A Study on Urban Competitiveness Based on the Perspective of City Networks

-- Taking the Guangdong-Hong Kong-Macao Bay Area as an Example

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Abstract

With the rapid advance of economic globalization, urban agglomeration in the increasingly important position in the national economy. Urban agglomeration as a platform to take advantage of opportunities arising from globalization, efforts to enhance the competitiveness of the city is each city's development goals. Although current research on traditional competitiveness is relatively mature, but the study of the impact of urban competitiveness is no systematic evaluation system, it has a great need for improvement of urban competitiveness from the perspective of urban agglomerations. This article from the perspective of urban agglomeration of urban competitiveness analysis, construction of urban competitiveness evaluation system, the city is divided into competitive endogenous competitive, exogenous two aspects to analyze the competitiveness of Hong Kong and Macao large urban competitiveness Bay Area using principal component analysis and analysis of competitive chain network model large urban agglomerations of the Bay Area, come to the city to obtain a source of competitiveness and proposes to enhance the city's competitiveness strategy.

Keywords

Guangdong-Hong Kong-Macao Bay Area; urban competitiveness; principal component analysis; chain network model.

1. INTRODUCTION

With the deepening government reform and market-oriented reform of our economy, and improve the city's ability to independence, improved resource allocation mechanism of the city, improve the city to attract social resources capacity, in essence, competing cities force has been improved. As the 21st century, economic globalization, regional integration processes gradually deepened, competition and cooperation between the city and the city has intensified. Urbanization Planning in China has made it clear urban agglomeration as an important factor in promoting the urbanization process in China, and it is important to achieve the main high-speed development of the national economy.

Urban competitiveness on city population is urban agglomeration as the carrier, various cities in their respective advantages in the analysis group, mutual collaboration, the ability to create a better group within the network environment. Urban Competitiveness departure from the point of view of urban agglomerations broke the previous research study will focus on the city limits, pay more attention to cooperation and competition between the city group network in various cities. Cities on the rising status of national space, strengthen urban competitiveness

research network on city groups, it is conducive to rich urban competitiveness research system, and improve the overall competitiveness of the city is of great significance.

City Group is deepening links between cities and urban collection formed gradually, urban development A spatial organization to form the mature stage [1]. City Group has three basic characteristics: have a number of different types of cities; have at least one mega-cities as the center of the city; there is a close link between the cities. China's urban population is gradually formed in the process of urbanization, the development of cooperation in the provincial city has played a crucial role, while the main effort is the development of China's urbanization [2]. Urbanization is a process of economic development of a country have a certain stage must pass through, not only to attract more residents, but also means that economic activities are closely linked. Scholars generally believe that the essence of urban agglomeration is an established network of contacts between the various cities, the interactive aspects of the flow of people, goods, capital, technology and other flow is the formation of urban agglomerations exist between different cities to promote [3]. Interaction urban centers but also and its surrounding cities generated at a position adjacent to the spatial conditions. By pushing these carriers, inter-city relations will gradually form of competition or cooperation, but evolved over time and urban functions, the relationship between the city will change. At present China's urban population studies in theory and practice have made great progress. China's urban population is still in the stage of rapid development, it is gradually form a regional entity with the overall strength of the urban-based cluster.

At present, China's highest density cities, most scholars of the three major urban agglomerations as the Yangtze River Delta city group, the Pearl River Delta city group, Jingjinji. Urban development has become the main group supporting the provincial development strategy [4].

2. LITERATURE REVIEW

In urban competitiveness evaluation, Peter kresl first proposed the display and explanatory framework in urban competitiveness evaluation system, we have made tremendous contributions to for the construction and subsequent evaluation index system of urban competitiveness [5]. In urban competitiveness evaluation, Xu Xueqiang, etc. (2006) from the underlying competitiveness of core competitiveness, environmental competitiveness of these three subsystems to build urban competitiveness evaluation model, and spatial and temporal evolution of urban competitiveness of the Pearl River Delta city group analysis[6]. Li Jie (2008) considered urban competitiveness evaluation should be made clear on the basis of quantitative analysis of the functions of positioning the city in the space in which, combining the advantages of urban development and regional spatial and urban systems, rather than blindly pursue rankings of cities . Through the advantages of urban development in China's three major urban agglomerations of quantitative evaluation, factor analysis reveals the characteristics of urban development, and the formation and development of urban agglomeration for a more in-depth research, the main innovation is added to the index system the distance between this indicator and secondary urban core cities to assess the links between cities[7].

