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Urban Network Characteristics and Its Impact Mechanism Based on Headquarter-Affiliate Tourism Businesses Connection in Zhejiang

Jie Zhang[1]*

[1]College of Zhijiang, University of Zhejiang Science and Technology, Shaoxing, 312030, PRC

Correspondence
J. Zhang, College of Zhijiang, University of Zhejiang Science and Technology, Shaoxing, 312030, PRC
Email: happier110@163.com

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Abstract

This study examines the network of travel agency branches, enabling the construction of a city-association matrix founded on parent-child relationships among these agencies. Using social network analysis, the study explores the hierarchical distribution and network characteristics of cities in Zhejiang Province. Additionally, conditional logit regression is applied to analyze factors influencing the structure of the travel agency city network across the region. The results indicate (1) distinct hierarchical patterns among cities based on the parent-child relationships of travel agencies. The analysis reveals three regional zones with clear hierarchical structures. (2) Spatial correlations among cities also demonstrate a distinct ordering, where inter-city relationships at varying levels form a complex urban network. (3) This urban network in Zhejiang Province is shaped by several influential factors.

KEYWORDS

headquarter-affiliate relationship, travel agencies, network, urban hierarchy, impact mechanisms

1 | INTRODUCTION

The study of urban systems has long been a central focus in urban geography. The formation of urban networks is closely tied to the spatial expansion of global economic activities. The division of labor and the distribution of multinational corporations have progressively integrated cities worldwide into interconnected urban networks (Friedmann, 1986). This significant shift from traditional urban systems to urban networks signifies the emergence of a new spatial organization and pattern of urban relationships. Within urban network, the city functions as an exchange node for various elements. Rather than relying solely on advantages scale and geographical proximity to effectively manage and control these elements a city's influence now depends more on the extent to which it is embedded within the broader network (Pan et al., 2019; Wang et al., 2015). Conversely, as multifunctional entities, cities serve both production and consumption roles, functions that are inherently linked to the growth of the service industry. Urban economic development and the advancement of the service sector are mutually supportive and interdependent. With the ongoing transition from an industrial economy to a service- and digital-based economy, the level of

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service industry development has become a key indicator of modern economic progress. Numerous studies highlight that cities with advanced service industries and a high level of industrial agglomeration tend to exhibit greater control and service capacities within the urban network (Taylor, 2010; Rossi et al., 2005). In urban system studies, foreign scholars have built upon classical central place theory to propose various influential theories, including the concepts of the world city (Sassen, 1991), world city network (Taylor, 2001), functional network (Castells, 1996a), and multi-core urban areas (Westin et al., 1994). In 1996, Castells introduced the theory of "flowing space" (Castells, 1996b), which shifted urban geography toward complex and diversified network research and provided a theoretical foundation for subsequent studies on world cities. Currently, three primary paradigms guide urban network research. First, the paradigm analyzes urban network characteristics by identifying cities' economic attributes (Gu et al., 2008). Second, it utilizes various "flow" data types—such as traffic information flow (Wang et al., 2004; Chen et al., 2017), capital talent flow (Jin et al., 2018; Ma et al., 2017), innovation knowledge flow (Liu et al., 2017; Cao et al., 2002)—to represent other aspects of connections. Third, inspired by the interlocking network model from the Globalization and World City Network Research Group (GaWC) (Taylor et al., 2002), the inter-city network model is constructed by studying the spatial and geographical distributions of enterprises. Studies in this area predominantly focus on producer services (Alderson et al., 2004; Zhao et al., 2012; Wang et al., 2019; Pan et al., 2018), manufacturing enterprises (Wu et al., 2012; Ma et al., Zhu et al., 2019), innovative enterprises(Huang et al., 2021; Zhou et al., 2023), and general enterprises (Wu et al., 2015). With the advancement of research and the increased accessibility of network big data, studying urban networks through enterprise contact data. Existing research has significantly enriched study of urban network systems across various spatial scales. However, some limitations remain. First, in recent years, studies from the perspective of enterprise networks remain limited, with most focusing on the producer service industry, while research on the life service industry are relatively scarce. Second, in terms of spatial scale, most studies focus on provinces and cities, with few in-depth analyses at the county level. research methods tend to focus on interpreting network features, in-depth analysis of the underlying logic behind the formation of these features (Pan et al., 2019). Additionally, most studies rely on qualitative analysis (Wang et al., 2014; Li et al., 2023), with only a few utilizing quantitative approaches (Duan et al., 2018; Han et al., 2021). In recent years, several factors—such as "anti-globalization," "new industrial revolution, and "COVID-19"—have intersected in the global economy, fueling discussions on restructuring China's industrial chain. Amid these unprecedented changes, the tourism sector faces new and complex challenges. In May 2021, China's Ministry of Culture and Tourism outlined in the "14th Five-Year Plan for Culture and Tourism" that the tourism industry should enhance the modernization of its industrial chain to foster a more advanced industrial system and pattern. Despite these goals, regional disparities persist in China's tourism development (Fang et al., 2023). Tourism agencies, as critical components of the tourism industry chain, play an essential role in promoting high-quality urban economic and tourism development. The spatial distribution of tourism agencies and their branches reveals not only the division of labor and cooperation among cities but also the hierarchical and power dynamics within the urban system. In response to these complex shifts, it is essential to analyze the spatial layout of tourism agencies from both industrial and spatial perspectives. This approach will help elucidate the organizational characteristics of tourism agencies in the evolving landscape and provide insights into the network roles of urban life service industries. This study focuses on Zhejiang Province—a region with a relatively advanced economy, society, and tourism sector. Using travel agencies as conduits for inter-city connections, the study employs Taylor's "head-branch" enterprise model along with social network and spatial analysis methods to investigate the characteristics of urban networks in Zhejiang Province. Additionally, the study applies a conditional logit model to examine the underlying mechanisms shaping these urban networks.

