.

V. Conclusion

This paper discusses the important factors of the urban development and agglomerations. Through surveys and analysis, it concludes that the identified sixteen factors are all important and relevant to the success of cities and its agglomerations; a city's ability to influence its neighboring areas is its essential function; and especially the innovation and sustainability will be the key to its continuous development. It further explores the experiences and lessons in the development of cities and urban

agglomerations in the US and in the world, and discusses how China can learn from these experiences and lessons to better plan its urban development and agglomerations in the future. The results from this study provide different views on the urbanization and urban agglomerations from three different groups - the college faculty, business executives and government officers, and these results also provide valuable insights on better urban planning and balanced city development for policy makers.

There is no precedence of China's fast economic development and the rapid rise of cities and urban agglomerations. In the past decades, there were many constructions of infrastructures, especially the investment and construction of roads, undergrounds, and air traffics, the layouts and constructions of inter-city railways, high-speed railways and other transportation, which have provided the basis and foundation for the development of cities and urban agglomerations. If China can learn from the development experience and lessons of other countries, fully understand the characteristics of the history, culture and tradition in different cities and regions, prioritize people's basic needs and the internal demand of economic development, keep its cities distinctive, balanced, sustainable, inclusive and innovative, its cities and urban agglomerations will be developed quicker and better, and that in turn will better promote its economic and social progress.

Acknowledgements

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