Ni Pengfei (2001) proposed a model of bow arrows that urban competitiveness by hard power (bow) and soft power (string) ability to support industrial city (arrow)[8]. Wang Fazeng was made (2011) that the global flow of capital, innovation and the knowledge and skills of senior personnel, tourists are all the valuable elements of urban development in today's trend of economic globalization, these factors intensified the competition between cities[9]. Wang Yunlin, Niu Wenyuan (2008) multidimensional network of contacts between urban competitiveness and urban combined, and the use of social network analysis drawn competitive cities in the network, and put forward the concept and analytical framework network

competitiveness[10] . Ni Pengfei (2011) by building a chain network model, the use of advanced production headquarters and branches of multinational companies set up in various cities to measure global connections of the city, is a major innovation research in urban linkages degree[11].

Domestic scholars in the analysis of urban competitiveness, build urban competitiveness evaluation index, most of the urban competitiveness is divided into several subsystems, then the analysis of these subsystems main component, arrive at a final score of urban competitiveness . However, evaluation of different scholars build are different, so inconvenient to evaluate and compare different urban competitiveness from time or space. There is no uniform evaluation criteria, which is the study of urban competitiveness of our country caused great inconvenience. And evaluation system most scholars do not consider the proposed structure of the network link between the city and the city in which the city group, which also led to a lack of more specific scientific analysis and the evolution of awareness on urban competitiveness. Lain begg (1999) believed to enhance the competitiveness of the city should pay attention to the process of "feedback" mechanism[12]. In addition, the birth of a city and its surrounding cities there is a close relationship, the link between the city and the city also contributed to the city generated relations, but also promote the development of the entire city population. Research on intercity relations dating back to central place theory, the theory that the links between different cities just a simple one-way interaction, which emphasizes the big cities provide goods and services to small cities, while ignoring between the two cities the level of relations. According to Friedmann theory of international division of labor, we put forward the hypothesis that the world's cities. Taylor (2010) from the microscopic point of the city network concept was deepened proposed chain network model, which proposes advanced production flow multinational network services company formed between the various levels of nodes form is generated between cities Contact [13].

The method of the present study intercity relations more mature social space is discrete dynamical theory (Dendrinos-Sonis). Domestic research on the relationship between the city also converted from qualitative research quantitative research, the study also shift from the study of a single city to study relations between the city and other cities. Chinese scholars at the time of the city Contact quantitative analysis, often using gravity model space. Miao Changhong use the gravity model to Henan Province as the research object to study the links between various cities of the province, and measure in detail the link between Zhengzhou and other provincial capitals, mainly by means of data transport front, the study found that economic there is a close link between the contact and transport links[14].

3. THE THEORETICAL ANALYSIS OF URBAN COMPETITIVENESS

3.1. Connotation of Urban Competitiveness

For the concept of urban competitiveness, many scholars believe that the competitiveness of the city is a city with its existing comparative advantages in terms of the sum of the natural, economic, social, cultural, institutional and other basis, through the creation of good urban environment, resource elements the ability to form a stronger flow during the gathering, attracting and using various resource elements, and, ultimately, a stronger performance than other competitors, more sustainable development capacity and ability to raise the level of welfare of its inhabitants. In short, urban competitiveness is manifested outside the city to attract and radiation as well as the sustainable development of the ability to use their own advantage. Therefore, the level of competitiveness of a city also determines the development of the city and development potential. Domestic and foreign scholars on urban competitiveness focused on the theoretical model of urban competitiveness and the evaluation of urban competitiveness and so on. Overseas Research on Urban Competitiveness of more mature and

focused on the research aspects of the relationship between inter-city competition and cooperation, and enhance the competitiveness of cities and so on. The study of urban competitiveness from the beginning of the 20th century, the study of urban competitiveness in relatively weak, especially in the city starting from the perspective of urban agglomerations network Competitiveness. So study the impact of urban agglomeration network of urban competitiveness are all important for the improvement of urban competitiveness evaluation system, and promote communication and cooperation between the various cities.