2 | STUDY AREA, DATA SOURCE AND RESEARCH METHOD

2.1 | Study area and data source

Zhejiang Province has 90 districts and counties across 11 prefectures. In recent years, numerous adjustments have been made to county-level administrative divisions within the province. To ensure uniformity and continuity in this study, relevant districts and counties were consolidated, resulting in a final set of 63 county-level units. Using data from the Zhejiang Provincial Government portal (https://data.zj.gov.cn/), a directory of all tourism agency enterprises in Zhejiang Province was compiled, totaling 3,433

agencies as of November 30, 2022. In the data processing phase, the Tianyan search platform was used to determine the branch and ownership structures of travel agencies, identifying parent-child relationships, regional locations, and the number of branches. If the parent company of a travel agency enterprise operates within a non-travel-related industry or is headquartered outside the province, the travel agency is classified as an independent corporate headquarters. During data collection, any enterprises that had been cancelled or whose licenses were revoked were excluded from the analysis. Moreover, we assign city-specific values to travel agencies of at various levels. The parent companies of travel agencies selected in this study were all enterprises with at least two branches. Based on the hierarchical structure of travel agencies and their branches, this study utilizes established methodologies and incorporates the specific characteristics of the dataset to classify travel agencies into three distinct categories: headquarters, subsidiaries, and sun companies). Regions housing these types of agencies are assigned values of 5, 3, and 1, respectively, whereas regions devoid of any travel agencies are assigned a value of 0. As of December 31, 2022, data on 500 travel agency parent companies and 1,785 branches across all 63 regional spatial units were used to construct an initial matrix of 63×500. Additional regional attribute data were sourced from the Statistical Yearbook of Zhejiang Province (2022) and the statistical yearbook of various municipalities in Zhejiang Province.

2.2 | Study area and data source

Referring to Taylor's "Interlock Network" model [7], we assume there are m travel agency enterprises across n cities, which represents the service value of travel agency j in city i, travel agency enterprise nm forms the service matrix v, and the inter-city connectivity between two cities a and b represented by travel agency j is then defined as follows:

$$c_{ab,j} = \sum_{a} v_{aj} v_{bj} \tag{1}$$

where: ajv is the service value of travel agency j in city a; bjv is the service value of travel agency j in city b; ab, j, c represents the degree of connection between City a and City b based on travel agency j. For cities a and b, based on the overall connectivity between them is determined based on the city-pair linkages established by a total of m travel agency enterprises, there is:

$$C_{ab} = c_{ab,j} \tag{2}$$

In n regions, each city can have a maximum of $N-1$ connections. Therefore, in the entire network, the total connectivity of each city with other cities is expressed as follows: Since the sum of connectivity values of all cities in the region are quite high, in order to better illustrate the status of cities in the whole network, this paper uses a measure of relative network connectivity. This measure is defined as the ratio of the total connectivity of each city with the highest value in the region:

$$C_a = \sum_{i} C_{ai}, a \neq i \tag{3}$$

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$$N_a = C_a / C_h \tag{4}$$

3 | ANALYSIS OF URBAN NETWORK CHARACTERISTICS

3.1 | Urban network level analysis

Based on the calculations, the relative connectivity of cities in Zhejiang Province has been determined. The natural breakpoint method, employed in ArcGIS software is used to obtain the relative connectivity of cities into five levels (Fig.1). The urban area of Hangzhou ranks at the first level with a relative connectivity score of 1. The second level includes only the urban area of Ningbo, which has a relative connectivity score of 0.465.

