

# Study on the Spatial Distribution Pattern of Catering Industry in the Urban Center of Kunming from 2012 to 2022

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**Abstract:** Taking the urban center of Kunming as the study area, this paper extracts the POI data of the catering industry in 2012, 2016, 2020 and 2022 of Kunming by adopting web crawler technology, and then the average nearest neighbor index, geographic concentration index, kernel density analysis and spatial autocorrelation index are used by this study to conduct a comparative study on the spatial distribution pattern of the catering industry in the urban center of Kunming so as to explore its spatial clustering and evolutionary characteristics. The study results show that: (1) The development trend of the spatial pattern of the catering industry in the urban center area of Kunming is consistent with the urban development planning of Kunming, with the center clustering and expanding outward. (2) Although relying on commercial centers, tourist hotspots and university campuses, catering points form a multi-center distribution and "large aggregation, small dispersion" spatial pattern, the spatial distribution is unbalanced. (3) The spatial distribution pattern of catering industry is consistent with the overall spatial distribution pattern of catering industry, showing a multicenter gathering trend.

**Keywords:** Poi, Urban center area of Kunming, Catering industry, Spatial pattern.

## 1. Introduction

As an important industry in China's national economic development, the catering industry not only plays a key role in balancing the industrial structure and economic pattern of cities, but also creates employment opportunities for the public while meeting the consumption needs of residents. It has been shown that the revenue of the catering industry accounts for more than one-tenth of the total social consumer income in China and has been maintaining an annual growth rate of about 10%. From the perspective of urban development, food and drink, as one of the unique local cultures, can not only gather the popularity of the city and show the unique characteristics of the city's food habits, but also pull apart the differences with other cities to further demonstrate the image of the city and enhance competitiveness [1-2]. With the rapid development of the Internet, e-commerce and other technologies, the catering industry has been integrated with new technologies and a large number of software have emerged, such as Meituan, Dianping, Ele.me, etc., all of which provide convenience and reference for mass consumption, and also provide a platform for big data analysis [3]. Using the data collected by these software, the spatial layout analysis of the city's catering industry can be realized more accurately, which is conducive to characterizing the socio-spatial structure of the city, and is also conducive to improve urban planning and management, and thus provide a reference for the healthy long-term development of the city.

Many studies on the spatial distribution of catering industry have been carried out at home and abroad, and certain study results and theoretical systems have been accumulated. Specifically, in terms of the study on the spatial distribution of urban catering, Huang Shujuan [4] took Guilin as the study area and analyzed the characteristics of the spatial pattern of the catering industry in Guilin city, the study results showed

that the catering industry in Guilin is characterized by the distribution of one main center and one subcenter, and the urban center has a strong competitiveness in terms of price and rating. The study carried out by Huang is of great reference significance for the subsequent spatial layout of the catering industry in tourist cities. Zhou Aihua [5] took the time-honored restaurants in the urban area of Beijing as the study object and analyzed the spatial pattern using GIS analysis. The study results showed that the catering industry in Beijing presents the characteristics of central concentration and peripheral dispersion, which is closely related to the level of urban regional development. As for the study on the factors influencing the spatial distribution of the catering industry, Schiff [6] used data modeling analysis to investigate more than 120,000 restaurants in about 700 cities in the U.S. The study results showed that the most important factor influencing the spatial pattern distribution of the urban catering industry is the distribution density of the number of population. Additionally, Tu [7] took the main urban area of Chongqing as the research object to study the relationship between the urban pattern, terrain and the spatial distribution of catering industry. The results show that the catering industry in the main urban area of Chongqing has a spatial structure of one main center, two secondary centers, and the spatial distribution is consistent with the urban terrain trend. Among many influencing factors, the commercial spatial distribution has the greatest influence on the catering industry.

In terms of investigation and study methods, scholar Dock [8] used the method of gravity model to investigate the influencing factors affecting the distribution of catering industry in Kentucky, U.S.A. The results showed that the geographical location and competitiveness of restaurants would affect the distribution of catering industry, and there is a close relationship among the development of catering industry in cities and the urban layout and consumer ability. This study provides a reference for the spatial distribution of

urban catering industry by comparing various gravity model methods. Qi Weifeng [9] took the data of Dianping as the source, and used python crawler technology to obtain the review data, sales volume, price and other basic data of catering businesses in the main urban area of Hangzhou. The results showed that the main urban area of Hangzhou showed an olive-shaped distribution, and there were more medium reputation merchants. Meng Deyou [10] and Li Xiaojian [10] used the nearest neighbor index, geographic concentration index and kernel density analysis to explore the spatial pattern and evolutionary characteristics of the catering industry in the main urban area of Zhengzhou for a total of four years in 2010, 2013, 2016 and 2019. The study results showed that the catering industry in the main urban area of Zhengzhou had significant clustering characteristics, and the distribution of restaurant showed a gradual expansion from the urban center area to the outside. Additionally, Based on the distribution of urban take-out merchants in 2016 and more than 800,000 data of urban POI from 2016 to 2018, He Xiong [11] analyzed the distribution characteristics of both in space from macro, meso and micro levels using methods such as standard ellipse deviation and kernel density analysis in GIS, and further explored the correlation existing between them in space.

