The spatial logic of office buildings' economic benefits:

A case study of Xicheng district in Beijing

Jingyi Yang[1], Sheng Qiang[1]
1 School of Architecture and Design, Beijing Jiaotong University, China,
jingyiyang163@163.com

ABSTRACT

With the rapid development of the digital economy and the COVID-19 pandemic in recent years, there is a great transformation for both the quantity and the usage of offices buildings. On the one hand many shopping malls were changed to office function, but on the other hand due to the increasing number of online meeting or working at home, the future of office buildings is also suspicious. This raises an important question: what is the spatial logic of the office building's usage? This study focused on Xicheng District in Beijing, covering an area of 50.7 square kilometres. A total of 986 office buildings in the district were selected, which included tax data for 23,720 companies from 2019 to 2022, and the average tax revenue per square meter and aggregated tax revenue within the region were used as indicators to evaluate the economic benefits generated by the buildings. The study used space syntax segment model as a tool to analysis the economic benefits of office buildings, incorporating other variables such as population density, Points of Interest (POI), and proximity to public transport. Statistical analyses were conducted at both city and block levels. The results suggested that the accessibility of the office buildings have substantial impact on their economic benefits. Furthermore, the prosperity of surrounding businesses and the provision of adequate municipal facilities also had some impacts. The findings have important implications for urban planners and administrators in enhancing building usage efficiency and improving urban spatial layouts.

KEYWORDS

Office building, Tax revenue, Space syntax, Urban morphology, Empirical research

1 INTRODUCTION

With the advancement of China's urbanization process, building economics has played a significant role in the economic development of various regions. However, in recent years, with the development of the digital economy and the impact of the COVID-19 pandemic, the emergence of new consumption patterns such as e-commerce and online home shopping has led to a transformation in the employment and shopping habits of urban residents. This has resulted in a real problem of declining utilization rates of commercial building spaces in the central districts of Beijing. Against this backdrop, conducting a comprehensive survey of the usage status of buildings in the central urban areas and conducting in-depth analysis of the spatial needs of different types of buildings will help to analyse the spatial logic of building economic benefits. This will enable better understanding and management of the spatial foundation that supports various functions' reasonable stock ('quantity') and operational efficiency ('quality'), thereby enhancing the systematic and scientific nature of urban renewal efforts.

2 LITTERATURE REVIEW

To assess the economic performance of office buildings, it is necessary to select variables that are sufficiently data-rich and quantifiable. In previous studies, there has been quantitative analysis of office rental data. In many countries or regions, the hedonic price method (Lancaster 1966) is a popular approach to evaluate intangible goods, and as inputs to land use and transportation models (Löchl and Axhausen 2010). Mills used a sample of 543 office lease contracts in Chicago to establish a mathematical model and analyze the factors influencing office rental prices (Mills 1992). The results of his study indicate that the impact of internal amenities on office rental prices aligns with expectations but lacks significance, while the location variables also align with expectations and exhibit a higher level of significance. Compared to the inherent characteristics of office buildings, the spatial location of office buildings within the city has a greater impact on rental prices. In Sivitanidou's study on office rental prices in Los Angeles, it was found that areas with a lower proportion of commercial land tend to have higher office rental levels, suggesting that commercial development constrains office development (Sivitanidou 1995). In Beijing, based on the office building rental prices in the Zhongguancun West District of Beijing, Wang Siyu used multiple regression analysis to derive a linear model regarding rental prices (Wang and Xu 2017). The study concluded that the accessibility of subway stations as an external spatial factor plays a significant role in determining office rental levels. In 2009, it was found that in a single-center city, under the influence of transportation costs, the location choice for office activities tends to favor the city center. Zhang observed that the rent of office buildings is negatively correlated with the distance from the city center (Zhang et.al 2010). Liu et al. found, based on the LASSO regression model, that the average depth value in spatial syntax parameters has a negative impact on shop rent (Liu et.al 2021). Although rental data is readily available due to the openness of networks, it possesses characteristics such as randomness and short-term effectiveness. It often reflects data on vacant buildings at specific time points, thus lacking the ability to consistently portray the overall economic development of an area over the long term. Moreover, property rents, sale prices, and similar metrics primarily represent land values and may not authentically capture the economic efficiency derived from land use.

On the other hand, there have been significant achievements in research on the actual utilization rates of office buildings. Wheaton and Torto conducted empirical studies on the market, time periods, and random samples of 17 major urban areas in the United States (Wheaton and Torto 1988), focusing on the spatial utilization rates of commercial office buildings. They concluded that the natural vacancy rate of each commercial office building varies depending on different block forms and location grades, which is related to urban morphology. There is a significant positive correlation between the intensity of urban functional development and urban vitality. Local spatial mismatches indicate instances of either overcrowding or inefficient utilization of urban space. The morphology of the road network, serving as the backbone of the city, has a crucial impact on the performance of building use (Ortigosa and Menendez 2014). Therefore, investigating the underlying spatial logic of building utilization and profitability in urban areas has become an important issue.

3 DATASETS AND METHODS

3.1 Datasets

This study is framed within the area of Xicheng District in Beijing, covering an area of 50.7 square kilometres (figure 1). Four datasets have been compiled for this study which includes the spatial accessibility dataset, the commercial density and residential density dataset, the building volume dataset and the corporate tax revenue dataset. The four datasets have been spatially joined in GIS software.