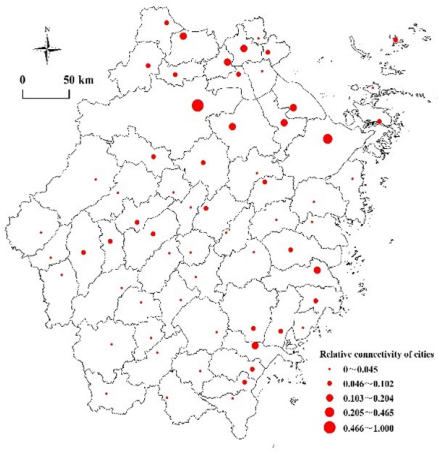

FIGURE 1 Although we encourage authors to send us the highest-quality figures possible, for peer-review purposes we are can accept a wide variety of formats, sizes, and resolutions. Legends should be concise but comprehensive – the figure and its legend must be understandable without reference to the text. Include definitions of any symbols used and define/explain all abbreviations and units of measurement.

The third level has eight regions: Shaoxing urban area, Wenzhou urban area, Yuyao City, Huzhou urban area, Taizhou urban area, Cixi City, Tongxiang City, Jiaxing urban area and other 8 regions, with relative connectivity values ranging from 0.103 0.204, accounting for 12.70% of the total. The fourth level consists of 21 regions, including Anji County, Jinhua City, Zhoushan City, Dongyang City, Xinchang County, and Qu zhou City, with relative connectivity values ranging from 0.046 to 0.102, representing 33.33% of the total. Finally, the fifth level includes 32 regions, such as Jiashan County, Jiande City, Yiwu City, and Taishun County, with relative connectivity values below 0.045, accounting for 50.79% of the total. As illustrated in FIG.2, there is a significant disparity in relative connectivity between the first and second tiers, as well as between the second and third tiers. The relative connectivity value of the urban area of Hangzhou is more than twice that of the second-ranked urban area, Ningbo, while Ningbo's relative connectivity value is approximately 2 to 4 times that of the third tier, indicating a pronounced "cliff drop" between the tiers. In contrast, the relative connectivity scores of the third, fourth, and fifth levels show minimal variation, with a gentle decline in connectivity values. This indicates a clear differentiation in urban hierarchy within Zhejiang Province, reflecting a significant structural organization. Hangzhou, as the first-tier city, occupies a dominant core position in the urban network, while Ningbo holds the secondary core position. The influence of other cities in the province is relatively limited, particularly among the 33 cities in the fourth and fifth tiers, which for nearly account to 85% and occupy the lower levels of the urban hierarchy. As an international city, Hangzhou boasts a high overall level of tourism service and exerts strong control within the network.

From the perspective of urban regional distribution (FIG.2.), the urban levels of Zhejiang Province can be categorized into three main areas: the region surrounding Hangzhou Bay, the coastal area of Wenzhou and Taizhou in eastern Zhejiang, and the Jinquli area in southwest Zhejiang. The first area is the region around Hangzhou Bay, which not only hosts the two core cities of Hangzhou and Ningbo but also includes five important node cities: Shaoxing city, Huzhou city, Jiaxing city, Yuyao city, Cixi city, and Tongxiangcity. Together, these cities form the primary gathering place for travel agencies and their branches in Zhejiang Province. This concentration reflects a relatively high level of social and economic development in the Hangzhou Bay area, characterized by active tourism service enterprises and a substantial number of travel agency businesses. Due to the presence of these higher-tier cities, this area occupies a favorable position within the urban network, providing it with a significant advantage over the other two regions. The second area encompasses the coastal section of Wenzhou and Taizhou in eastern Zhejiang Province. Although there are no first- or second-level cities in this area, it contains two third-level cities: Wenzhou and Taizhou. Under the influence and guidance of these cities, Ruian city, Linhai city, Yueqing city, Yongjia county, and Wenling city also play important hub roles. However, due to the absence of higher-tier cities, this area is positioned in the middle among the three regions. The third area is the Jinquli plate in southwest Zhejiang. In this area, only five cities—Jinhua city, Dongyang city, Quzhou city, Lanxi city, and Longyou county—rank at the fourth level, while the remaining cities fall into the fifth level. Overall, this region exhibits a relatively low urban level and has weaker control over resources, placing it at a disadvantage compared