In general, although there are a lot of studies on the spatial pattern of catering industry at home and abroad, the acquisition of study data has changed from traditional census data to big data, most of the study contents are based on the distribution pattern of a single year, and there are relatively few comparative and evolutionary characteristics of the spatial distribution pattern, and most of the study areas are mainly economically developed regions. Therefore, it is of great significance to make full use of modern analytical techniques. Taking the main urban area of Kunming as the study object, this study firstly adopts python crawler technology to extract POI data of catering industry in 2012, 2016, 2020 and 2022. Then, methods such as average nearest neighbor index, geographic concentration index, kernel density estimation and spatial autocorrelation index are used to make a comparative study on the spatial distribution pattern of catering industry in the urban center area of Kunming, so as to explore the spatial agglomeration and evolution characteristics of catering industry, and finally the agglomeration characteristics was discussed. This study can provide a theoretical basis for the development of the catering industry in Kunming, and also has reference significance for the selection of sites for the construction of the city's future cuisine variety street so as to enhancing the city's popularity.

## 2. Study Area, Study Methods and Data Sources

### 2.1. Study Area

Kunming, the capital city of Yunnan Province in China, has a total area of 21,000 square kilometers and a total population of 5,828,700 as of the end of 2020. There are 52 streets and 5 districts in Kunming, namely Wuhua District, Panlong District, Xishan District, Guandu District and Chenggong District. Kunming is also known as the "Spring City" because of its pleasant scenery and mild climate in all seasons, which attracts a large number of tourists. In 2020, the GDP of Kunming was 673.379 billion CNY, of which the GDP of the tertiary industry was 431.851 billion yuan, with a growth rate of 2.3%. Compared with 2019, the consumer price index of Kunming increased by 0.6%, and the total number of

individual industrial and commercial households was 105,300, with a growth rate of more than 13% [12-13]. The city is surrounded by mountains on three sides and water on one side, forming a polycentric spatial development pattern of "one lake, four rings, one lake, four auxiliary lakes".

### 2.2. Data Sources and Processing

The POI data used in this study are obtained from Amap and Dianping, where the data of 2012, 2016 and 2020 are obtained from Amap, and the POI data of 2022 up to March is crawled from Dianping website by using python software, and the information crawled included the name, address, location coordinates, and type of catering spots. After cleaning and screening the data, and removing data with incomplete information or wrong location through field visits, the final POI data for the four years are obtained as 8811, 45882, 50867 and 47031, respectively. Additionally, the socio-economic data of Kunming involved in the study are all obtained from the Kunming Statistical Yearbook of 2021.

### 2.3. Study Methods

Referring to the analysis methods of point data distribution used by previous scholars, this study adopts average nearest neighbor index, geographic concentration index, kernel density analysis and spatial autocorrelation index to express the spatial clustering characteristics of catering points in the urban center of Kunming.

#### 2.3.1. Average Nearest Neighbor Index

The average nearest neighbor index is used to measure the distance between the center of mass of each factor studied and the center of mass of its closest factor, and then these nearest neighbor distances are added together to calculate the average value. This index can usually be used to judge the distribution type of point elements, and is also a common index to judge the degree of proximity of point elements in spatial distribution [10]. The formula is as follows:

$$AMN = r_1/r_E ; r_E = 1/2\sqrt{A/n} \quad (1)$$

Where, AMN is used to represent the average nearest neighbor index. When  $AMN > 1$ , the factors to be analyzed are regarded as dispersed distribution. When  $AMN < 1$ , the factor is regarded as aggregation distribution, and the closer the index is to 1, the higher the degree of agglomeration is. When  $AMN = 1$ , it means that the factor is randomly distributed.  $n$  is the number of samples;  $A$  is the study area [10].

#### 2.3.2. Geographic Concentration Index

Geographical concentration index is used to represent the concentration degree of research factors in geographical space. The larger the index is, the more concentrated the distribution of the factors in geographical space would be, while the smaller the index value is, the more dispersed the distribution of the factors would be [10]. The formula is as follows:

$$G = 100\% \times \sqrt{\sum_{m=1}^k \left( \frac{X_m}{T} \right)^2} \quad (2)$$

Where,  $G$  is the geographical concentration index;  $X_m$  is the factor value distributed in the  $M$ th geographic space, and  $k$  is the number of geographic space (region).  $T$  is the sum of the research elements in all geographical Spaces. When the

geographical concentration index of each region is greater than the geographical concentration index of the research factors evenly distributed among provinces and cities, it means that the distribution of the element in the geographic space is concentrated, and vice versa is dispersed.

### 2.3.3. Kernel Density Analysis

Kernel density analysis is mainly used to analyze the density of point elements in space by identifying the hot spots in the study area to describe the clustering characteristics and density of point elements in space [14-15]. The formula is as follows:

$$f_h(x) = \frac{1}{nh} \sum_{i=1}^n k\left(\frac{x-x_i}{h}\right) \quad (3)$$

Where:  $f_h(X)$  is the kernel density value. The larger the value, the denser the distribution of point elements in the study,  $k$  is the spatial weight of element  $i$ ,  $h$  is the search radius and  $n$  is the sum of point elements in the study area [10].