3.1.1 Spatial accessibility dataset

The first dataset is the street network measures derived from the Space Syntax Database using the Baidu Maps Open Platform. The spatial syntax segment model used is based on the highest precision road centerlines in Baidu Maps, covering all streets within the Sixth Ring Road of Beijing and surrounding towns. In terms of parameter selection, Bill Hillier et al. proposed the normalized angular choice (NACH) and the normalized angular integration (NAIN), aiming to further mitigate the impact of segment quantity on analysis (Hillier et.al 2012), thus enabling comparison of spatial systems at different scales and complexities. Additionally, based on the analysis results of actual traffic flow from multiple locations in Beijing between 2015 and 2017 (Sheng et.al 2018), this study selects the 10km radius spatial syntax parameters, the 3km radius spatial syntax parameters and as 1km radius spatial syntax parameters for evaluating vehicle accessibility, bicycle accessibility and walking accessibility within the research area. Additionally, urban transportation infrastructure are crucial hardware foundations for the development of office building, exerting a similar driving force on its profitability. Therefore, this study adds a parameter for the distance to public transportation stations to reflect the topological distance from the midpoint of the street segment where the building is located to the nearest bus or subway station. To express the distance to a certain point, this study employs the method of calculating Metro Step Depth (MSD) from the Depthmap software to indicate the distance to a facility. And the distribution data of bus stops and subway entrances are sourced from the Baidu Maps platform.

In Beijing, as a single urban center, the road located at Tiananmen Square is designated as the city center, and the Metro Step Depth (MSD) values are calculated using the same method to express the parameters from various locations to the city center.

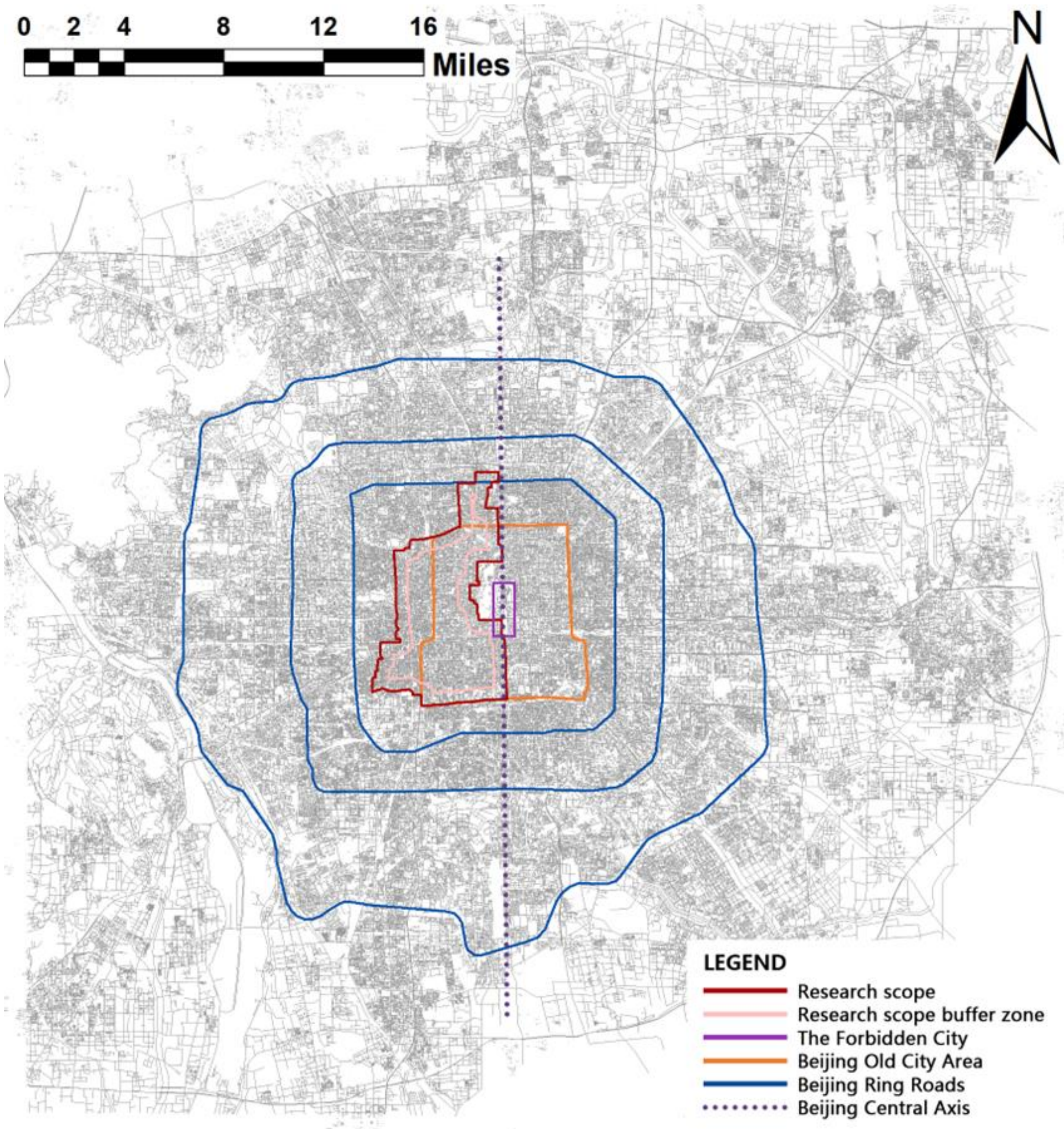

Figure 1: Research area and modelling scope

3.1.2 Commercial density and residential density dataset

The second dataset consists of two types of density data, the commercial density data and cell phone signaling data. The commercial density data, obtained from Baidu Street View and field surveys, include the number of shops on each street within the research area and a 200-meter buffer zone outside of it. Similar to population density data, after being input into the spatial syntax software Depthmap, the summed values within the accessible ranges of 400m, 600m, 800m, and 1000m from each street segment center are respectively calculated to determine the density. In addition, distances to commercial complexes (MSD Mall) from each road segment were also computed.