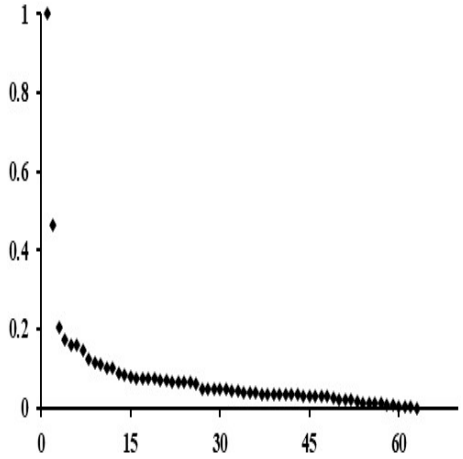

FIGURE 2 Although we encourage authors to send us the highest-quality figures possible, for peer-review purposes we are can accept a wide variety of formats, sizes, and resolutions. Legends should be concise but comprehensive – the figure and its legend must be understandable without reference to the text. Include definitions of any symbols used and define/explain all abbreviations and units of measurement.

to the other two regions. This situation reflects a lower level of social and economic development in southwest Zhejiang and highlights the significant gap in the urban tourism service industry compared to the more developed sectors around Hangzhou Bay and the coastal areas of Wenzhou and Taizhou in eastern Zhejiang. Consequently, the distribution of travel agencies in this province remains relatively sparse.

3.2 | Analysis of inter-city correlation features in the network

Using the inter-city connectivity values calculated by formula (2) (Tab.1.), a total of 1,953 city pairs were identified. However, due to some cities lacking connectivity with travel agencies, the actual number of connected city pairs was reduced to 1,294. First, the ranking of inter-city connectivity values revealed that the highest connectivity score was between the Hangzhou urban area and the Ningbo urban area (4,973), followed by the Hangzhou urban area and the Shaoxing urban area (2,949), the Ningbo urban area and Cixi City (2,501), and the Hangzhou urban area and Wenzhou urban area (2,022), all of which exceed 2,000. To facilitate the analysis, 175 groups of inter-city connections with connectivity values greater than 100 were selected and categorized into four levels. connections with values exceeding 2,000,The first level comprises four groups of city connections with values exceeding 2,000, accounting for 2.29% of the total. The second level includes 14 groups of inter-city connections with values between 1,000 and 2,000, representing 8%. The third level consists of 25 groups of city connections with scores between 500 and 1,000, making up 14.28%. The fourth level contains 132 groups of city connections with scores ranging from 100 to 500, which account for 75.42%.

TABLE 1 Inter-city connectivity in the network (major cities)

	Hangzhou	Ningbo	Wenzhou	Jiaxing	Shaoxing
Hangzhou	—	4973	2022	1484	2949
Ningbo		—	486	717	630
Wenzhou			—	99	297
Jiaxing				—	90
Shaoxing					—

ArcGIS software was employed to illustrate the correlation characteristics of the inter-city networks (FIG. 3). According to

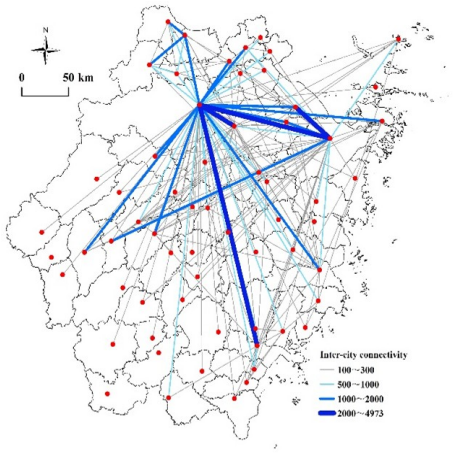

FIGURE 3 Although we encourage authors to send us the highest-quality figures possible, for peer-review purposes we are can accept a wide variety of formats, sizes, and resolutions. Legends should be concise but comprehensive – the figure and its legend must be understandable without reference to the text. Include definitions of any symbols used and define/explain all abbreviations and units of measurement.