### 2.3.4. Spatial Autocorrelation Analysis

Spatial autocorrelation analysis is usually used to determine whether a variable is spatially correlated and to what extent. If the value of a variable becomes more similar as the measurement distance decreases, then the variable is spatially positively correlated; conversely, it is spatially negatively correlated. If the measured value does not exhibit any spatial dependence, then this variable is spatially uncorrelated or exhibits spatial randomness. In the study, spatial autocorrelation is used to analyze the correlation between the elements of catering points in the global and local space, and the global Moran's I index and the local Getis-Ord  $G_i^*$  index are selected to measure them, respectively.

The global Moran's I index can be used to determine whether the spatial distribution of catering industry has agglomeration characteristics in the whole study area [7]. When Moran's I is greater than 0, it indicates that the elements of catering points present an agglomeration trend in space; when Moran's I is less than 0, it presents a discrete distribution trend. When Moran's I is equal to 0, it indicates that the point elements are randomly distributed in space and there is no spatial autocorrelation.

Getis-Ord  $G_i^*$  index is used to describe the degree of spatial agglomeration of catering industry in a local region [7], and to detect which areas in the study area are high value agglomeration, which areas are low value agglomeration, which areas are alternating high and low value agglomeration, so as to make a visual analysis of hot or cold spots of catering distribution. The formula is as follows:

$$G_i^* = \frac{\sum_{j=1}^n W_{ij}(d) x_j}{\sum_{i=1}^n x_i} \quad (4)$$

When  $G_i^*$  is greater than 0, it means that the attributes of the study area are similar to those of the neighboring area. In other words, the region with a high degree of agglomeration is adjacent to the region with a high degree of agglomeration, and the region with a low degree of agglomeration is adjacent to the region with a low degree of agglomeration. On the contrary, when  $G_i^*$  is less than 0, it is considered that the attributes of the study area and neighboring areas repel each other, presenting an alternating agglomeration of high and

low values [15].

## 3. Distribution Characteristics of Spatial Pattern of Catering Industry in Urban Center Area of Kunming

### 3.1. Overall Distribution Characteristics of Catering Industry

The spatial agglomeration characteristics of the catering industry in Kunming are significant, but the degree of agglomeration has weakened, and the spatial distribution of the catering industry is not uniform. First, the average nearest neighbor distance index of catering points gradually increased from 0.169 in 2012 to 0.35 in 2022, with indexes greater than 0 and less than 1. Passing the test at the 1% significance level indicates that the catering points show the characteristics of significant spatial agglomeration, but the degree of agglomeration is weakened and shows a tendency to spread outward [10]. Second, the geographical concentration index decreased from 0.483 in 2012 to 0.471 in 2022, which also proves that although the spatial aggregation in the central city of Kunming is characteristic, the degree of aggregation shows a decreasing trend year by year. Third, according to the statistics of the number, density and proportion of catering points in each administrative region (Table 1), it can be found that the number of catering points in the central urban area of Kunming has shown a rising and then falling trend since 2012, and the spatial distribution of its catering industry is uneven, among which the number of catering points in Wuhua District and Guandu District is relatively more and more dense, reaching a peak in 2020, with a total number of 10,641 and 16319, and the density is 26.83, 25.61 per square kilometer, accounting for 21% and 32% of the central urban area of Kunming respectively. While the number of catering points in Chenggong District and Xishan District is less, of which Xishan District has the lowest density and the highest value is only 9.75 per square kilometer, and the number of catering points in Chenggong District is the least. Although the number of catering in Chenggong District and Xishan District has been increasing gradually since 2012, the increase speed is slow. This is because the construction and development of the old urban areas in the central urban areas were earlier and accumulated more resource advantages and population density, which has a greater demand for catering industry. Therefore, a large number of catering businesses are concentrated in Wuhua District and Guandu District. Fourth, compared with 2020, the number of catering points in 2022 decreased by 3,836, of which the number of catering points in Guandu District, Xishan District and Wuhua District decreased by 1,233, 1,077 and 858, respectively, as a result of the outbreak of COVID-19 during the Spring Festival in 2020, which led to the suspension of a large number of catering enterprises. Guandu District, as the new center of Kunming and the gathering area of the major traffic routes, was greatly affected by the epidemic, and there was a significant decrease in the number of catering points in the area centered on Guandu Ancient Town, the railway station and Changshui Airport. While in Xishan District, the number and density of catering points near tourist attractions including Da Guan Park, the Ridge Dam and the National Village as the core of the restaurant cluster have significantly decreased. As for Wuhua District, the number of catering points in Wuhua District has also been affected by the epidemic, with the

number decreasing from 10,641 to 9,783 in 2020. And the number of catering points in Panlong District and Chenggong District decreased from 9,158 and 5,994 in 2020 to 8,704 and

5,780 in 2022, respectively, indicating that the two areas were less affected by the epidemic.

