

## Study on the Spatial Matching Between Urban Green Tourism Space Accessibility and Residents' Housing Behavior Preferences – A Case Study from China

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### *Abstract*

Urban green tourism space accessibility is one of the important indicators for measuring urban livability, and has significant implications for social equity and people's wellbeing. This article takes Zhengzhou city as the research object, and uses land use data, commercial housing transaction data, population density data, Gaussian two-step moving search method, and GWR geographic weighted regression model method to analyze and calculate the temporal and spatial matching between urban green tourism space accessibility and residents' behavior preferences. The main findings are as follows: (1) overall, green spaces within the core area of Zhengzhou city show lower values in the central region but higher values in the eastern and western regions, indicating large spatial differences. (2) The distribution of residents' demand for green tourism space accessibility shows significant differences in the central and eastern regions. (3) The spatial matching degree between green tourism space accessibility and residents' behavior preferences within the Fourth Ring Road of Zhengzhou city is generally high, with high matching degrees in the central and eastern areas and low matching degrees in the northern and southern areas, reflecting the unfairness in the distribution of green tourism space. The article puts forward planning and construction suggestions and viewpoints to address the existing unfairness problems and phenomena.

**Keywords:** Urban Green Tourism Space, Accessibility, Housing Preference

## Introduction

Green space is a collection of green elements that have ecological value and service function and can meet the needs of residents. It is a basic element of human settlements and an important guarantee for achieving sustainable urban development. Due to its shared attribute as a public space and the current development concept of “people-oriented, ecological health” promoted in urban construction, the accessibility of green spaces serves as a benchmark for measuring the current status, fairness level, and service level of urban green infrastructure configuration, which can further improve social equity and enhance people’s well-being.

Early studies on green space accessibility mainly focused on exploring measurement methods. For example, Tao Yu <sup>[1]</sup> used the simple buffer method to measure the accessibility of green spaces; Kong F H et al. <sup>[2]</sup> measured accessibility by calculating the cumulative time required for residents to travel by transportation to reach green spaces in residential areas; Zhu Yaojun et al. <sup>[3]</sup> analyzed network accessibility using the network distance method, with “centroids” and “accessible points” representing block units and urban forest patches... As urban residents’ living standards improve, consumer demands change, and the concept of “humanism” deepens, the issue of fairness in the allocation of public resources such as green space has become a hot topic. Scholars have begun to re-examine the study of green space accessibility from the perspective of fairness, proposing to alleviate the fairness issues of green space accessibility from two aspects: increasing the supply of green space accessibility and guiding the demand of residents. Some scholars even used urban tourism green space accessibility as a carrier to conduct spatial supply-demand relationship analysis <sup>[4-6]</sup>. Compared with the supply of green space accessibility, the academic community still pays relatively little attention to the demand for green space by residents, and how to objectively reflect the real needs of urban residents is worth exploring.

Furthermore, exploring and analyzing the temporal and spatial matching between urban tourism green space accessibility and residents’ housing behavior preferences can not only reflect residents’ dependence on the urban tourism green space environment but also be conducive to further analysis of urban tourism green space planning. However, existing literature has rarely reported on this. Therefore, taking Zhengzhou city as an example, this study obtained multiple sources of data on green space, housing, and rail transit in Zhengzhou in 2020 through various channels. It comprehensively used the Gaussian two-step moving search method and the GWR improved feature price model to calculate and analyze the

spatial matching between green space accessibility and residents' behavior preferences, providing scientific experience for addressing the uneven distribution of tourism green space, promoting fairness in residents' welfare, and achieving sustainable development in Zhengzhou city.