FIG.1, the inter-city connections within the urban networks not only exhibit a strong hierarchical structure but also demonstrate agglomeration characteristics in spatial distribution. The highest intensity of connections at the first level includes the three core cities of Hangzhou, Ningbo, and Wenzhou, as well as Shaoxing and Cixi. The second level of high-intensity inter-city connection introduces 12 additional node cities, including Yuyao, Huzhou, Taizhou, Jiaxing, Zhoushan, Anji, Tongxiang, Changxing, Jinhua, Longyou, Quzhou, and Tonglu. In terms of regional distribution, these cities are primarily concentrated around Hangzhou Bay, while there are relatively few node cities in the coastal areas of Wenzhou and Taizhou in eastern Zhejiang and in the Jinquli region in southwest Zhejiang.

From the regional distribution of links established between the cities (Tab.2.), six connectivity forms can be identified: "within the region around Hangzhou Bay", "within the sea area", "within the southwest region of Jinquli", "Bay Area-coastal","Bay Area-southwest",and "coastal-southwest." At the first level, there are three groups of inter-city correlations occurring within the region around Hangzhou Bay, accounting for 7% of this level. In contrast, only one group falls under the "Bay Area - coastal" connection form. At the second level, 10 groups of inter-city connections exist within the Bay Area, making up 71.43% of this tier, while the remaining four groups also relate to urban nodes within the Bay Area. The third tier consists of fifteen groups (60%) of inter-city connections categorized as "within the Bay Area", with another nine groups connecting to Bay Area cities. In the fourth level, the number of inter-city connections categorized as belonging to the "Bay Area," "coastal area," and "southwest area" are 49, 17, and 6 groups, respectively. Notably, the number of "Bay Area - coastal" and "Bay Area - southwest" city connections has significantly increased. Overall, urban nodes in the Hangzhou Bay region not only demonstrate a high volume of local connections but also exhibit closer ties compared to the other two regions. Conversely, cities in the eastern Zhejiang coastal area and the southwest Zhejiang region are more likely to establish cross-regional relationships with Bay Area cities. This observation further underscores the prominence and status of cities around Hangzhou Bay within the urban network. This pattern not only highlights the distinct geographical disparities in producer services across Zhejiang Province, but also reflects the characteristics of economic development, revealing a trend of "strength in the northeast - weakness in the southwest."

4 | ANALYSIS OF URBAN NETWORK CHARACTERISTICS

4.1 | Model Construction

The conditional logit model is commonly employed to analyze the decision-making processes of individuals faced with various choice options. This model has found extensive application in research on the spatial location choices of enterprises (He et al., 2012; Zhang et al., 2019). Viewed through the perspective of "flowing space," the degree of connectivity and the status of urban networks—based on the relationships established by travel agencies—are ultimately manifested in the spatial distribution of

TABLE 2 Statistics of manifestations of inter-city correlation

Level	Num	Within the Bay area	Within the sea area	Within the south west region	Bay-coastal	Bay- south-west	Coastal-southwest
I	4	3	0	0	1	0	0
II	14	10	0	0	1	3	0
III	25	15	1	0	7	2	0
IV	132	49	17	6	24	32	4
Total	175	77	18	6	33	37	4

these agencies. Since the development strategies and service capabilities of the parent companies of travel agencies are typically reflected in the spatial expansion of their branches, this study focuses on the spatial layout of travel agency branches and utilizes the conditional logit model to further investigate the mechanisms underlying the formation of urban networks. Specifically, when analyzing the selection of the spatial location of the travel agency branches, it is assumed that the characteristics of the enterprises are constant. In this context, only the characteristics of the alternative regions influence the selection of locations. Thus, the random utility derived from the selection of region j by travel agency branch i is expressed as follows:

$$U_{ij} = x'_{ij}\beta + \varepsilon_{ij}, (i = 1,2,...,n, j = 1,2,...,J) \tag{5}$$

If the error terms are independently distributed and share the same extremum, the probability that branch i chooses region j is as follows:

$$p(y_i = j \,|x_{ij}\,) = \frac{\exp(x'_{ij}\beta)}{\sum_{k=1}^{J} \exp(x'_{ik}\beta)} \tag{6}$$