**Table 1.** Distribution of catering POI in the study area

Administrative District	Number of catering points				Share of catering points				Density of catering sites (pcs/km <sup>2</sup> )			
	2012	2016	2020	2022	2012	2016	2020	2022	2012	2016	2020	2022
Chenggong District	387	4052	5994	5780	5	9	12	12	0.78	8.12	12.02	11.59
Guandu District	2490	14337	16319	15086	28	31	32	32	3.91	22.5	25.61	23.68
Panlong District	1824	8672	9158	8704	21	19	18	19	2.16	10.26	10.83	10.3
Wuhua District	2055	10910	10641	9783	23	24	21	21	5.18	27.52	26.83	24.67
Xishan District	2055	7911	8755	7678	23	17	17	16	2.29	8.81	9.75	8.55

### 3.2. Spatial Agglomeration Characteristics of Catering Industry

The spatial distribution pattern of catering industry in the urban center area of Kunming presents a trend of multi-center gathering and expanding from the center to the periphery. The junction of Wuhua District, Xishan District, Panlong District and Guandu District forms a high-density agglomeration area, which expands outward from the center to form a new small-scale independent agglomeration center in Chenggong New District, showing a spatial pattern of "large aggregation and small dispersion". In this study, the kernel density analysis method is used to analyze the agglomeration characteristics of catering points in the central urban area for four years in 2012, 2016, 2018 and 2020, and then the natural break point method is adopted to classify and determine the search radius of 1000m to measure the kernel density of catering points. As shown in Figure 1 of kernel density, it can be seen that firstly, from 2012 to 2022, the catering industry in the urban center area of Kunming has been expanding from the center to the periphery. Among them, the junction of Wuhua District, Xishan District, Panlong District and Guandu District have the most significant density, and then spread outward, forming a spot-like aggregation trend in Chenggong District, but the scale is relatively small. Secondly, a spatial pattern of multi-core distribution is formed. The urban center area of Kunming has formed a multi-center spatial pattern with Dongfeng Square as the main center, Cuihu Historical and cultural Area, the First City of South Asian customs, Dagan Park, World Horticultural Exposition Park, Guandu Ancient Town, Changshui International Airport, Kunming Railway Station, Kunming South Railway Station, Chenggong University Town and the Colorful Yunnan First City as the sub-centers. Thirdly, although the catering points are mainly clustered at the junction of four districts in 2012 and forms a small agglomeration in Chenggong District, with the gradual improvement of supporting facilities in Panlong District and Guandu District, the increase of residential occupancy rate, as well as the vigorous development of tourism in Kunming in

recent years, a large number of people are attracted, which promotes the occupancy of catering industries and thus drives the development of the catering industry in this region [16-17]. Fourthly, the connection between Dongfeng Square as the center and several sub-centers in Panlong District is gradually strengthened, forming a preliminary point-piece situation. Although the trend of point-piece in 2020 is strengthening and expanding to the east and southeast, and new catering gathering points are formed near Changshui International Airport in Panlong District and near Chenggong university town, their scale is relatively small and independent. In 2022, compared with 2020, although the number of catering points is reduced under the impact of the epidemic, there is no significant change in the total gathering trend.

### 3.3. Spatial Autocorrelation Analysis

The distribution of catering industry in Kunming shows a significant positive spatial correlation, with hotspot areas concentrated at the junction of four districts and a trend of expansion to the southeast in the development direction. Using a 2km x 2km square grid as the study unit for spatial autocorrelation analysis of catering points, it can be concluded that (1) the global Moran's index shows the existence of spatial clustering characteristics of catering point distribution, with the global Moran's I indexes of 0.738, 0.739, 0.722 and 0.718 in each year, and the standardized Z values are all greater than the critical value (1.96) at the significance level of 0.05, indicating a significant positive spatial correlation in the distribution of catering points [10]. (2) The hotspot area is concentrated in the junction of Wuhua District, Guandu District, Xishan District and Panlong District, and keeps expanding to the southeast, forming a small-scale and independent hotspot area in Chenggong District in 2016, and then with the gradual improvement of the supporting facilities around the university city and the increase of the occupancy rate of the community, the hotspot area of Chenggong New Town expand and have a smaller connection with the central hotspot area from 2020 to 2022.