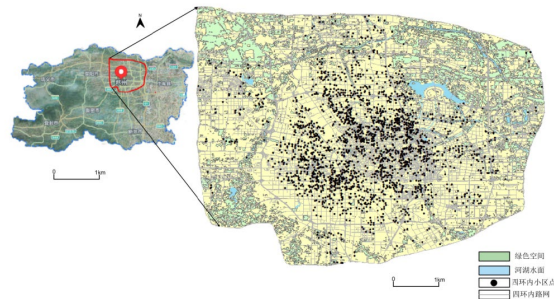
### **Study Area and Data**

#### **Overview of the study area**

The scope of this study is mainly focused on the Zhengzhou city area, including all areas within the fourth ring road. The rapid development of Zhengzhou city began about 20 years ago. During these two decades, Zhengzhou city has rapidly gathered human and material resources from the whole province, expanded its urban scale, increased its population year by year, and experienced high-speed economic development. However, such development has not been without negative factors. The rapid increase in population in a short period of time has led to a shortage of housing supply in Zhengzhou city. In order to solve the housing problem, a large number of urban tourism green spaces have been converted into construction land for building apartment buildings and various production buildings. Under this background, the comprehensive land development intensity of Zhengzhou city is 25.98%, and the area of urban tourism green space is shrinking at a rate of 2.5% per year. At this rate, the living environment in Zhengzhou city will continue to deteriorate, ultimately threatening the physical and mental health of its citizens. Although Henan Province has issued the "Ecological Protection and Construction Plan for Zhengzhou Metropolitan Area (2020-2035)" in October 2020, which clarifies the ecological construction goals of the Zhengzhou metropolitan area, due to pressure from economic development and inertia, the issue of urban greening in Zhengzhou city remains severe [7].

As shown in Figure 1, we can see that the main part of Zhengzhou city and the major residential areas have relatively few green spaces. Most of Zhengzhou's green spaces are distributed near the fourth ring road, with relatively large patches of green space and water surfaces. Overall, the green spaces in Zhengzhou city show the characteristics of surrounding the main urban area.

**Figure 1. Distribution of green spaces in Zhengzhou city (within the fourth ring road)**



#### Data sources

The research data includes five types: land use data, POI point data, commercial housing transaction data, population density data, and road data.

(1) land use data is the Zhengzhou City's 2020 land use grid data with a resolution of 30m. The data source is the Resource and Environment Science and Data Center of the Chinese Academy of Sciences. <https://www.resdc.cn/data.aspx?DATAID=264> ).

(2) POI data, also known as Point of Interest data, includes coordinate data for various point data such as education, medical care, green spaces, and entertainment. The data source is from Amap (AutoNavi).

(3) Commercial housing transaction data refers to second-hand housing transaction data in Zhengzhou City in 2020. It contains attribute data such as house type, orientation, area, and transaction price, and was screened for normal data through data cleaning. The data mainly comes from the Beike Zhaofang second-hand housing website.

(4) Population density data refers to the population density data of permanent residents in Zhengzhou City in 2020, used to analyze the unit population density in Zhengzhou City. The resolution is 1000m, and the data source is from the WorldPop website. <https://www.worldpop.org/>)

(5) The purpose of collecting road data is to calculate the shortest distance of the road network based on the road data, and then conduct subsequent accessibility analysis. The data source is from a website. [GEOFABRIK.download\(https://download.geofabrik.de/asia.html\)](https://download.geofabrik.de/asia.html) )

#### Research Methods

#### Data sources

The Gaussian two-step moving search method considers both supply and demand factors and uses an attenuation function to assign reasonable distance attenuation values, thereby comprehensively and conveniently calculating the accessibility of urban tourist green spaces [4]. Among them, using a Gaussian attenuation function to establish spatial attenuation rules is the most commonly used method among various extension forms. The specific steps are as follows:

First, extract the centroid of the urban green tourist space as the supply point  $j$ . Using the maximum distance  $d_0$  that people travel to the green space as the radius, establish a search field  $j$ . Summarize the population within the search field  $j$ , use the Gaussian function to assign weights according to the distance attenuation law, and add up the weighted population to calculate the supply-demand ratio  $R_j$ :

$$R_j = \frac{S_j}{\sum_{k \in \{d_k \leq d_j\}} G(d_{ij}) D_k}$$

Where,  $D_k$  is the population of each demand unit  $k$ ,  $d_{kj}$  is the road network distance between location  $k$  and  $j$ . For urban tourist green spaces with multiple entrances, select the road network distance from the demand unit to the nearest entrance. The demand unit  $k$  needs to be within the search range (i.e.,  $d_{kj} < d_0$ ).  $S_j$  is the area of urban tourist green space  $j$ .  $G(d_{ij})$  is a Gaussian attenuation function that takes into account spatial friction issues. Its specific form can be expressed as:

$$G(d_{ij}) = \frac{e^{\frac{1}{2} \times \left(\frac{d_{ij}}{d_0}\right)^2} - e^{-\frac{1}{2}}}{1 - e^{\frac{1}{2}}} (d_{ij} < d_0)$$

