A Study on Evolution of Exhibition Enterprises Spatial Distribution in Wuhan

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Abstract. With the fast developing MICE industry of Wuhan, local exhibition enterprises have the evolution of spatial pattern. How the spatial pattern of exhibition enterprise is and whether it has formed a certain concentration have become the writing purpose of this paper. Based on the data of Wuhan city exhibition enterprises from 1990-2014, this paper gets these conclusions: exhibition enterprises are increasing rapidly; exhibition enterprises are distributed in the host city of Wuhan; the construction of the venue has a certain influence on the location of the exhibition enterprises; exhibition enterprises are appearing agglomeration trend.

1. Introduction

As economic globalization develops rapidly, MICE industry, a new commercial activity, emerges when the tertiary industry develops maturely, and attracts attention from many national and local governments; it even becomes the new growth point for local economic development. To well support the development of MICE industry, Wuhan, a city of China, the government consecutively issues documents such as Suggestions on Upgrading Service Industry to Impelling the Construction of Central City, and Interim Procedures on Managing Special Funds for Convention and Exhibition Development in Wuhan; all of these create benign external environment and provide favorable policy support to boost the healthy and rapid development of MICE industry. Thanks to convenient traffic conditions and benign industrial base, MICE industry has gained a certain achievement in Wuhan, and quantity of exhibition enterprises increases increasingly. What interests the writer is: during the long-run development, how spatial distribution of event enterprises in Wuhan evolves and how the gathering formed.

2. Research on Spatial Distribution of Enterprises

Zuoquan Zhao (2009) presented from the perspective of geography that spatial distribution is a kind of geographical grid, the center and direction on two-dimension space, and intensity and form of space in its own geographical range. This shows that spatial distribution is a kind of economic concept as well as geographic concept. As the micro-foundation of industrial development, the spatial distribution of enterprises is always the key topic on the research about economic geography, and enterprise gathering is the hot topic of researches on spatial distribution of enterprises. What is gathering? Marshall (1890) firstly presented the answer, and put forward the concept “external economy”. Enterprise gathering will affect enterprises choices on location (Weber, 1909). Enterprises trend to set their offices in region where gather many highly professional enterprises (Angel, 1990). However,
excessive gathering will lead to increasingly congested traffic, and continuously rising rental price and land price, which will prevent enterprises from entering the gathering region (Arauzo-Carod J M, 2005). Xinju Wu, Mingjun Sun (2011) analyzed the reasons why conference enterprises gathering happens, and they believe that internal supply and demands from external market are the key to generate gathering.

Analyzing relevant researches, it could be found that researches on exhibition enterprises from the perspective of space are a few; and techniques adopted mainly are GIS and economics theory. The paper studies the evolution process of spatial distribution of exhibition enterprises in Wuhan by taking advantages of exhibition enterprises data and GIS technology. Research perspective of the paper is innovative and research methods are realizable.

3. Research Methods

3.1. Data Sources
Taking definition of “conference and exhibition service” on National Industries Classification (GB/T4754-2011) formulated by National Bureau of Statistics of China for reference and combining retrievable statistical data about MICE industry, the paper defines the exhibition enterprises as the ones engaging in convention and exhibition operation and service.

Regarding getting essential data, the paper takes advantage of exhibition enterprises directory provided by Information Center of Wuhan Industry and Commerce Authority, then selects their businesses on www.whhd.gov.cn by inputting key words “conference and exhibition”; and the date range is from January 1st, 1990 to December 31st, 2014. There are 6997 enterprises meet with the requirements. To further study exhibition enterprises, the paper finally selects 3185 exhibition enterprises as the research samples, that are 61 exhibition enterprises which were founded during the period from 1990 and 2001, 869 exhibition enterprises founded during 2002 and 2011, and 2255 exhibition enterprises established during 2012 and 2014.

Each exhibition enterprise is a spot in the space; writer takes advantage of enterprises’ registered address and Baidu map to get enterprises’ distributed information, then matches it with electronic map of Wuhan City. Spatial distribution maps of events during different periods will be gained when develop it based on their founding time.

3.2. Research Methods
The research mainly employs kernel density estimation to analyze the gathering situation of exhibition enterprises. Kernel density estimation is used to calculate the density of element in the field where it locates; it is a method which employs data samples to study data. Visualized analysis of spatial point could be realized through kernel density estimation. As distance between the element and the center of grid increases and the weight lowers, related results could be used to identify and indicate the dispersion and gathering situation of the individual sample in survey region.

Regarding specific operation, longitude and latitude information of exhibition enterprises were gained through Baidu map API; ArcGIS10.2 divided the regional map in to the grip with related dimension. Kernel density estimation was adopted to calculate the estimated quantity of exhibition enterprises at each grid, and density distribution map of exhibition enterprises was finally formed based on the numerical value.