3.2. Construction of Urban Competitiveness Index

In order to be more objective and accurate evaluation of urban competitiveness, we must establish a comprehensive evaluation system. In summary the basis of domestic and foreign scholars on the study of urban competitiveness, as used herein, interpretive displays and two sets of indicators to analyze the sources and the evaluation system of urban competitiveness. The former use of the results of the traditional competitiveness studies conducted show evaluation, the latter to the former subdivided explained. Here's explanatory indicators divided into two parts: the endogenous competitiveness, namely urban population of the city itself has a competitive edge, you can draw on traditional competitive research scholars before results; exogenous competitiveness, that is, within each urban agglomeration Contact competition and cooperation between cities formed, reflecting the close links between the various cities extent, the city needs to relational data network.

Display indicators include the average GDP, population growth, per capita GDP, fixed asset investment growth rate, with these four metrics to characterize the overall competitiveness of the city.

- the average GDP, not only can reflect the city's gross production, but also reflect the value of density areas.

- Population growth rate can be more accurately show the growth rate of the region's population.

- per capita GDP, the ability to reflect the city's development through a measure of living standards in the region.

- Fixed asset investment growth, from an investment point of a comprehensive reflection of the city's ability to create value.

Between the various factors affecting the competitiveness of each city, it is a whole system. Since the body is the city's residents and businesses, so this will be endogenous competitive livable and appropriate business is divided into two aspects to describe, and draw on traditional competitive analysis framework was constructed following endogenous competitiveness indicators, specific indicators Table 1.

Livable capacity mainly from the quality of the population, social environment, ecological environment, living environment, municipal environment in these five areas to build. The higher the level of a livable city, the ability to attract high-quality talent will be stronger, the stronger the competition of the city. The ability to build appropriate business major from business growth index, innovation and the environment, local needs, these four aspects of the institutional environment. The stronger the ability of enterprises as an important mainstay of the economy has not anticipated role in the creation of wealth of the city, the stronger should the industry the ability of a city to attract big business, the city's competitiveness will be a corresponding strong.

Table 1. Health Competitiveness Index System

Endogenous competitiveness	Livable capacity	Population quality	The number of students universities and colleges
		social environment	Number of beds per thousand doctors have, Public library collection of books per million people
		ecological environment	air quality
		quality of life	Per capita consumption expenditure, per capita disposable income
		Municipal and Environmental	Each square kilometer of road traffic mileage, the number of postal
	Industry capacity	Enterprise growth index	New business growth
		Innovation environment	Number of patent applications, R & D expenditure as a percentage of GDP
		Local needs	Tertiary industries in GDP, retail sales, import and export volume
		environment system	Corporate income tax rate, financial institutions deposit loans, FDI

In addition, exogenous regional advantages into competitiveness and the degree of contact two aspects, specific indicators in Table 2.

Table 2. Exogenous Competitiveness Index System

Exogenous competitiveness	Location Advantage	The number of road transit, container throughput, airspace class,distance from the city to international airport
	the extent of contact	Banking connection rate, connection rate securities industry, accounting firms connection rate, connection rate law firms, advertising enterprise connectivity rate, management consulting firm connection rate

Among them, mainly from exogenous competitive regional advantages and the degree of contact both to build. By road between the cities, rail, air links and advanced producer services enterprises in the city to describe the layout of the various links between the closeness of different cities. A city the higher the degree of contact with other cities, indicating that exogenous competitiveness of the city will be stronger.