Cell phone signaling data, based on residential density identified by China Unicom in 2020, are utilized in this study. The user's stay in a place for more than 30 minutes is recorded as a stay. The signalling data is processed by determining the work or residence (the working population is additionally limited by the age of 18-59 years) for more than 10 consecutive days during the day and night of the month. Then the cell phone signaling signaling data can be divided into two parts: residential density data and work density data. Due to the data's granularity of 200-meter grid cells, it requires uniformization before analysis. The study calculates the summed values of mobile signaling data within four accessible ranges of 400m, 600m, 800m, and 1000m from each street segment center. Thus, the dependent variable of employment data was obtained along with the independent variable of residential population data.

3.1.3 Building volume dataset

In addition to the aforementioned datasets, an integral part of this study involves leveraging the urban built volume dataset which is obtained from the Baidu Maps Open Platform. Through meticulous examination of street view maps, we meticulously recorded detailed building function information. This comprehensive dataset was meticulously categorized into nine distinct types of buildings, encompassing a wide spectrum of urban infrastructure: medical facilities, cultural and sports venues, educational institutions, commercial establishments, hotels, offices, government buildings, and residential properties. By meticulously classifying the existing buildings within the urban landscape, we aim to derive a nuanced understanding of the spatial construction volume across various functional types. This meticulous approach not only enhances the granularity of our analysis but also enables us to discern intricate patterns and dynamics within the urban fabric.

3.1.4 Corporate tax revenue dataset

The fourth dataset is corporate tax revenue data with corresponding usage area, sourced from government agencies. A total of 986 office buildings in the district were selected, which included tax data for 23,720 companies from 2019 to 2022, and the average tax revenue per square meter and aggregated tax revenue within the region were used as indicators to evaluate the economic benefits generated by the buildings. The tax revenue data encompasses various sectors, including office buildings, commercial centers, hotels, and retail businesses. These can be categorized based on operational types into commercial, hotel, and office sectors. The spatial construction volume of these three types of buildings is included within the previously mentioned nine categories of building volume data. Apart from integrating tax revenue data, this study also incorporates rental data as an additional open big data variable. The rental data, acquired from the Fang.com website in August 2023, provides valuable insights into the dynamics of the real estate market. By including rental data alongside tax revenue information, this study aims to achieve a more comprehensive analysis of the economic landscape and its implications for urban development and policy-making.

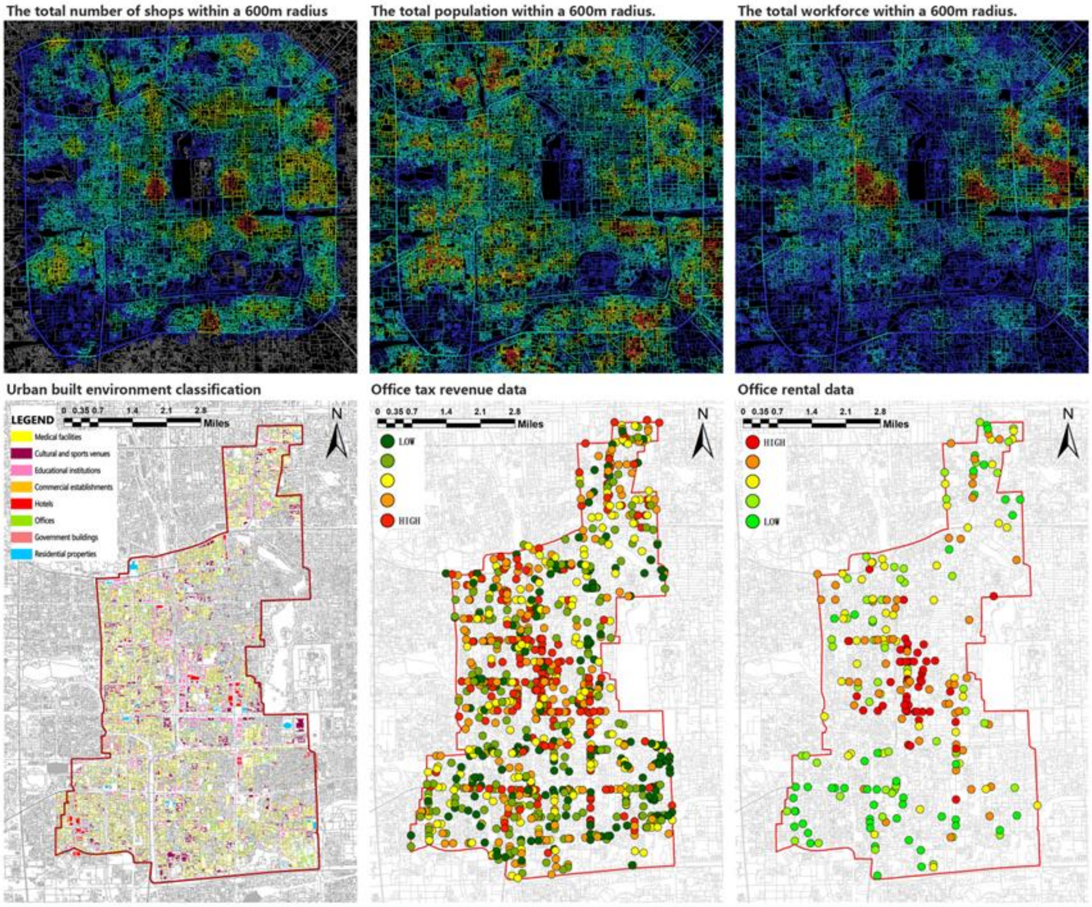

Figure 2: Presentation of various datasets in the segment map (upper) and the GIS model (lower)

3.2 Exploratory Data Analysis

After integrating the variables mentioned earlier, it becomes evident at the urban scale that there is a strong correlation between the quantity of office space construction and economic benefits, with correlation coefficients consistently ranging between 0.7 and 0.8 (Figure 3). Therefore, this study will focus on in-depth investigation of regional tax contributions and workforce disparities, and meticulously examine the urban morphological factors influencing the economic efficacy of office buildings. By scrutinizing various urban morphological factors, such as spatial accessibility and building density, the study aimed to shed light on the underlying mechanisms driving the economic performance of office buildings. Through comprehensive investigation and rigorous statistical analysis, the research sought to provide valuable insights into the complex dynamics shaping urban economies.