Second, take any entrance location  $i$  as the demand point, use the maximum road network distance  $d_0$  that people travel to the urban tourist green space as the radius, and establish a search field  $i$ . Then, find all the urban tourist green spaces  $j$  within the search field and summarize the supply-demand ratio  $R_j$  of these urban tourist green spaces based on the Gaussian attenuation function. Finally, calculate the distance-cost-based accessibility  $A_i^D$  of urban tourist green spaces for residents at point  $i$ . The higher the value, the higher the accessibility. Its specific form can be expressed as:

$$A_i^D = \sum_{j < d_i = i} G(d_{ij}) R_j$$

#### Geographically Weighted Regression (GWR) Model

In traditional regression analysis, the Ordinary Least Squares (OLS) model assumes that the relationship between independent variables and dependent variables remains stable within the region. The regression

coefficients obtained by this model are the average values of the entire study region, referring to the calculation formula below:

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_n x_n + \varepsilon$$

In this formula,  $y$  is the housing price,  $n$  is the independent variable. Based on existing literature, this article constructs a linear combination of independent variables  $x_i$  from three aspects: house characteristics, neighborhood characteristics, and environmental characteristics, including the area of the selected housing, distance to the nearest subway, distance to the nearest hospital, distance to the nearest city center, distance to the nearest water body, distance to the nearest green space, number of bus stops, number of schools, and number of pharmacies (Table 1).  $\beta_i$  represents the regression coefficient, and  $\varepsilon$  is the random error term that follows a normal distribution.

**Table 3-1 Variable Description**

| Variable Types                | Variable Name    | Description                                                                            |
|-------------------------------|------------------|----------------------------------------------------------------------------------------|
| House Characteristics         | Area             | The area of the housing in square meters                                               |
| Neighborhood Characteristics  | Near_Subway      | The Euclidean distance from the housing to the nearest subway station in meters        |
|                               | Near_Hospital    | The Euclidean distance from the housing to the nearest hospital in meters              |
|                               | Near_Center      | The Euclidean distance from the housing to the nearest administrative center in meters |
|                               | Near_Water       | The Euclidean distance from the housing to the nearest water body in meters            |
|                               | Green_space      | The Euclidean distance from the housing to the nearest green space in meters           |
| Environmental Characteristics | Number_Bus       | The number of bus stops within a 1 km radius of the housing                            |
|                               | Number_School    | The number of schools within a 1 km radius of the housing                              |
|                               | Number_Drugstore | The number of drugstores within a 1 km radius of the housing                           |

Geographically Weighted Regression (GWR) model is a method proposed to solve the problem that OLS cannot reflect the local regression equation at each point. It introduces the geographic location of data into the regression parameters. Its main advantage is that it applies spatial weight

matrix to the linear regression model, expands the traditional regression model by introducing geographical coordinates, and has flexible local adjustment optimization weight function. The model coefficients can better reveal the spatial heterogeneity of geographical features and are widely used in spatial analysis and modeling of geographical data [8].

At the operational level, before conducting GWR analysis, data needs to be subjected to OLS linear regression and residual analysis to ensure that the basic assumptions are reasonable. The structure of the GWR model is:

$$y_i = \beta_0(u_i, v_i) + \sum_k \beta_k(u_i, v_i)x_{ik} + \varepsilon_i$$

In the formula:  $y_i$  is the dependent variable; the coordinates of target region  $i$  are  $(u_i, v_i)$ ;  $\beta_0(u_i, v_i)$  is the intercept term;  $x_{ik}$  is the value of explanatory variable  $x_k$  in target region  $i$ ; the value of function  $\beta_k(u_i, v_i)$  at geographical location  $i$  is  $\beta_k(u_i, v_i)$ ;  $k$  is the number of explanatory variables in the model;  $\varepsilon_i$  is the random disturbance term.