4. URBAN COMPETITIVENESS DECONSTRUCT

Based on the index system of the foregoing construction of the Pearl River Delta city group analyzed revealed index of urban competitiveness in 2017. These indicators data from the Statistical Yearbook 2018 of various cities, principal component analysis revealed index by SPSS software to obtain the results shown in Table 3.

Table 3. 2017 Bay Area cities revealed index score

	score	ranking
Guangzhou	85.16	4
Shenzhen	97.33	2
Zhuhai	78.34	6
Foshan	80.12	5
Huizhou	29.67	11
Dongguan	75.67	7
Zhongshan	72.11	8
Jiangmen	68.55	9
Zhaoqing	34.72	10
Hong Kong	87.83	3
Macau	100.00	1

Calculated from the four display indicators build competitive score can be seen, ranked first in Macau. As the capital city of Guangzhou in Guangdong Province ranked fourth, second, three are in Shenzhen and Hong Kong. Guangzhou, both in terms of the population's ability to attract, or the ability to attract capital investment are better than inferior to Hong Kong, Shenzhen, Guangzhou, suggesting that in terms of people, materials ability to attract, has a competitive advantage, but compared with Shenzhen, is not competitive force. But not with Guangzhou in the accumulation and transformation of society to create wealth and resources such as Hong Kong, Shenzhen, compared to competitive advantage, so the overall competitiveness ranking fourth, to be further improved. And Shenzhen as the rapid development since the reform and opening up city, well-developed financial sector, and relying on the geographical advantage near Hong Kong played a good capacity for diffusion, an advantage in terms of wealth creation.

4.1. Endogenous Competitive Analysis

For competitive endogenous explanatory indicators, the paper is divided into livable appropriate business capability and the ability to perform a measure of the ability of the city and livable appropriate business capability index system according to the above method of principal component analysis, the specific results are Table 4.

Table 4. 2017 Bay Area cities endogenous competitive score

	Livable capacity		Industry capacity		Endogenous competitiveness	
	score	ranking	score	ranking	score	ranking
Guangzhou	89.07	4	78.26	3	82.17	3
Shenzhen	100	1	100	1	100	1
Zhuhai	57.87	5	42.2	7	45.54	7
Foshan	45.33	9	48.34	6	41.86	9
Huizhou	57.33	6	50.64	5	49.81	5
Dongguan	50.93	8	55.75	4	49.03	6
Zhongshan	54.93	7	38.62	8	42.05	8
Jiangmen	41.07	10	30.69	9	30.04	10
Zhaoqing	26.67	11	25.58	11	19.38	11
Hong Kong	93.87	2	89.51	2	90.89	2
Macau	90.13	3	25.83	10	54.65	4

From the point of view of endogenous factors affecting competitiveness, ability level should the industry in Guangzhou has yet to be improved, livable capacity relative disadvantage. Table 3 shows that Shenzhen should the industry livable ability and capacity are ranked first, with an absolute competitive advantage in the large cities in the Bay Area. Hong Kong should the industry livable ability and capacity are ranked second in the Bay Area. In contrast, the various elements of Guangzhou endogenous competitive scores were weaker than in Shenzhen and Hong Kong. Guangzhou should the industry the ability to score 78.26, ranked third, livable ability to score 89.07, ranking fourth. In comparison, Guangzhou should the industry livable ability and capability there is still large room for improvement.

Specifically, the Guangzhou economic infrastructure, in terms of industrial structure compared to Shenzhen, Hong Kong at a disadvantage, still need further restructuring and upgrading. The tertiary industry output value of Guangzhou, Shenzhen, Hong Kong, three places have been occupied for more than half of its GDP, but in terms of the proportion of modern service industry, Guangzhou and Hong Kong comparable level, the overall situation is slightly better in Shenzhen, modern service industry and therefore all regions development of water on average there is a big room for improvement. In terms of the elements of innovation, better than Hong Kong, Guangzhou, and Shenzhen ranked first but still some gaps. In recent years, Shenzhen Innovation atmosphere, a large R & D investment, total spending on social development in 2017 reached 97.7 billion yuan, accounting for 4.34% GDP, while total R & D spending only Shenzhen, Guangzhou community about 1/3, occupy GDP ratio only 2.48%, Hong Kong is to reach only about 1/5 of Shenzhen, accounting for only 0.80% of its GDP. Guangzhou, Hong Kong lagged behind in terms of innovation environment in Shenzhen, Guangzhou R & D technology can be seen, there are still large room for development, in general, still need to further increase the total funding. So endogenous competitiveness Shenzhen ranked first.