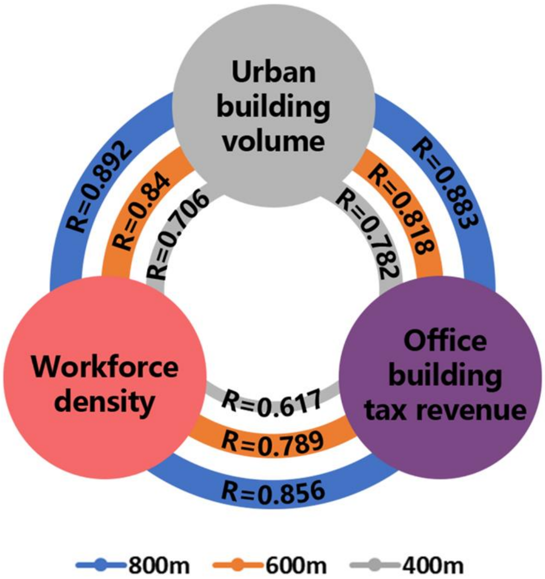

Figure 3: Correlations among the dependent variables (office space construction volume, workforce density and tax revenue levels).

4 RESULTS

4.1 Urban spatial functional zoning analysis

At the urban scale, this study aggregated data on office building tax revenue and workforce population within three ranges (400 meters, 600 meters, and 800 meters). As depicted in the upper part of Figure 4, the gradient of blue shades represents varying levels of tax revenue, while the gradient of red shades reflects the density of the workforce. The results reveal that in the central area of the old city, particularly in the modern Financial Street of Xicheng District, there is a superior performance in tax revenue. In contrast, the workforce tends to concentrate in traditional hutong areas such as Huguo Temple and Dashilan. A comparison between the new commercial center and traditional hutong areas highlights distinct differences in topological structures, workforce aggregation, and spatial utilization. The lower part of Figure 4 illustrates the overall situation by superimposing workforce density and tax revenue levels. Regions shaded towards red indicate a proportionally higher workforce compared to tax revenue, suggesting that more individuals work in these areas but generate less wealth per capita. Conversely, areas shaded towards blue indicate a lower workforce but contribute significantly to tax revenue. Interestingly, the map also highlights numerous white and purple areas, representing regions with both low workforce and tax revenue and those with high levels of both, respectively. In the subsequent phase, our focus shifts to identifying street segments that epitomize the four distinct color zones (white, red, blue, and purple) depicted in Figure 4. These segments will serve as our study subjects, enabling us to delve into the disparities in spatial accessibility across various scales.