4.2 | Variable selection processing

For the 1,785 corporate travel agency branches, each branch i has 63 cities j as alternative regions. If travel agency branch i selects County j, the dependent variable is marked as 1, otherwise, it is marked as 0. Considering data availability, this paper selects 13 explanatory variables from six aspects—regional economy, tourism industry, infrastructure, production and operation costs, tourism development policy, and location geography to explore the formation mechanism of the urban network. (I) Regional economic development. Economic development level (X1) advanced economic and social development typically have relatively stable society, creating favorable conditions for establishment of tourism agency branches. Per capita disposable income of urban residents in each district and county is selected as the indicator. Market size (X2): From the perspective of new economic geography, enterprises are more likely to establish operations in regions with larger market size., Therefore, the gross product of each district and county is used as the indicator for market size. Industrial structure (X3): The proportion of regional tertiary industry reflects the level of service industry development and the diversity of related industries. This index is represented by the proportion of the tertiary industry within the gross regional product. Urbanization level (X4): Since the reform and opening up period, the level of urbanizations has significantly impacted China's economic development and industrial distribution. Urbanization is typically measured through population or land-based indicators. Due to the incomplete population data in the yearbook of Zhejiang Province, land urbanization is used as index, defined as the ratio of the built-up area to the total area each district and county. Openness to the outside world (X5): Economic globalization promotes regional economic growth significantly increases the possibility of foreign tourists visiting, which supports the the development of local tourism and the establishment of travel agency branches. To measure this, the index uses ratio of total regional imports and exports to the gross regional product. (II)Tourism industry development: The Tourism reception capacity (X6): The regional tourism reception capacity is

represented by the total number of tourists and the total tourism revenue. In this study, an integrated index combining both the total number of tourists and tourism income is calculated using entropy method. This approach effectively captures the regional tourism reception capacity and competitiveness. There are no 5A scenic spots (X7): The presence of 5A scenic spots in a region enhances its appeal by offering high-quality attractions and drawing more travel agencies to establish operations there. The index assesses whether 5A scenic spots are available, assigning a value of 1 if such spots are present, and if they are not. (III) Infrastructure Development: The informatization level (X8): efficient and robust information infrastructure facilities seamless communication for enterprises, supporting the establishment and operation of travel agencies. This index uses the per capita post and telecommunications income of each district and county as a measure of informatization level. Transportation accessibility (X9): High quality transportation infrastructure supports the establishment of travel agency branches by improving regional connectivity. This index measures transportation accessibility through the volume of passenger and cargo transport in each district and county. There is no airport (X10)Well-developed airport infrastructure enhances travel convenience and creates travel agency branches. Regions with airports are assigned a value of 1, while regions without airports are assigned a value of 0. (IV)Production and Operation Cost: Distance from Headquarters (X11): In considering production and operational costs, travel agencies often prefer locations closer to their headquarters. Greater geographical distance between alternative branch location and the parent company typically raises operational costs, which may reduce the agency's willingness to establish branches. This index measures the distance between the alternative location and the headquarters. (V)Tourism Industry Development Policy: Whether it is a regional tourism demonstration zone (X12): Regional tourism initiatives significantly boost tourism development and influence the distribution travel agencies. This indicator assesses whether an area is designated as a global tourism demonstration zone. If the qualifies a global tourism demonstration zone, it is assigned a value of 1; otherwise, it receives a value of 0. (VI) Location and Geographical Factors: whether it is the main urban area (X13): Urbanization concentrates a wide range of resources and assets, facilitating the marketing and strategic placement of tourism enterprises. In contrast, remote suburban counties, with their lower population present challenges for tourism enterprise promotion and expansion. This index assesses whether a region qualifies as main urban area, a significant factor in determining the location of tourism subsidiaries. Regions classified as main urban area are assigned a value of 1, other areas are assigned a value of 0. The above explanatory variables, with the exception of the dummy variables, were transformed using the natural logarithm.

(3) Analysis of measurement results Before conducting the conditional logit regression analysis, a correlation test of the independent variables was performed. The results indicated that the per capita disposable income of urban residents, regional GDP, urbanization level, and transportation accessibility exhibited high correlations with one another. To mitigate the impact of multicollinearity on the model, these variables were systematically introduced into the model estimation. The findings from the conditional logit regression analysis are presented in Table 3.