The first law of geography states that everything is related to everything else, but near things are more related than distant things. Weighting the observations, the weighting of each observation point changes with the change of geographical location  $i$ . The specific formula is as follows:

$$\begin{aligned} \tilde{\beta}(u_i, v_i) &= [X^T W(u_i, v_i) X]^{-1} X^T W(u_i, v_i) Y \\ X &= \begin{bmatrix} 1x_{11} & \cdots & x_{1m} \\ 1x_{21} & \cdots & x_{2m} \\ \cdots & \cdots & \cdots \\ 1x_{n1} & \cdots & x_{nm} \end{bmatrix}, Y = \begin{bmatrix} y_1 \\ y_2 \\ \cdots \\ y_n \end{bmatrix} \\ W(u_i, v_i) &= W(i) = \begin{bmatrix} w_{i1} & 0 & \cdots & 0 \\ 0 & w_{i2} & \cdots & 0 \\ \cdots & \cdots & \cdots & \cdots \\ 0 & 0 & \cdots & w_{in} \end{bmatrix} \\ \beta &= \begin{bmatrix} \beta_0(u_1, v_1) \beta_1(u_1, v_1) \cdots \beta_m(u_1, v_1) \\ \beta_0(u_2, v_2) \beta_1(u_2, v_2) \cdots \beta_m(u_2, v_2) \\ \cdots \\ \beta_0(u_n, v_n) \beta_1(u_n, v_n) \cdots \beta_m(u_n, v_n) \end{bmatrix} \end{aligned}$$

In the formula:  $\tilde{\beta}$  is the estimate of  $\beta$  in matrix;  $n$  is the number of spatial regions;  $w_{in}$  is the weight of location  $i$  on the  $n$ -th study area.

The selection of spatial weight function is the core of the GWR model, and it is crucial for accurate estimation of model parameters. Among many weight functions, the Gaussian function is the most commonly used. It uses a threshold-free monotonic decreasing function to describe the relationship between distance  $d_{ij}$  and weight function  $W_{ij}$ . The functional expression is:

$$W_{ij} = \exp\left(-\left(\frac{1}{2}\right)\left(\frac{d_{ij}}{b}\right)^2\right)$$

In the formula:  $d_{ij}$  is the distance (in km) between sample points  $i$  and  $j$ ;  $b$  is the bandwidth, a non-negative decay parameter that describes the relationship between distance value and weight. The determination of the bandwidth has a significant impact on the entire GWR regression estimation. Cleveland's cross-validation method (CV) is used to select the optimal bandwidth. The principle is to determine the bandwidth by measuring the true value and fitted value of observation points according to the minimum square criterion. The specific formula is as follows:

$$CV = \sum_{i=1}^n [y_i - \tilde{y}_{*i}(b)]^2$$

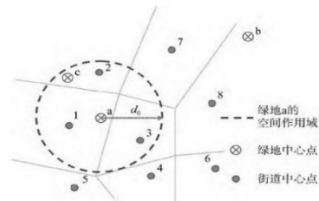
In the formula,  $\tilde{y}_{*i}(b)$  is the fitted value excluding itself. When the  $CV$  value reaches its minimum, the bandwidth  $b$  at this point is the optimal bandwidth.

### Research Process and Result Analysis.

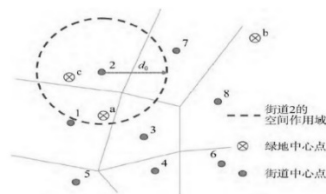
#### Green Space Accessibility

The specific principle of Gaussian two-step moving search method is shown in the following figure.

**Figure 2: The first step of the Gaussian two-step moving search method.**



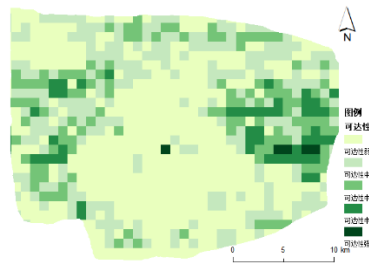
**Figure 3: The second step of the Gaussian two-step moving search method.**



By establishing an OD cost matrix in ArcGIS and conducting network analysis based on the traffic network data within the fourth ring road of Zhengzhou City, this study used the Gaussian two-step moving search method to calculate green space data and population density data. For