4.2. Exogenous Competitive Analysis

Exogenous explanatory article competitiveness indicators included in the regional advantages and the degree of urban linkages. Location advantage is still the principal component analysis using the measurement method, specific results are shown in Table 5.

Table 5. 2017 Bay Area city location advantages score

	Location Advantage	
	score	ranking
Guangzhou	100.00	1
Shenzhen	95.35	2
Zhuhai	46.28	6
Foshan	52.79	4
Huizhou	50.00	5
Dongguan	41.16	8
Zhongshan	39.30	9
Jiangmen	37.91	10
Zhaoqing	23.26	11
Hong Kong	64.65	3
Macau	45.35	7

In terms of Guangzhou, the advantage is exogenous competitiveness has become an important source of acquiring urban competitiveness. Comparative distribution in urban green competitiveness and exogenous competitive, more obvious differentiation. City points of view, Shenzhen, Hong Kong, Macao, Jiangmen, Dongguan, Zhongshan endogenous competitiveness score higher than exogenous competitiveness. Guangzhou endogenous competitive score of 82.17 points, Shenzhen has a larger gap, ranking third in the Bay Area; exogenous competitive score of 100 points, slightly higher than in Shenzhen, ranked first in the Bay Area and thus become an important source of competitive exogenous acquire Guangzhou city competitiveness.

From the point of view geographic conditions, living in the Bay Area in Guangzhou, the center position, highways, ports, aviation and conditions more favorable, highly geographical advantages. From the point of view of urban network status, as the capital city of Guangzhou, and other cities in the political, economic and cultural exchanges between more contact between the city more closely, the city network in scoring position only slightly lower than in Shenzhen, It has the absolute ability to influence the big Bay Area cities. Generally speaking, Guangzhou - Shenzhen - Hong Kong has formed the core circle large Bay Area, the three cities can effectively use the resources in the Bay Area, and lead to further play a central role in the Bay Area.

The Urban Contacts such as banking, securities, accounting firms, law firms, advertising companies, management consulting company to build a chain network model to calculate the extent of the close links between the cities by advanced producer services business, to describe urban population exogenous competitive strength of each city. Chain links of the city obtained by calculating these cities attribute data, in particular results in Table 6.

Table 6. linking the value of Bay Area cities

Link value	Banking	Securities	Accounting	law	advertising	consulting	Overall connection degree
Guangzhou	699	444	220	88	100	116	1667
Shenzhen	747	504	234	96	12	116	1709
Zhuhai	538	284	74	40	0	0	936
Foshan	560	424	64	20	0	0	1068
Huizhou	324	152	0	0	0	0	476
Dongguan	452	264	0	0	0	0	716
Zhongshan	518	244	0	0	0	0	762
Jiangmen	560	376	54	20	0	0	1010
Zhaoqing	518	348	0	0	0	0	866
Hong Kong	713	312	254	60	96	160	1595
Macau	501	0	160	0	0	32	693

As can be seen from Table 6, the highest city of Shenzhen contact, followed by Guangzhou and Hong Kong. Contact of the city reflects the status of the city is located in the urban population, the higher the contact of the city, indicating that the city has more competitive advantage. Mainly due to the Shenzhen Special Economic Zone as the first since China's reform and opening up, the first to establish a fairly complete socialist market economic system, in recent years the pace of development has created a miracle, it is a microcosm of China's reform and opening up the brilliant achievements. As the capital of Guangdong Province, Guangzhou, and other cities in the political, economic, cultural, transportation and other areas we have close ties. So overall strength of Shenzhen and Guangzhou, plays a leading role in the Pearl River Delta city group.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusion