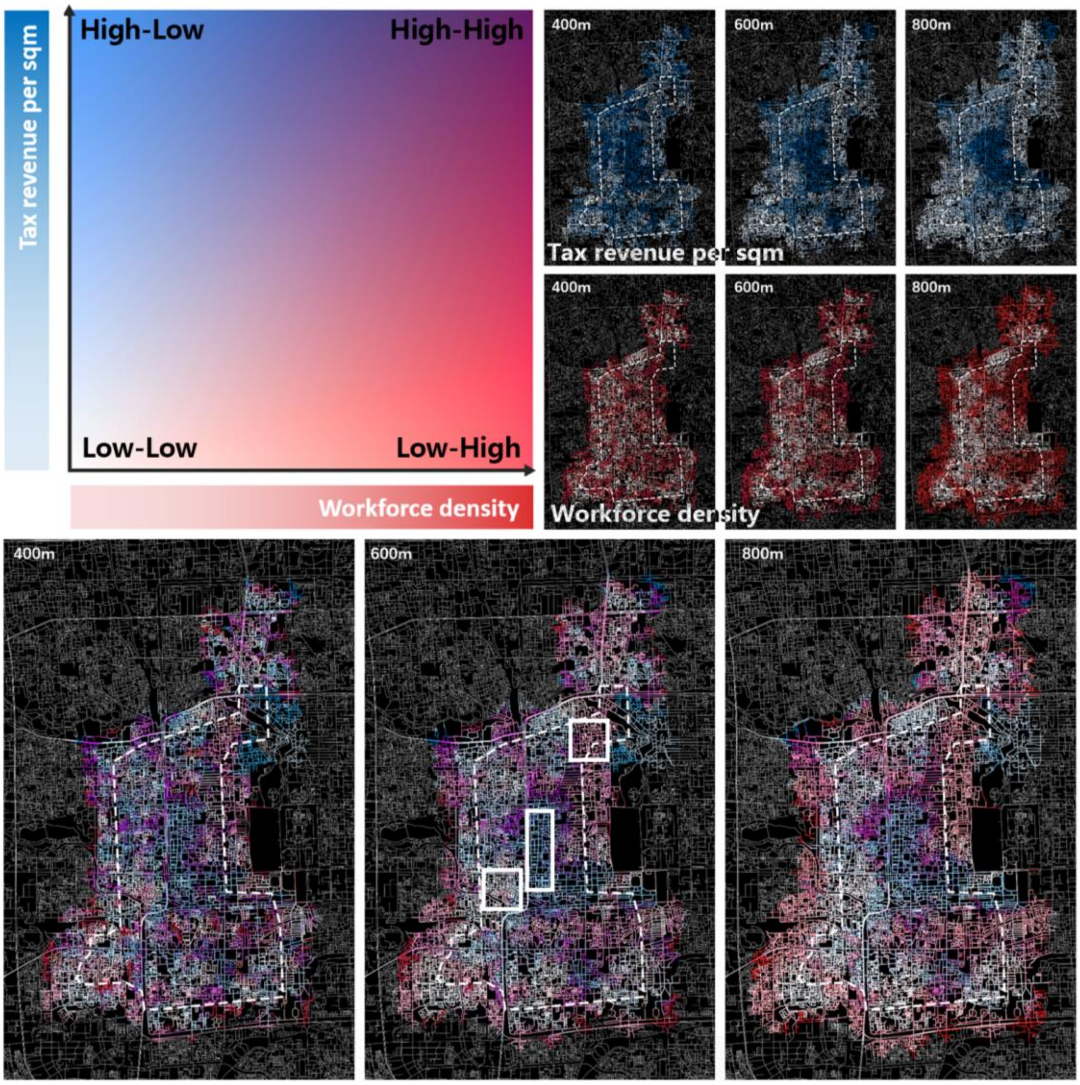

Figure 4: Spatial distribution of workforce density and tax revenue

Based on the analysis of actual traffic flow from multiple locations in Beijing between 2015 and 2018, spatial syntax parameters with radii of 10km, 3km, and 1km are selected to evaluate vehicle accessibility, bicycle accessibility, and walking accessibility within the research area (figure 5). Across the three levels of accessibility, the spatial distribution patterns of building usage exhibit a consistent trend: as tax revenue and population increase, the accessibility of street segments for walking, cycling, and driving also sees improvement. Notably, when considering the Degree of Integration (NAIN), significant disparities emerge in the accessibility statistics among the four types of office buildings. Areas with better economic prospects tend to enjoy more favorable positioning, indicating that higher overall integration correlates with greater potential for economic benefits in office buildings. Contrasting the white and red zones, it becomes apparent that the correlation between the number of workers in buildings and area accessibility is less pronounced in regions with lower profitability. This could be attributed to the presence of small government offices, such as community centers, even in areas with limited accessibility. Furthermore, under a 10km calculation radius, the difference in NAIN statistics between blue/purple zones and white/red zones is more pronounced than under a 1km calculation radius. The box plots appear flatter, indicative of more concentrated data. This suggests that as the calculation radius increases, the relationship between building tax revenue disparity and larger-scale accessibility becomes tighter, while the connection between regional tax revenue and walking accessibility weakens. The statistical analysis above reveals disparities in the demand for through traffic and destination traffic between the workforce and office business capacity.

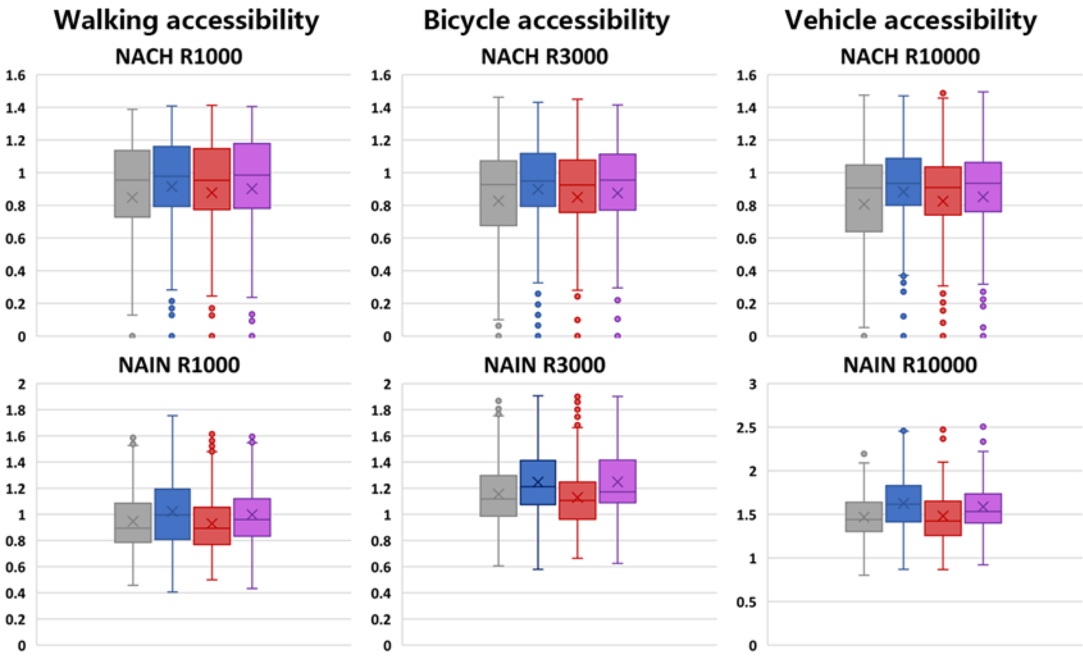

Figure 5: Box plots of spatial accessibility for the four types of buildings

Additionally, the study identifies significant variations in the topological morphology of streets across the four zones. Overall, distinct street morphology differences can be observed among the white, red, and blue zones. The white zone is dominated by modern residential complexes, the red zone is characterized by traditional hutong neighborhoods, while the blue zone is primarily comprised of modern commercial centers (Figure 6).