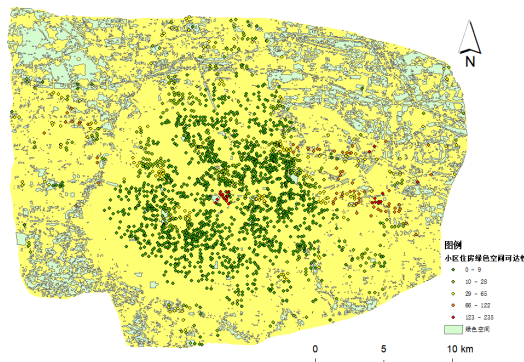
the sake of realism, the service radius was set to 1000m. The reason is that urban tourism green spaces should not be too far away from residents, otherwise they will not be able to meet their needs well. According to the normal walking speed of adults, which is about 3 km/h, a walking distance of 20 minutes or 1000m was taken as the service radius[9]. Finally, the result is shown in the figure below.

**Figure 4: Accessibility view**



By analyzing the second-hand housing transaction information of Beike and conducting a field analysis of the accessibility of green spaces in Zhengzhou City obtained through the Gaussian two-step moving search method, this study finally obtained the supply view of the accessibility of green space in residential areas. The results are shown in Figure 5.

**Figure 5: Accessibility view of green space in residential areas**



The numerical values represent the accessibility of green space in the residential areas. According to Figure 5, the accessibility of green space within the fourth ring road of Zhengzhou City generally presents a distribution pattern that gradually decreases from the center of the inner ring to the outer ring. There are certain high accessibility golden areas in the city center, such as near Zhengzhou Station, but overall accessibility is lower than that in the outer ring. The main areas with good accessibility in the outer ring are CBD, Zhengzhou East Station, and the Henan Provincial Government. Overall, the supply of green space services in Zhengzhou City is weak, while the development of green space supplies in peripheral new areas is relatively sufficient.

### Residents' Housing Behavior Preferences

This study used SPSS software for data processing. Both Ordinary Least Squares (OLS) and Geographically Weighted Regression (GWR) models were calculated separately.

The variable coefficients were obtained through the OLS regression method, as shown in Table 1.

**Table 1: OLS Regression**

| Variable<br>Abbreviation | Regression<br>Coefficient | T Value | Small Probability<br>P Value |
|--------------------------|---------------------------|---------|------------------------------|
| Near_Subway              | -0.063                    | -3.049  | 0.002                        |
| Near_Water               | -0.092                    | -4.409  | 0.000                        |
| Near_Hospital            | 0.022                     | 0.931   | 0.352                        |
| Near_Center              | 0.178                     | 7.733   | 0.000                        |
| Number_Bus               | -0.031                    | -1.392  | 0.164                        |
| Number_School            | -0.024                    | -0.893  | 0.372                        |
| Number_Drugstore         | -0.001                    | -0.033  | 0.974                        |
| Area                     | 0.221                     | 11.336  | 0.000                        |
| Green_space              | 0.170                     | 8.271   | 0.000                        |

Based on this, the GWR model method was used to obtain an OLS model that is more suitable for local areas, as shown in Table 2.

**Table 2: GWR Model Calculation Results.**

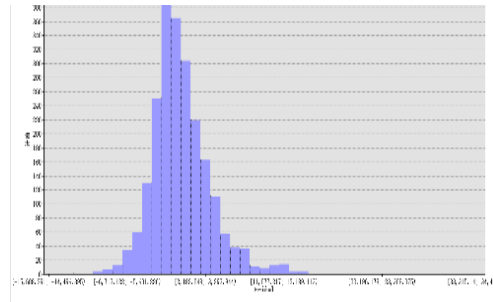
| Variables     | OLS       | GWR Model        |                   |         |                   |               |
|---------------|-----------|------------------|-------------------|---------|-------------------|---------------|
|               |           | Minimum<br>Value | Upper<br>Quartile | Median  | Lower<br>Quartile | Max.<br>Value |
| Near_Subway   | -0.063**  | -2.3704          | -1.2108           | -0.6362 | 0.0217            | 0.6831        |
| Near_Water    | -0.092*** | -1.7141          | -0.7876           | -0.1454 | 0.0201            | 0.7432        |
| Near_Hospital | 0.022*    | -3.5527          | -1.3160           | -0.4447 | 0.5436            | 3.4032        |
| Near_Center   | 0.178***  | -0.7215          | 0.0075            | 0.2900  | 0.5008            | 0.9064        |
| No._Bus       | -0.031*   | -274.8552        | -104.9368         | 13.5502 | 28.1302           | 93.2351       |
| No.School     | -0.024*   | -284.5680        | -21.7788          | -4.4306 | 11.4893           | 98.1547       |
| No.Drugstore  | -0.001*   | -40.9235         | -3.5069           | 19.8150 | 66.0152           | 153.3259      |
| Area          | 0.221***  | 2.6920           | 13.0939           | 20.3397 | 23.4027           | 39.1950       |
| Green_space   | 0.170***  | -33.7088         | -14.2908          | -2.9771 | 14.9597           | 86.6067       |