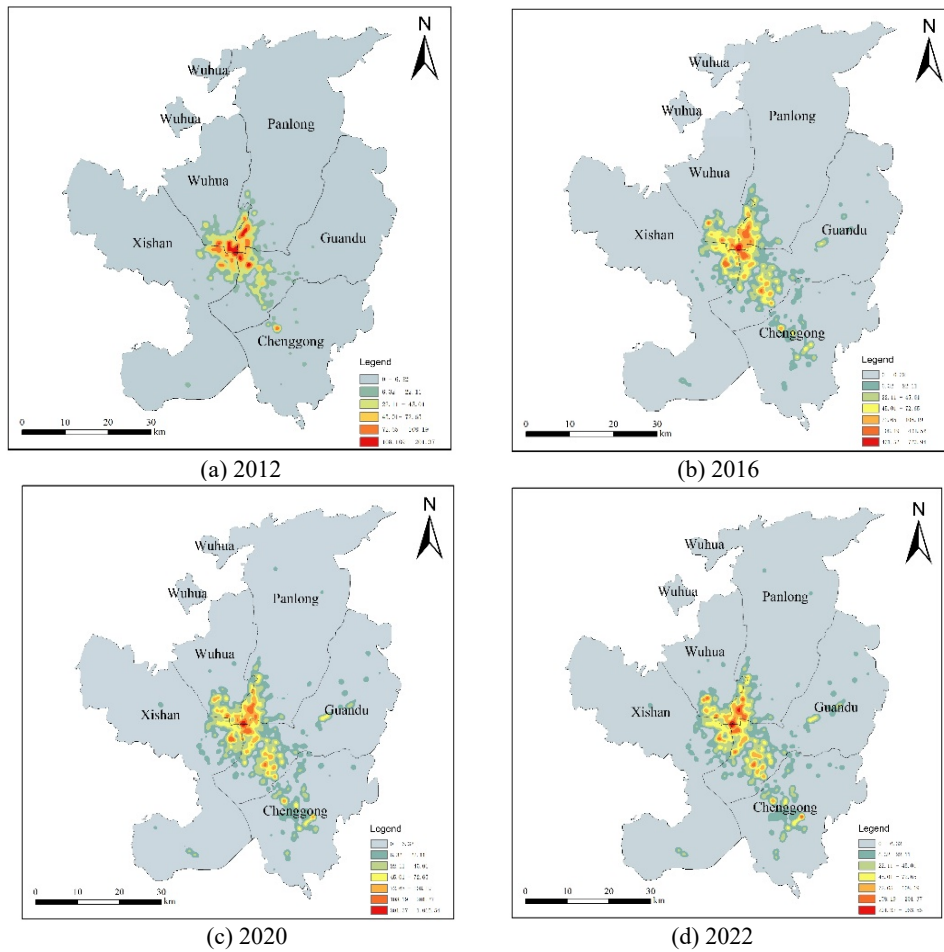


Figure 1. Analysis chart of core density of catering industry in downtown Kunming

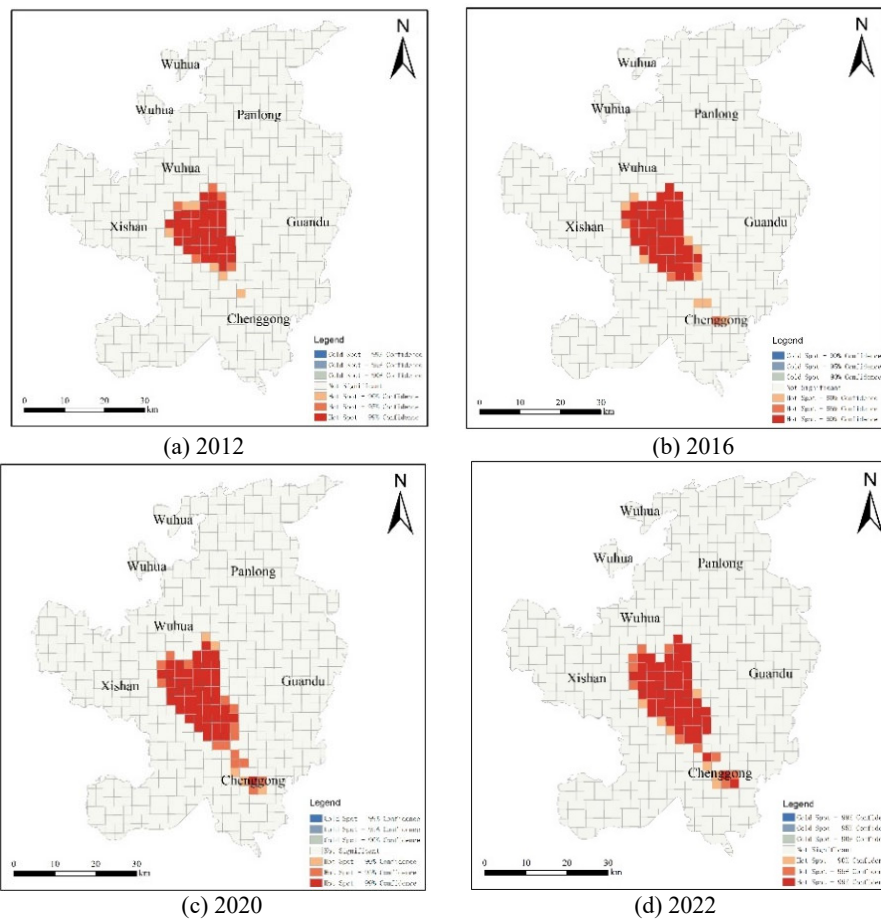


Figure 2. Spatial autocorrelation analysis of catering industry in the central urban area of Kunming

#### 4. Differences in Spatial Distribution Characteristics of Different Catering Industries

According to the Standard of Classified Catering Industry of National Economy, the catering industry is divided into four categories: meal service, fast food service, beverage and cold beverage service and other catering services [10]. Since other catering services do not take a high proportion, this paper only analyzes the three categories of catering industry and summarizes their spatial distribution characteristics.