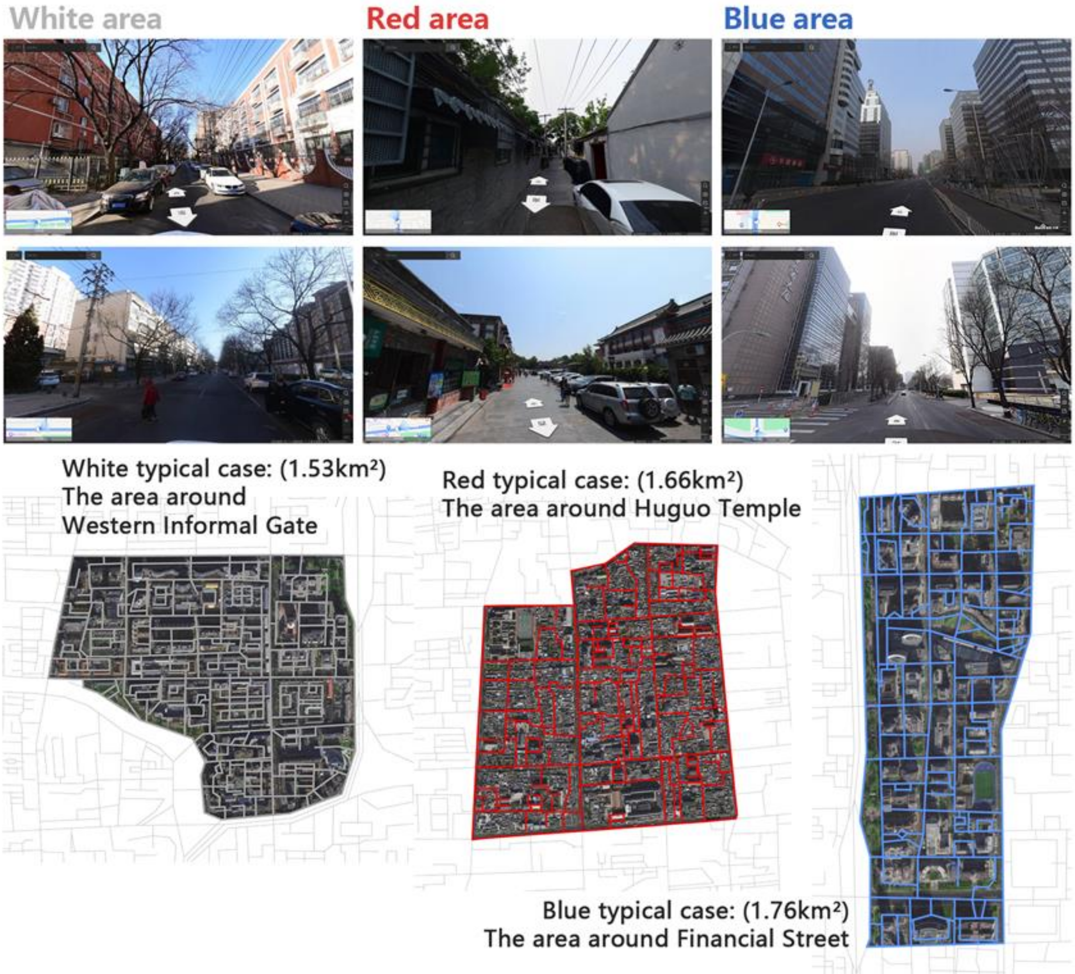

Figure 6: Three typical cases of different kinds of area (white area, red area, blue area)

The white areas are predominantly concentrated in modern residential neighborhoods. Due to the large area occupied by residential properties, modern residential complexes are typically enclosed, often through the use of walls, gates, and security measures. This design restricts access to outsiders and vehicles, enhancing the security and privacy within the complex, thereby improving residents' quality of life. However, this enclosed nature may lead to isolation from the surrounding community, as only residents have access to the internal areas of the complex. Additionally, just as illustrated in the typical white zone area shown in Figure 5, modern residential complexes usually occupy significant blocks within the city, further limiting social interaction and connectivity with the broader community. As a result, the overall accessibility of the road network in these areas is relatively poor. Moreover, due to limited accessibility and the dominance of residential properties, there is a scarcity of office facilities in these areas, hindering the development of commercial clusters. Consequently, the majority of modern residential neighborhoods in the study area appear as white zones.

The red areas predominantly concentrate in the northern and southern parts of the study area, which happen to be two of the largest traditional hutong areas within the Xicheng District. These areas have preserved the street layout dating back to the Ming Dynasty. Taking the

Huguo Temple vicinity in the northern part of the study area as an example, the main roads in this area have undergone modernization, providing relatively good accessibility. However, the internal road network within the neighborhoods is more complex, with topological links unevenly arranged. The topology of the street network generally exhibits a branching structure. Despite the closure of some courtyards, many hutongs remain accessible, facilitating the blending of residential life and community activities. Consequently, numerous community businesses catering to residents have flourished, creating numerous employment opportunities. However, due to the limited profitability of these small-scale businesses, many do not meet the taxation criteria, resulting in a large portion of the hutong areas being classified as red zones. The blue area is concentrated in the central part of Xicheng District, located in the Beijing Financial Street area. In 1993, the Chinese State Council approved the construction of the National Financial Management Center in this area, centralizing the headquarters of financial institutions, thus giving rise to Beijing Financial Street. The road network in the Financial Street area is relatively orderly, which primarily accommodates financial institutions, corporate headquarters, and related professional services. These entities often require significant office space but may employ relatively fewer people compared to other sectors like retail or manufacturing. As a result, despite generating substantial tax revenue due to the high value of financial transactions and corporate profits, the workforce density remains relatively low. Furthermore, the orderly road network in the area reflects intentional urban planning and design aimed at facilitating the efficient flow of traffic and ensuring accessibility to key financial institutions. The straight and organized layout of roads may also be attributed to the modern redevelopment and urban renewal initiatives undertaken in the Financial Street district to create a business-friendly environment conducive to financial activities.