As can be seen from the above analysis, urban competitiveness in Urban Cluster is a complex concept, research and competitiveness of a single city needs to consider the impact of all aspects of urban systems group compared to the city. So from this angle factor can be drawn, the city decided to include not only the competitiveness of the city's own development, the city compete with each other partnerships in other cities and also to enhance the city's competitiveness has played a larger role. This article from the perspective of urban agglomeration of urban competitiveness analysis, construction of urban competitiveness evaluation system, the city is divided into competitive endogenous competitive, exogenous two aspects to analyze the competitiveness of Hong Kong and Macao large urban competitiveness Bay Area, Concluded as follow.

1, "the Guangzhou - Shenzhen - Hong Kong" integrated development of the situation has been basically formed. Guangzhou, Shenzhen, Hong Kong's three large urban core of the Bay Area, both have a distinct advantage on the competitiveness of endogenous or exogenous competition, the top three. And by other urban linkages in banking, securities, accounting firms, law firms, advertising, management consulting several advanced producer services in cities with populations close degree. As can be seen from the results, in large urban agglomerations Bay Area, the city of Shenzhen has the highest degree of contact, followed by Guangzhou and Hong Kong.

2, competitive advantage in different cities are different. As the core of the Bay Area city of Guangdong, Hong Kong, Guangzhou and appropriate business ability level remains to be improved, livable capacity relative disadvantage. And Shenzhen should the industry livable ability and capacity are ranked first, with great advantages of Shenzhen endogenous competitiveness. Guangzhou geographical advantages exogenous competitiveness has become an important source of acquiring urban competitiveness, Guangzhou, Shenzhen slightly higher than the regional advantages score, ranking first in the Bay Area. Shenzhen, Guangzhou, respectively, on the inner life and the competitiveness of exogenous competitive advantage. Cities need the full use of competitive advantage, to further enhance the competitiveness aspects of the short board, to achieve the city's comprehensive features new color, focus on building an international metropolis, the city and give full play to the National Center for comprehensive gateway city leading role.

5.2. Recommendation

Different cities have different competitive advantages. Enhance the city's competitiveness must first consolidate their strength, enhance the competitiveness of the foundation, and give full play to the city can create the greatest competitive advantage, bringing economic benefits to other cities in the urban agglomeration. In the context of regional integration should be based on a regional perspective clearly recognize the source of urban competitiveness. On the one hand, the city actively enhance the competitiveness of endogenous, exogenous lay a solid foundation for competitiveness; on the other hand, actively expand the layout of various industries, strengthen the links between the city tightness of exogenous enhance the competitiveness of cities; and finally to promote coordination between urban agglomerations, enhance the competitiveness of the entire region. Specific recommendations are as follows.

(1) The Government should give full play to its staff the ability to attract talent, to further simplify staff settled policies to attract more talent to move into. As the largest university in the Bay Area institution city, Guangzhou, give full play to the role of the cradle of personnel training, to further improve the level of university-related facilities, to increase investment in R & D funding of university innovation, producing more innovative talents, while for the college and

research talent agency to create a good living environment for entrepreneurship and innovation, to create a model of development "to attract talent, nurture and retain talent".

(2) to increase R & D investment, focus on cultivating technology-intensive industries, to build advanced manufacturing and modern service industry strong city, while improving government efficiency, simplify procedures processes to efficient service to attract more foreign enterprises settled settled.

(3) To lead the efforts to enhance the cultural function, and promote the comprehensive strength of a new urban culture color. As a historical and cultural city of Guangzhou, with Lingnan culture, red culture, sea silk culture brand, started on the basis of brand culture, while fostering improve education center. To further improve the ecological environment, improve the consumption and welfare of residents, creating desirable industry livable urban brand.

(4) the need to further consolidate the city network status, comprehensively enhance international business center, integrated transport hub function, building an international information hub and international exchange center, with "along the way" and build "a core area of a zone" to promote Guangdong, Hong Kong Grand Bay District coordinated regional development.

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