4. Research Results
MICE industry in Wuhan can’t develop without the construction of venues. And WHICEC (Wuhan International Conference & Exhibition Center) makes Wuhan get rid of predicament that no venue was available for holding conference and exhibition, and enable Wuhan to have the ability to hold various large-scale conferences and exhibitions. This is why writer divided related evolution stages based on the completion time of important venues in Wuhan, hoping to find out some valuable conclusions. However, the completion time of WHICEC was September, 2001, and the completion
time of WIEC (Wuhan International Expo Center) was October, 2011; the construction of these two venues was completed in the latter half of the year. Therefore, they had limited influence on the development of conference and exhibition in that year. This is why writer decided to take the following years, i.e. 2002 and 2012, as the time node. Development of exhibition enterprises in Wuhan could be divided into three stages based on analysis on sample data.

4.1. The First Stage: distribution of exhibition enterprises was distributed sporadically during 1990 and 2001.

After the reform and opening-up, MICE industry in Wuhan grasped opportunities and developed rapidly, that Wuhan won its place on the top echelon of exhibition cities, and had successfully held exhibitions which were well-known in China such as The 6th National Book Fair, 95 France Industrial Exhibition, Guangzhou Commodity Expo. However, Wuhan experienced awkward situation since 1996 when the old Wuhan Exhibition Center was dismantled, resulting that Wuhan lost its place on the top echelon.

According to sample data, there were total 61 enterprises engaging in conference and exhibition service during 1990 and 2001. Among these 61 enterprises, only a few situated at the places where were far from the main urban area, and most of them located at the main urban area which formed a certain gathering in Jianghan District, but such gathering was not obvious. It may be because we just gained a few sample data.

![Figure 1. Density of exhibition enterprises during 1990 and 2001](image)

4.2. The Second Stage: exhibition enterprises trended to gathering during 2002 and 2011.

Construction of WHICEC was completed at the end of 2001, and lots of conferences and exhibitions were held in it in 2002. The establishment of WHICEC changes the awkward situation encountered by Wuhan that it had no venue to hold conference and exhibition, and offers new opportunities for Wuhan to develop its MICE industry. Locating at the main commercial district in Wuhan, indoor area of WHICEC reaches 30,000 square meters, which could have 2000 standardized international booths. Its outdoor area reaches 20,000 square meters, which could have 500 standardized booths. WHICEC has held lots of influential conferences and exhibitions since it comes into service, such as China International Machinery & Electronic Products Fair, China Food Expo & Trade Fair, Agriculture Expo Wuhan China, and International Auto Show. As new venues come to service, exhibition enterprises in Wuhan rise and MICE industry in Wuhan develops.

Quantity of exhibition enterprises which were newly founded in 2002 was 33, it was 43 in 2003, 60 in 2004, 90 in 2005, 63 in 2006, 161 in 2007, 297 in 2008, 420 in 2009, 684 in 2010, and 869 in 2011. The average annual growth rate was 51.24%. Comparing the quantity of new exhibition enterprises founded in 2011 with the one in 2002, the growth rate reached 2533.33%.

Enterprises engaging in conference and exhibition service increased dramatically in 2011, which also changed the spatial distribution of exhibition enterprises in Wuhan. According to figure 2, several gathering areas for exhibition enterprises appeared in Wuhan in 2011, which included gathering in
business district at Wuhan Square (WHICEC), gathering at Zhongnan business district, gathering at Guanggu business district (Wuhan Science & Technology Convention and Exhibition Center).

![Figure 2. Density of exhibition enterprises during 2002 and 2011](image)

### 4.3. The Third Stage: exhibition enterprises develop rapidly during 2012 and 2014, and circular gathering is formed.

The use of WIEC starts the new era for the development of conference and exhibition in Wuhan. Situating at Sixin, WIEC has 0.15 million square meters indoor area, and 40,000 square meters outdoor area; its exhibition scale ranks the third in national wide and ranks the first in the Central China. WIEC changes the pattern of MICE industry in Wuhan to some extent. WHICEC focuses on holding conferences and exhibitions about consumer goods, while WIEC mainly holds conferences and exhibitions about comprehensive brands and professional conferences and exhibitions.

Quantity of exhibition enterprises increased drastically during this period; there were 869 exhibition enterprises in 2012, 1266 in 2013, and 2255 in 2014, that its average growth rate reached 61.90%.

From the perspective of enterprise gathering, it is different from the one in 2011. In 2014, exhibition enterprises covered nearly all main urban areas in Wuhan, and started to develop into the suburb to form circular gathering.

![Figure 3. Density of exhibition enterprises during 2012 and 2014](image)

### 5. Factors Affecting exhibition enterprises Gathering in Wuhan City

#### 5.1. Distribution of Exhibition Areas

According to figure 2, exhibition enterprises mainly gathered at business district in Wuhan Square (WHICEC), Zhongnan business district, Guanggu business district (Wuhan Science & Technology Convention and Exhibition Center). Among which, gathering in business district at Wuhan Square (WHICEC) and Guanggu business district (Wuhan Science & Technology Convention and Exhibition Center) have strong correlation with distribution of convention and exhibition venues. Influence of
WIEC on exhibition enterprises gathering starts to appear. Quantity of exhibition enterprises in Hanyang District increases since 2011: the quantity of exhibition enterprises in Hanyang District in 2011 was 32; it was 53 in 2012; 69 in 2013; and 97 in 2014. Thus it can be seen that as the new landmark in Hanyang, WIEC greatly promotes the development of exhibition enterprises in Hanyang District, and conference and exhibition venues have great influence on the regional distribution of exhibition enterprises.