4.2 Quantitative analysis

To delve deeper into the impact of spatial syntax parameters at various calculation radii on street segment tax revenue, we calculated spatial syntax variables across nine gradients ranging from 500m to 10km. Through this analysis, we aimed to discern the relationship between spatial syntax variables and the calculation radius. Notably, the 400m aggregate calculation results yielded subpar analytical performance, while the 800m aggregate range appeared to blur the accuracy of the data. Consequently, we opted to focus on the 600m aggregate data for regression analysis. A comprehensive analysis was conducted on a dataset comprising 986 buildings within the study area. The results revealed a significant correlation between the level of tax revenue and a spatial syntax parameter known as standard angle integration (figure 7). Streets characterized by lower integration levels tended to exhibit higher topological depth and lower road grades. This finding aligns with the expected behavior observed in urban commercial layouts, where buildings situated on such streets are often hindered by their deeper positions, resulting in decreased efficiency in building usage and subsequently lower tax revenue generation.

Our findings underscored that the standardized integration parameter, with a 3km radius, consistently exhibited a strong correlation with the average tax revenue per square meter of buildings. This parameter's calculation radius, to some extent, reflects the accessibility of non-motorized transportation within the city. Hence, within the study area, buildings boasting higher average tax revenue per square meter generally enjoyed superior medium-scale transportation accessibility. Furthermore, upon comparing the correlation coefficients of integration series and selection series parameters, we observed that the former demonstrated stronger correlations. This suggests that the relationship between building tax revenue and street crossing traffic flow is not significantly dependent on selection series parameters.

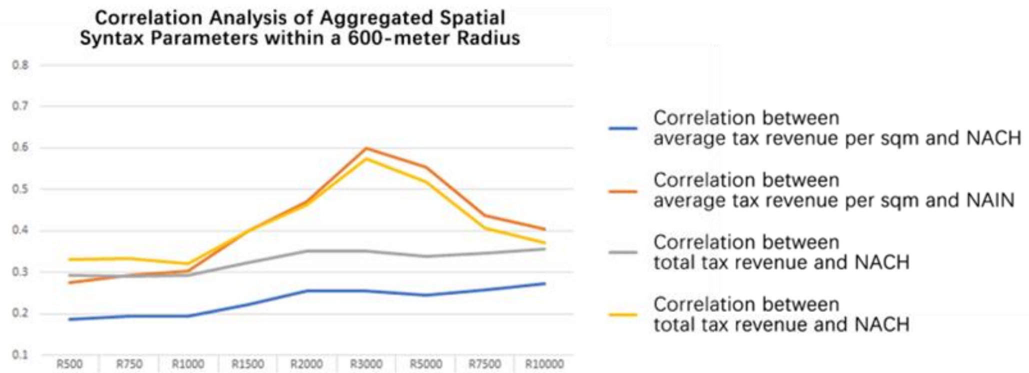

Figure 7: Correlation analysis between spatial syntax parameters and aggregated tax revenue data within a 600-meter range

In terms of the correlation analysis of other variables (table 1), the distance of buildings to the city center (Tiananmen Square) and to commercial complexes exhibits a moderate level of correlation with the tax revenue of buildings, with correlation coefficients around 0.5 and 0.3, respectively. Firstly, the centrality of the city plays a significant role in the profitability of buildings. Given that the central area of Beijing houses numerous government institutions, buildings in close proximity often benefit from the presence of these institutions and enterprises, leading to higher tax revenue levels. Secondly, the interaction between buildings and surrounding commercial complexes fosters a symbiotic relationship. Commercial complexes typically offer comprehensive commercial amenities, including parking facilities, security measures, and logistics services, enhancing the attractiveness and competitiveness of nearby buildings. Therefore, buildings in closer proximity to commercial complexes can leverage these amenities to augment their appeal and competitiveness, thus mutually driving regional economic development.

Table 1: Correlation analysis between other variables and aggregated tax revenue data within three kinds of ranges

Variables	400m	600m	800m
Msd Bus Stop	-0.126	-0.279	-0.311
Msd Underground Stations	-0.077	-0.125	-0.246
Msd Tiananmen Square	-0.349	-0.483	-0.633
Msd Mall	-0.201	-0.294	-0.337
Total commercial facilities R400m	-0.120	-0.111	0.133
Total commercial facilities R600m	0.002	0.019	0.233
Total commercial facilities R800m	0.035	0.062	0.233
Total commercial facilities R1000m	0.105	0.141	0.277
Total living population R400m	-0.251	-0.175	-0.224
Total living population R600m	-0.092	-0.143	-0.164
Total living population R800m	-0.140	-0.140	-0.197
Total living population R1000m	-0.215	-0.217	-0.326

Taking a step further, this study delves deeper into the mechanisms driving building economic development under the influence of various factors. Using the average tax revenue per square meter within a 600-meter radius as the dependent variable, we employ a stepwise multiple regression analysis to identify robust regression models. The results, illustrated in Figure 8, showcase a model with an adjusted R-squared value of 0.528, indicating a strong fit. The variables encompassed in the model include the integration value of a 3-kilometer radius within the 600-meter range (NAIN3000 R600), the number of surrounding commercial shops, the distance to Tiananmen Square, and the proximity to commercial complexes. Ranking the weights of each parameter from highest to lowest reveals the significant importance of the spatial syntax parameter "NAIN". Notably, the profitability of buildings exhibits the strongest correlation with moderate-scale spatial accessibility, as discussed earlier.