##### 4.1. Spatial Distribution Characteristics of Meal Service Points

The spatial agglomeration of meal service points is significant and presents a spatial pattern of multi-center distribution, which is basically consistent with the spatial distribution of the overall catering industry, resulting in the agglomeration of Wuhua District, Xishan District, Guandu District and Panlong District forms a small and independent agglomeration point together with Chenggong District (Figure 3). From the perspective of catering points quantity, the number of meal service points increased from 6,600 in 2012 to 33,465 in 2022, accounting for 71.2 percent of the total in 2022, down from 74.9 percent in 2012. The average nearest neighbor distance index increases from 0.169 in 2012 to 0.40 in 2022, and its index is greater than 0 and less than 1 through the test, which indicates that although the spatial

agglomeration of meal service points in the central area of Kunming is obvious, the degree of agglomeration has weakened. From the perspective of location, in 2012, the food service points were mainly concentrated in the junction of four districts and concentrated in patches, and there was also a gathering point in Chenggong university city, but it was small in scale and existed independently. since 2016, the degree of concentration at the junction of four districts gradually weakened and began to gradually spread to the east and southeast, and the linkage between the center Dongfeng Square and the sub-center of World Horticultural Expo in Panlong District was strengthened and gradually connected into one. At the same time, the linkage between sub-center in Xishan District, with Da Guan Yuan as the core gathering point, and the main center is weakening, and by 2020, the catering industry has formed new clustering points at the junction of Wuhua District, Panlong District and Guandu District, with Dongfeng Square and the World Horticultural Expo in Panlong District being more closely linked spatially. The Guandu District, on the other hand, continued to expand to the east along the main roads, forming a new point-like agglomeration center near Changshui International Airport. And relying on Chenggong university town as an agglomeration center, Chenggong District continuously developed in the southeast direction, forming a multi-center spatial pattern with weak connections among the centers. The development trend of catering services in 2022 is highly consistent with that in 2020.

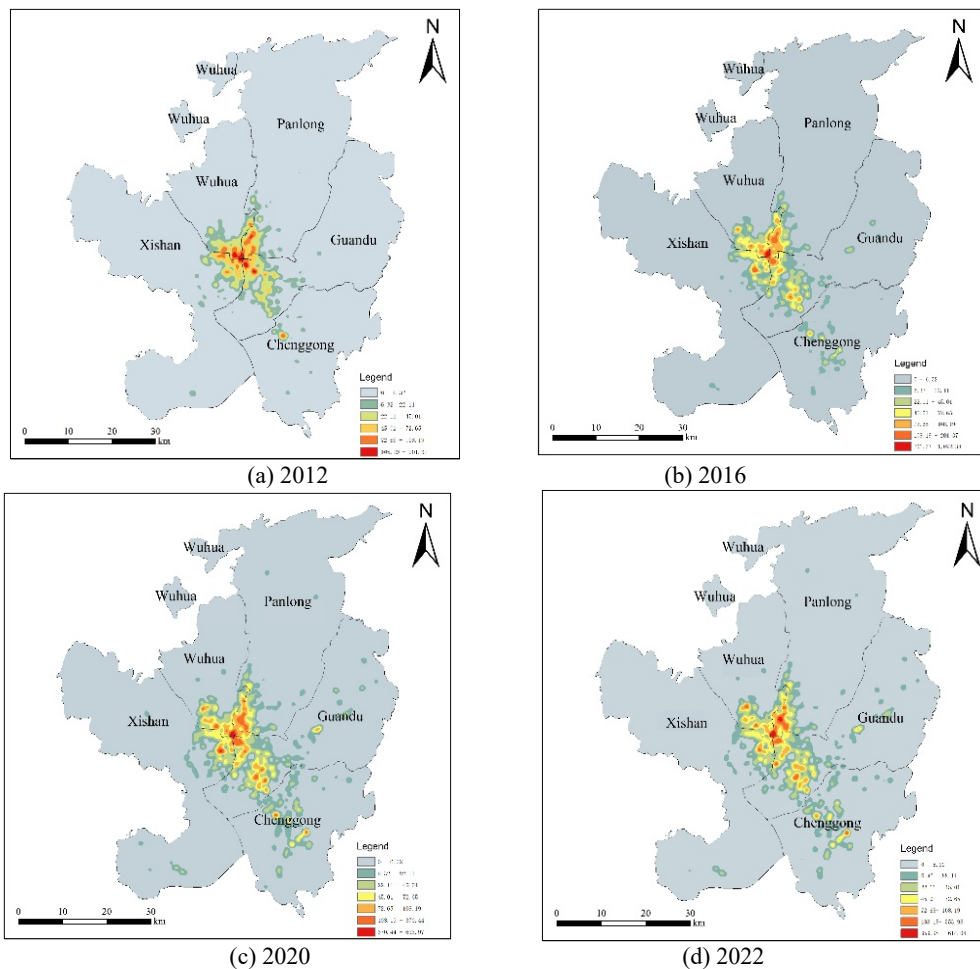


Figure 3. Analysis of nuclear density of dinner service industry in downtown Kunming

### 4.2. Spatial Distribution Characteristics of Fast Food Service Points

The spatial agglomeration of fast food service points is significant, and the agglomeration degree presents an inverted "V" shape, that is, the development trend of first increasing and then decreasing. The multi-center pattern develops from the center to the southwest continuously, forming a spatial pattern of "points connected into pieces" (Figure 4). From the perspective of fast food points quantity, the number of fast food service points increased from 634 in 2012 to 8992 in 2020, and decreased to 7256 in 2022, accounting for 7.20% of the total number of points in 2012 to 15.4% in 2022. The average nearest neighbor distance index decreases from 0.196 in 2012 to 0.190 in 2022, and its index is greater than 0 and

less than 1 through the test, indicating that the spatial agglomeration of fast food service points in the urban center area of Kunming is obvious, and there is a small increase in the degree of agglomeration. From the perspective of location, in 2012, fast food services mostly gathered at the junction of four districts and existed independently, and the kernel density value was low, reaching a maximum of 20.62 only. While after 2016, the spatial pattern of fast food gradually spreads outward from the center, forming multiple center points by 2020 and existing independently between the center points located near Kunming International Changshui Airport in Guandu District and Chenggong District. At this time, the maximum kernel density value reached 163.08, and in 2022, the maximum kernel density value decreased to 118.23, with a development trend basically consistent with that in 2022.