5.2. Density Level of Businesses
In 2014, ring gathering of exhibition enterprises appeared in Wuhan; exhibition enterprises highly gather in the central urban area in Wuhan City. In 2011, exhibition enterprises in Wuhan mainly gathered at business district in Wuhan Square (WHICEC), Zhongnan business district, Guanggu business district (Wuhan Science & Technology Convention and Exhibition Center). During the period from 1990 to 2001, exhibition enterprises in Wuhan City mainly gathered at business district in Wuhan Square. MICE industry can’t develop without business. Many 5A office buildings in the business district in Wuhan Square, Zhongnan business district, Guanggu business district provide excellent supporting facilities for enterprise development. Meanwhile, business district will bring lots of people and information and own perfect supporting facilities; all of these provide outstanding conditions for enterprise to develop. exhibition enterprises around WIEC are a few because commercial facilities around it are not good. Therefore, exhibition enterprises gradually gather at the adjacent area (such as main urban area in Hanyang). It should be mentioned that gathering of exhibition enterprises at business district at Wuhan Square (WHICEC) and Guanggu business district (Wuhan Science & Technology Convention and Exhibition Center) not only profit from the distribution of conference and exhibition venues or the density level of business, it is also the result gaining from many factors.

5.3. Degree of Convenient Traffic
According to spatial distribution map of exhibition enterprises in Wuhan, it could be found that exhibition enterprises in Wuhan mainly locate at the main urban area; only a few scatter at places which are far away from the main urban area. In 2011, 796 exhibition enterprises were newly founded in the main urban area, occupying 91.60% of the total newly founded exhibition enterprises in that year. 1919 exhibition enterprises were newly founded in main urban area in 2014, holding 85.10% of total newly founded exhibition enterprises in that year. Circular gathering of exhibition enterprises was formed in 2014, that offices of these exhibition enterprises were mainly around the main urban area. Yangtze River and Han River divide Wuhan City into three main urban areas, i.e. Wuchang, Hanyang and Hankou. These three areas have the optimal urban resources of Wuhan City, which fuel exhibition enterprises to develop rapidly. Meanwhile, exhibition enterprises mainly gather inside the third circle of Wuhan where its core is the main urban area. Development of conference and exhibition relies on the improvement of traffic environment. Site selection of conference and exhibition venues in the world change. They move from urban area which has convenient traffic to new districts where are close to transportation junctions such as subway, bus station, airport, etc. Transportation around WIEC, WHICEC, Wuhan Science & Technology Convention and Exhibition Center are convenient that many modes of transportation such as rail traffic and bus are available. exhibition enterprises also require convenient traffic, because convenient traffic will bring more businesses and make convenient for logistics transportation. Therefore, convenient transportation has a certain influence on the gathering of exhibition enterprises.

Distribution of conference and exhibition venues, density degree of businesses and degree of convenient traffic affect the gathering of exhibition enterprises to some extent; and such influence is not the result of a single factor but the result of synthetic action. This could be indicated by the fact that exhibition enterprises gather around Wuhan Square (WHICEC) and Guanggu business district (Wuhan Science & Technology Convention and Exhibition Center); but degree of exhibition enterprises gathering in WIEC is limited. Writer also found an interesting phenomenon during the
study that quantity of enterprises engaging in conference and exhibition service was less than one hundred in last century, but it reached 2255 in 2014. This indicates that MICE industry develops significantly in Wuhan. And businesses of enterprises engaging in conference and exhibition service are more than conference and exhibition service but also cover many fields such as media, medicine, retailing, computer, tourism, real estate. When selected samples, writer found that retail industry like Suning also involves conference and exhibition service, which is different from the traditional exhibition enterprises. To reflect actual situation of exhibition enterprises in Wuhan, these samples were also included under the research. Because of this, the samples contain lots of traditional commercial enterprises, which have high demands on business gathering and convenient transportation. This aggravates the dependency of exhibition enterprises on density degree of business and degree of convenient transportation.

6. Conclusions
The study analyzes the evolution of spatial distribution of exhibition enterprises in Wuhan City, finding that development of exhibition enterprises in Wuhan City has experienced the process from scattered distribution to multipoint gathering to circular gathering, and gathering of exhibition enterprises is affected by distribution of conference and exhibition venues, density degree of businesses and degree of convenient traffic. The purposes of research are reached.

However, the study still has deficiencies. For example, selected samples of exhibition enterprises were not classified further; reasons of the evolution of spatial distribution of exhibition enterprise were not analyzed deeply. Of course, such deficiencies will become the directions of subsequent studies, which are worthy of being studied further.

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