Comparing the regression coefficients in the GWR model, it can be seen that the preferred regression coefficients are shown in the table with both positive and negative values, and there are large differences between them, which indicates that the influencing factors have a large difference in impact size.

By inputting the above GWR calculation results into ArcMap and conducting local point analysis, we found that GWR does not have an

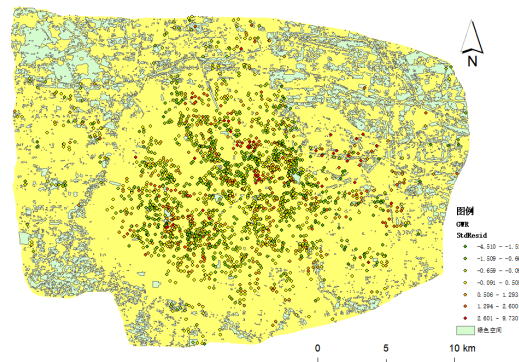
overall model, but each point has its own optimal model. Therefore, the specific coefficients correspond to each row in the table for the grid model coefficients. Finally, the GWR weighted results of each point were obtained, and by analyzing the residuals, it was found that they followed the normal distribution, indicating that the fitting effect was reasonable. The results are shown in Figure 6.

**Figure 6: Statistical Analysis of Residual Data.**



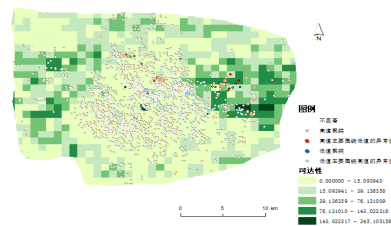
Based on the Euclidean distance data from residential housing to the nearest green space, the geographic weighted regression method was used to visualize the accessibility demand of each community to green spaces using GIS software. The results are shown in Figure 7:

**Figure 7: Visualization of Accessibility Demand for Green Spaces in Residential Areas.**



The map shows the visualization of accessibility demand for green spaces in residential areas. The points colored in dark red and dark green represent the poor fitting effect of the corresponding communities under the GWR model, while the others represent good fitting effects. Based on this, further clustering and outlier analysis (LISA) was conducted on the GWR data to obtain the results shown in Figure 8.

**Figure 8: LISA Analysis Results**

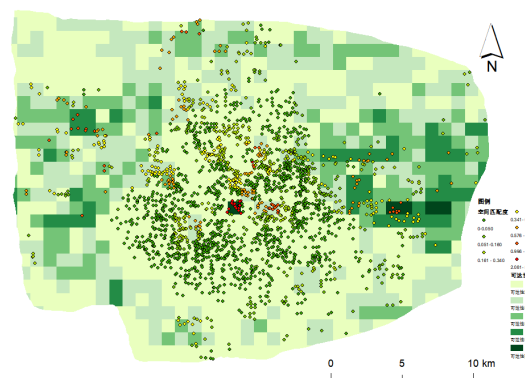


According to the LISA analysis in Figure 8, the points colored in dark red and dark blue indicate a higher difference in accessibility demand index from their surrounding areas, suggesting the unfairness of green space allocation within the city. On the other hand, the points colored in white, light red, or light blue indicate a smaller or insignificant difference in accessibility demand index from their surrounding areas.

The spatial and temporal matching between green space accessibility and resident behavior preferences

Based on the calculation results above, the indices involved in the supply level and demand level were normalized and divided to obtain the final spatial matching degree of resident behavior preferences. This data was then associated with the green space accessibility in Zhengzhou city, and the final results are shown in Figure 9.