Independent variables	Regression coefficients	Standard errors	Standardized coefficients	T-values	Significance
NAIN3000 R600	4.212565	0.721646	0.566303	5.837443	0.000000
Total commercial facilities R600m	-0.000626	0.000223	-0.280026	-2.807336	0.006827
MsdTiananmenSquare	-0.000125	0.000049	-0.270275	-2.573807	0.012683
MsdMall	-0.000249	0.000120	-0.207302	-2.071900	0.042810
(Constant)	-0.108675	1.021557		-0.106382	0.915653
Summary	**R**	**R-Squared**	**Adjusted R-Squared**	**Standard estimation error**	**Durbin-Watson**
	0.747897	0.559350	0.528427	0.409537	1.967636

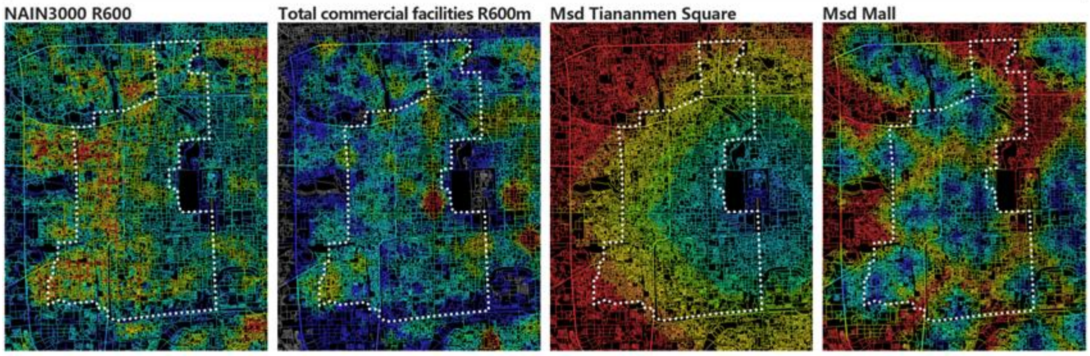

Figure 8: A multiple regression model for tax revenue aggregated within a 600-meter radius

5 CONCLUSIONS

In conclusion, this study investigates the economic performance of office buildings in an urban area, with a focus on the interplay between spatial characteristics and economic indicators. Through quantitative analysis and regression modeling, several key findings have emerged. Firstly, the spatial analysis reveals distinct patterns in the distribution of office building economic performance across different urban zones, characterized by variations in workforce density, tax revenue, and spatial accessibility. The delineation of white, red, and blue zones underscores the significance of urban morphology in shaping economic dynamics, with modern residential areas, traditional hutong neighborhoods, and commercial business districts exhibiting distinct economic profiles. Secondly, the regression analysis highlights the importance of spatial syntax parameters and proximity to central urban amenities in influencing office building economic outcomes. Variables such as integration density and distance to major landmarks like Tiananmen Square and commercial complexes demonstrate significant correlations with tax revenue, indicating the relevance of urban centrality and accessibility in driving economic performance.

However, it is important to acknowledge several limitations inherent in this study. Data constraints, methodological limitations, and the scope of analysis may impact the generalizability and robustness of the findings. Additionally, temporal dynamics and external factors beyond the study's scope could influence urban economic trends and office building performance over time.

Despite these limitations, this study provides valuable insights into the complex interrelationships between urban spatial characteristics and office building economic performance. By addressing these limitations and building upon this research, future studies can further advance our understanding of urban economic dynamics and inform more effective urban planning and policy interventions.

REFERENCES

Lancaster, K. (1966) ‘A New Approach to Consumer Theory’, *Journal of Political Economy*, 74(2), pp. 132–157. doi: 10.1086/259131.

Löchl, M., Axhausen, K. W. (2010) ‘Modelling Hedonic Residential Rents for Land Use and Transport Simulation While Considering Spatial Effects’, *The Journal of Transport and Land Use,* 3, pp. 39–63.

Mills, E. S. (1992) ‘Office Rent Determinants in the Chicago Area’, *Real Estate Economics,* 20(2), pp. 273–287. doi: 10.1111/1540-6229.00584.

Sivitanidou, R. (1995) ‘Urban Spatial Variations in Office-commercial Rents: The Role of Spatial Amenities and Commercial Zoning’, *Journal of urban Economics,* 38(1), pp. 23–49.

Wang, S., Xu, J. (2017) ‘Investigating the Relationship between Office Building Rental Prices in Zhongguancun West District and Factors such as Temporal Distance’, *Modern Business,* (01), pp. 273–279. doi: 10.14097/j.cnki.5392/2017.01.140.

Zhang, J., Chen, Y., Sun, Y. (2010) ‘Spatial Analysis on Urban Internal Economic Spatial Structure Based on Rent of Office Buildings in Beijing City’, *Scientia Geographica Sinica,* 30(6), pp. 833–838. doi: 10.13249/j.cnki.sgs.2010.06.025.

Liu, X., Huang, J., Zhao, G. (2021) ‘A Machine Learning Approach for Community-scale Commercial Rents Mapping’, *China Land Science,* 35(3), pp. 49–57. doi: 10.11994/zgtdkx.20210301.091856.

Wheaton, W. C., Torto, R. G. (1988) ‘Vacancy Rates and the Future of Office Rents’, *Real Estate Economics,* 16(4), pp. 430–436. doi: 10.1111/1540-6229.00466.

Ortigosa, J., Menendez, M. (2014) ‘Traffic Performance on Quasi-grid Urban Structures’, *Cities,* 36(2), pp. 18–27. doi: 10.1016/j.cities.2013.08.006.

Hillier, B., Yang, T., Turner, A. (2012) ‘Normalising Least Angle Choice in Depthmap - and How it Opens up New Perspectives on the Global and Local Analysis of City Space’, *Journal of Space syntax,* 3(2), pp. 155–193.

Sheng, Q., Yang, T., Liu, X. (2018) ‘lf the Wine is Good, Does it Matter Where the Restaurant Located? A Space Syntax Analysis on the Distribution of Restaurants in Wangfujing Area Based on the Reviewing Data from Dazhongdianping’, *New Architecture,* 5, pp. 124–130.