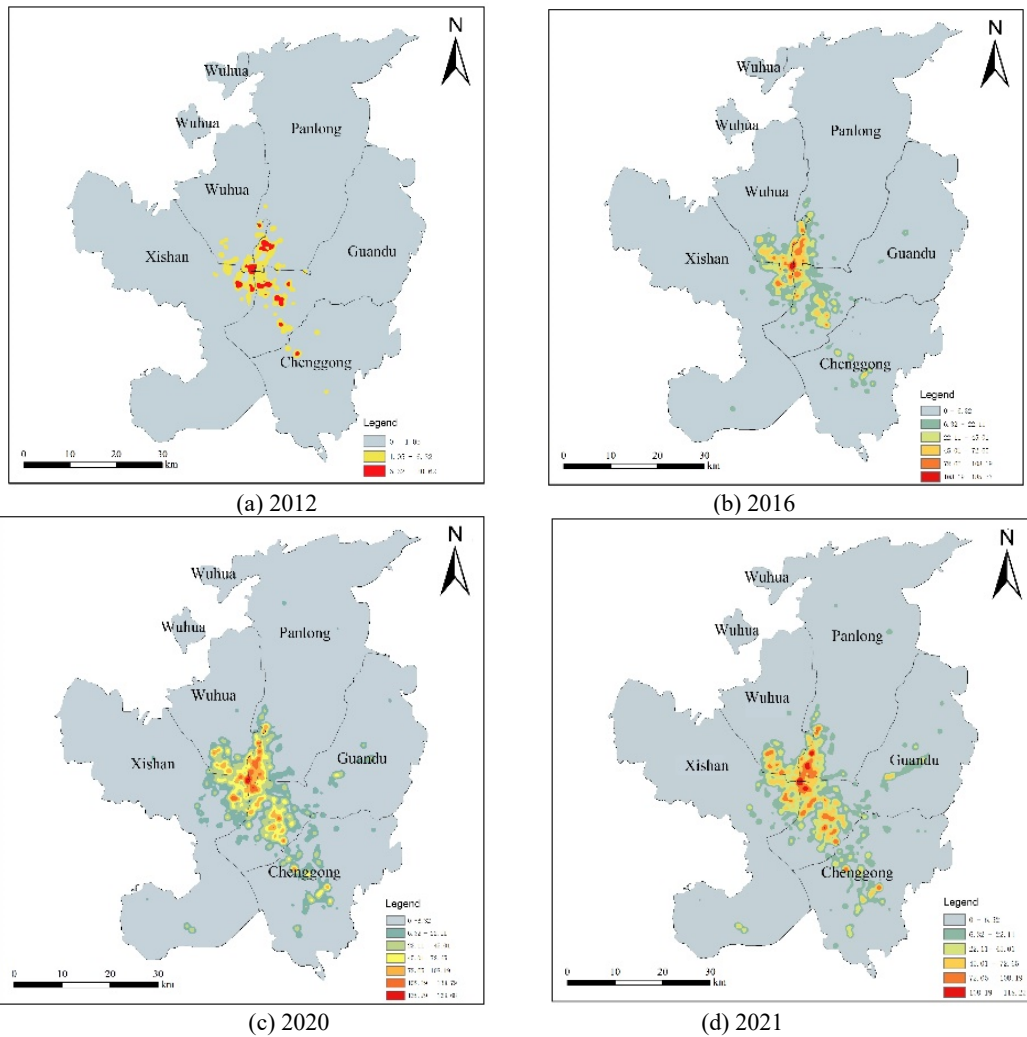


Figure 4. Analysis of nuclear density of fast food service industry in downtown Kunming

### 4.3. Spatial Distribution Characteristics of Beverage and Cold Beverage Service Points

The beverage and cold beverage service points are spatially distributed in clusters, with an obvious clustering trend and an N-shaped development trend. Although the agglomeration centers are formed at the junction of the four districts, the degree of agglomeration is not high, as shown in Figure 5. From the perspective of beverage and cold beverage service points quantity, beverage and cold beverage service points

increased from 1095 in 2012 to 5436 in 2016, and then decreased to 3306 in 2020, and then slowly increased to 3839 in 2022. The proportion of the total decreased from 12.42% in 2012 to 8.16% in 2022. In 2016, the beverage and cold beverage service points were the most numerous and the agglomeration range was larger, then the number of service points decreased and the agglomeration range gradually shrank around the center and formed two clusters of different sizes, followed by continuous expansion to the east and southeast in Changshui Airport and Chenggong University City to form some small agglomeration points. The kernel

density distribution as a whole decreases from the junction of the four districts to the peripheral areas, and its highest value

is 170.26.