**Figure 9: Spatial Matching between Green Space Accessibility and Resident Behavior Preferences.**



From a data perspective, these two types of data show a positive correlation, which means that the higher the green space accessibility, the higher the spatial matching degree of resident behavior preferences. In Figure 10, green space accessibility is differentiated by different shades of green, with the darker areas representing three regions: the central square, Zhengzhou People's Park, and Qili River Park (strong accessibility). At the same time, the spatial matching degree of resident behavior preferences near these three regions also shows the deepest red (spatial

matching degree between 2.081 and 5.730), proving that the two types of data are positively correlated in these three regions.

From a spatial distribution perspective, the overall green space accessibility in Zhengzhou city is relatively low, while it is high in only a few areas in the center and east of the city. At the same time, the green space accessibility for most residential areas is extremely low, showing the lightest shade of green (weak accessibility). This indicates that there are no suitable green spaces near these residential areas. This phenomenon is widespread in the residential areas of Zhengzhou city, and only a few residential areas in the center and east can enjoy relatively high green space accessibility. These concentrated areas of residential areas are also the main urban areas of Zhengzhou. The complicated functions of the main urban areas, involving medical, commercial, industrial, financial, and other functions, have squeezed the space allocated for urban tourist green space.

### **Conclusion and Suggestions**

Urban green tourist space planning is an important part of territorial spatial planning and also an important indicator to measure the livability of a city. Based on the research results and data on the distribution of commercial areas in the map region, this article has drawn relevant conclusions and put forward suggestions for different directions.

Firstly, overall green space accessibility inside the fourth ring road of Zhengzhou city matches well with the spatial matching degree of resident behavior preferences. The higher the accessibility, the higher the spatial matching degree, and residents are more likely to consider green space when choosing their homes. On the other hand, residents in areas with low accessibility do not consider green space as an important factor in their housing choices. Therefore, in the planning and layout of green spaces, it is necessary to be closer to the needs of residents and allocate them reasonably, so that the behavior preferences of residents are near urban tourist green spaces rather than far away from them, thus improving the comfort level of the green services around their homes.

Secondly, the service radius of 1000 meters selected in this article has both scientific basis and conforms[10] to the planning and development concept of "the last kilometer". However, the current green spaces within the fourth ring road of Zhengzhou city are mostly distributed in dotted patterns and the overall distribution is not balanced. Only a few residential areas are adjacent to public green resources such as city parks and forests, and these areas often appear as outliers in LISA analysis, which shows the unfairness in urban tourist green space planning. Therefore, to alleviate this situation, the distribution of green spaces within the city should be further expanded. For the areas where there is a large difference between the demand index and the surrounding area,

such as the eastern and central areas mentioned in this study, public green resource facilities should be added to increase the supply of green space accessibility, and achieve green service facilities within 1000 meters as soon as possible[11], thus satisfying citizens' demand for surrounding green spaces.

Furthermore, according to the definition of de-urbanization, some people, mostly middle-aged and elderly, choose to move away from rapidly developing cities in order to enjoy a peaceful and comfortable "slow life". However, industrial optimization and economic development are mostly concentrated in the central and western parts of Zhengzhou city, while the eastern part has the characteristics of high green space accessibility and population density[12]. Therefore, when the green space resources within the city center are limited and insufficient, people's willingness to live will be more inclined to areas farther away from the city center but do not affect commuting and can get away from the hustle and bustle of the city. The eastern area within the fourth ring road of Zhengzhou city is a good example of this phenomenon. Young people tend to pursue areas with convenient transportation in the city center, and their demand for green space accessibility is relatively low. Middle-aged and elderly people, on the other hand, are more likely to choose areas with high green space accessibility for their retirement life, and this is reflected in the high population density in the eastern region and the high demand for green spaces by residents. Therefore, different age groups have different demands for green spaces depending on their own development. In this case, government departments need to pay attention to the possible de-urbanization phenomenon in the eastern area within the fourth ring road of Zhengzhou city. If this phenomenon is conducive to the city's further development, it can learn from its experience and carry out corresponding transformations in its western areas. If this phenomenon will further widen the economic development gap within the city, relevant intervention measures should be taken in a timely manner to avoid negative impact.

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