(I)Analysis of Regional Economic Development Factors: The regression results indicate that the per capita disposable income of urban residents (X1) and regional GDP (X2) significantly positively influence the location choice of travel agency branches. This suggests that as living standards improve and the regional economy develops, residents' willingness to travel increases, thereby heightening the demand for tourism information and services to fulfill their growing aspirations for a better quality of life. Consequently, this trend enhances the likelihood of travel agency branches establishing a presence in these regions. Conversely, the index of industrial structure (X3) demonstrates a significant negative impact across all four models, suggesting that improvements in industrial structure may hinder the location choices of travel agency branches. A potential explanation for this is that Zhejiang Province has entered the latter stages of industrialization (Tang Gennian et al., 2015), where the overall level of service industry development is relatively high, resulting in a substantial number of travel agencies and branches. This leads to intensified competition within the industry, making it challenging for travel agencies to select and establish new branches due to excessive clustering. Additionally, the travel agency sector has a low entry threshold, resulting in a predominance of small and micro-enterprises, which intensifies competition across industries. Meanwhile, the urbanization level (X4) and openness to the outside world (X5) do not significantly impact the location choice of travel agency branches, likely due to the generally high levels of urbanization and openness across various districts and counties in Zhejiang Province. (II)Analysis of Tourism Industry Development Factors: The regression results reveal positive coefficients for both indicators related to tourism reception capacity (X6) and the presence of 5A-level scenic spots (X7). This indicates that the development of the regional tourism

TABLE 3 Conditional logit regression results of urban network formation mechanism

Variable	Model	Model	Model	Model
X1	1.499*** (4.94)			
X2		0.267***(5.52)		
X3	-0.590**(-2.10)	-0.534*(-1.82)	-1.090**(-3.74)	-0.719**(-2.36)
X4			0.015 (0.30)	
X5	-0.093 (-1.46)	-0.019 (-0.27)	-0.058(-0.79)	-0.084(-1.21)
X6	0.128*(1.93)	0.144*(1.71)	0.170**(1.96)	0.123*(1.65)
X7	0.279***(3.64)	0.130*(1.71)	0.319***(3.98)	0.222***(2.77)
X8	-0.004(-0.11)	-0.106**(-2.45)	0.0007(0.02)	-0.005(-0.14)
X9				0.188***(4.10)
X10	0.177(1.32)	0.106(0.76)	0.423***(3.27)	0.112(0.75)
X11	-0.811***(-62.33)	-0.806***(-61.25)	-0.821***(-62.14)	-0.814***(-63.09)
X12	-0.246***(-3.32)	-0.147*(-1.83)	-0.286***(-3.60)	-0.311***(-4.32)
X13	0.381***(3.60)	0.164(1.33)	0.358***(2.71)	0.212*(1.75)
Number of obs	112,455	112,455	112,455	112,455
Log likelihood	-4247.588	-4244.375	-4261.611	-4253.264
LR	8118.58	8072.85	8150.79	8116.35
Prob >chi2	0.0000	0.0000	0.0000	0.0000
Pseudo R2	0.4270	0.4274	0.4251	0.4262

(Note: *, **, *** respectively represent significance levels of 10%, 5%, and 1%, with Z statistics in parentheses)

industry plays a significant role in attracting travel agencies to establish branches within these areas.(III)Analysis of Infrastructure Development: The regression coefficient for the informatization level (X8) exhibits a significant negative effect solely in Model II, while it does not show significance in the other three models. This suggests that in regions characterized by high per capita telecommunications consumption, travel agencies tend to have a relatively higher concentration of branch locations, which may hinder further expansion of their operations. Conversely, the regression coefficients for land transport accessibility (X9) and the presence of an airport (X10) demonstrate significant positive influences in Model IV. These findings indicate that both land transport infrastructure and airport availability facilitate the spatial selection of travel agency branches, as travel agencies are more inclined to establish operations in areas with convenient transportation options. (IV)Analysis of Production and Operation Costs: The regression coefficient for the distance between branches and headquarters (X11) exhibits a significant negative correlation across all four models. This finding indicates that parent companies of travel agencies tend to prefer establishing and expanding their operations in proximity to their headquarters. This preference is primarily driven by considerations related to production and operational costs. (V) Tourism Industry Development Policy: The regression coefficient of the regional tourism Demonstration zone (X12) index exhibit a significant negative correlation across all four models. This result suggests that the regional tourism demonstration zone policy does not effectively enhance the spatial layout or increase the number of travel agency branches in Zhejiang Province; instead, it appears to exert an inhibitory effect. (VI) Geographical Factors: Regarding the index for the main urban area (X13), the regression coefficient in model II is not significant, while the other three models demonstrate a significant positive impact. This indicates that as urbanization progresses, a substantial concentration of communities and populations in urban areas facilitates marketing efforts and the establishment of tourism enterprises. Conversely, more remote suburban counties, characterized by sparse communities and populations, hinder the promotion and placement of tourism enterprises.