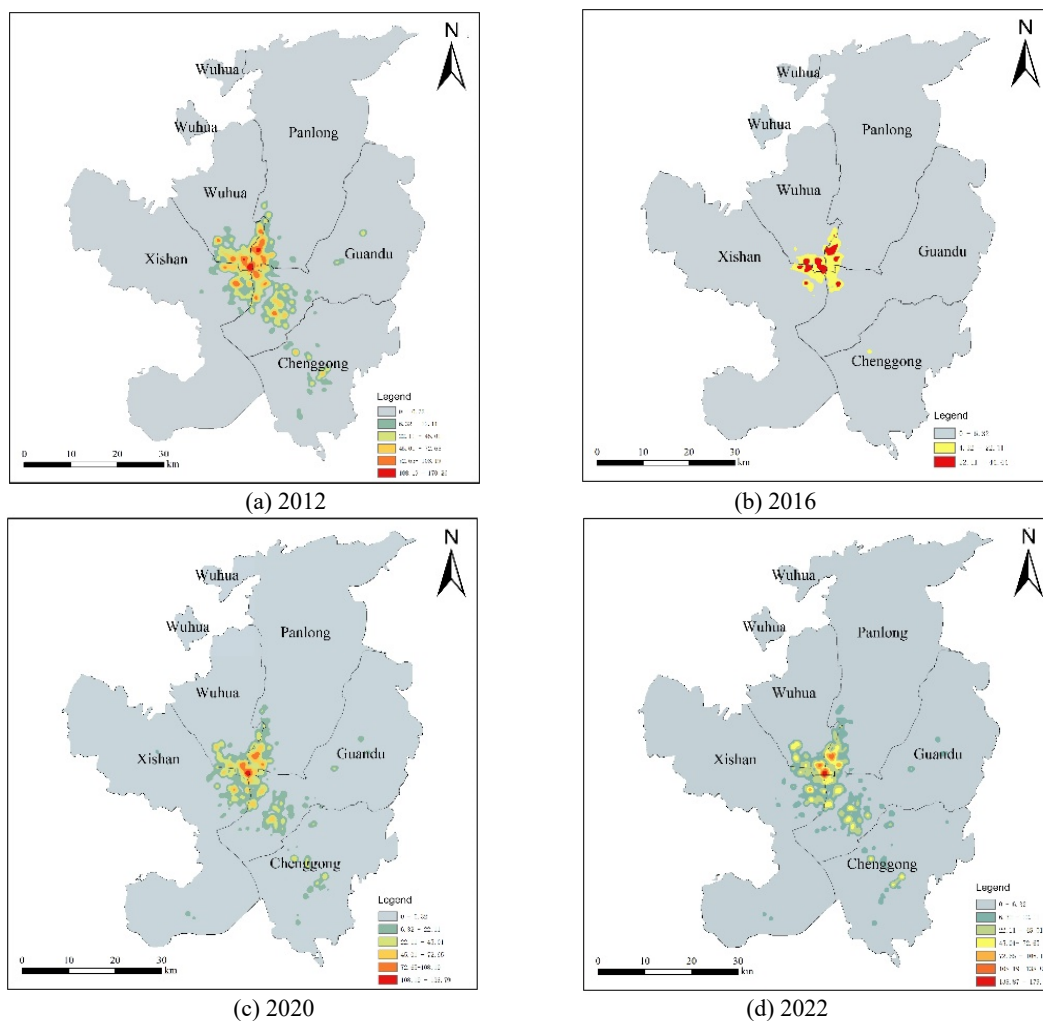


Figure 5. Analysis chart of nuclear density of cold drinks and beverage service industry in downtown Kunming

## 5. Conclusion and Discussion

### 5.1. Conclusion

Based on the above analysis, the following conclusions can be drawn (1) The catering industry in the urban center area of Kunming forms a high-density cluster core at the junction of Wuhua District, Panlong District, Xishan District and Guandu District and forms a cluster hotspot of catering industry. (2) There are spatial differences in the development of the catering industry in the central urban area of Kunming, and the distribution is obviously unbalanced, with the catering industry in Wuhua District and Guandu District being more numerous and denser, and the catering industry in Xishan District and Chenggong District being less numerous and less dense. (3) The catering industry relies on commercial centers, tourism hotspots and university campuses to form a spatial pattern of multi-center distribution. (4) The spatial distribution of various catering industries and the spatial structure of the city show significant consistency, with meal service as the leading industry and is consistent with the overall spatial distribution pattern of catering industry, while fast food service, beverage and cold drink service are expanding and contracting, but the overall development is still polycentric.

### 5.2. Discussion

As an important pillar industry to promote urban economic development, the catering industry plays an important role in demonstrating the charm of cities, balancing the economic structure of cities, meeting the needs of residents and promoting urban economic development. Its spatial layout reflects the layout of urban spatial structure and the trend of urban expansion to a large extent. Therefore, this study explores the spatial layout characteristics and evolution process of the restaurant industry in the urban center area of Kunming, and further reveals the development trend of the catering industry. However, it is still necessary to further deepen the study, including whether there is any correlation between the influencing factors and their degree of correlation.

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