5 | CONCLUSION AND DISCUSSION

Based on the travel agency enterprise database of Zhejiang Province, this study investigated the branches of these enterprises through relevant websites, established a city correlation matrix, and examined the hierarchical distribution of cities in the province, along with the characteristics and formation mechanisms of network correlations. The findings reveal that: (1) The city network in Zhejiang Province exhibits significant hierarchical characteristics, with Hangzhou serving as the core city, followed by Ningbo city as the secondary core. Important node cities include Shaoxing city, Wenzhou city, Yuyao city, Huzhou city, Taizhou city, Cixi city, Tongxiang city, and Jiaxing. The varying number of high-tier cities across the three regions creates clear hierarchical distinctions among them, with Hangzhou Bay occupying the absolute core position, the coastal areas of Wenzhou and Taizhou in eastern Zhejiang holding a middle position, and the Jinquli areas in southwestern Zhejiang classified as dominant.(2) Analysis of inter-city correlation characteristics indicates that inter-city connections within the urban network also display a strong hierarchical structure and clustering features in geographical distribution. Node cities in the Hangzhou Bay region prefer to interact with each other and maintain closer connections, while the coastal areas of eastern Zhejiang and southwestern regions show a tendency to establish cross-regional correlations with the Bay Area. (3) To analyze the factors influencing the branch layout of travel agencies in Zhejiang Province and reflect the formation mechanisms of the urban network, a conditional logit regression was employed. The results indicate that the per capita disposable income of residents, regional GDP, tourism reception capacity, presence of 5A scenic spots, land accessibility, airport facilities, and urban location positively impact the branch layout of travel agencies, enhancing the cities' status and level within the network. In contrast, urbanization, openness to the outside world, and informatization showed no significant influence on the location choices of travel agency branches, suggesting a limited effect on the hierarchical status of cities. Additionally, the distance between branch offices and headquarters displayed a significant negative correlation, indicating that travel agencies prefer to establish branches in geographically adjacent areas, which positively influences the formation of urban networks. The industrial structure and tourism development policies were found to hinder the location selection of travel agency branches, thus restricting the hierarchical status of certain cities within the network. Currently, as epidemic prevention and control measures have transitioned to regular management, China's economy and society are returning to a normal trajectory. In the post-epidemic era, there is a more robust demand for tourism consumption in China, which will lead to new adjustments in the tourism industry chain. Simultaneously, the current "dual cycle" development pattern presents new requirements and opportunities for the development of tourism in Zhejiang Province. To address these changes, it is essential to enhance the quality and resilience of the tourism industry, expedite the modernization of the tourism industry chain, and establish a contemporary industrial system. From the perspective of producer services, this paper finds that urban development in Zhejiang Province remains unbalanced. The tourism industry in the economic zone around Hangzhou Bay is relatively advanced, which, while promoting local economic growth, has also led to excessive concentration of tourism and, spatial irrationality to a certain extent. An important goal of dual-cycle development is to create a rational, coordinated, and efficient regional division of labor system that facilitates the reasonable allocation of resources. Therefore, stakeholders within the tourism industry chain must collaborate to establish a robust regional cooperation network. The study also identified that certain regions in Zhejiang Province lack tourism cooperation or even have no contact with each other. Thus, it is necessary to eliminate various barriers and facilitate both internal and external circulation, encouraging all stakeholders to actively engage in the urban coordination mechanism. Finally, it is crucial to strengthen and enhance the tourism capabilities of underdeveloped regions by expediting the development of high-quality tourism projects and service products, particularly in relatively disadvantaged areas. This approach will further optimize the spatial structure of tourism resources in the province, promote integrated regional tourism development, and reduce disparities among regions as swiftly as possible. Although this study selected travel agencies in Zhejiang Province as its research subject, it did not examine the spatiotemporal evolution characteristics of urban networks in the province using longitudinal time series data; notably, a panel model was not employed to analyze the influence mechanisms. Additionally, the placement of travel agency branches is influenced not only by the economic and social development of the regions under consideration but also by factors such as the level of the travel agencies' headquarters and the specific region in which they are situated. As a result, the spatial layout selection logic of travel agency branches could not be analyzed comprehensively, indicating a need for further research in this area.

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Jie Zhang graduated from Zhejiang University of Technology in 2019 with a Ph.D. in Management. He is currently an Associate Professor at the Zhijiang College, Zhejiang University of Technology, engaged in research in the fields of regional economics and economic geography.