



Study on the Driving Effect of Low Altitude Tourism Product Development on Regional Economic Growth

Xue Sun^{1,2,3,*}, Yanan Wang² and Xiaoliang Shi¹

¹ Harbin Bank, Harbin, Heilongjiang, 100010, China

² College of Business, City University of Hong Kong, HongKong, China

³ College of Economics and Management, Shenyang Agricultural University, Shenyang, 110866, China

SUMMARY: *Accompanied by the enhancement of people's consumption ability, in addition to satisfying the needs of mass entertainment and leisure, what consumers expect is to obtain personalized tourism experience through their own participation. Based on the elaboration of low altitude tourism product development strategy, the article explores the hypothesis of the impact of low altitude tourism product development on regional economic growth. It establishes an evaluation index system for the development level of regional economic growth, combines the coefficient of variation method and entropy weight method for comprehensive evaluation, and analyzes the development trend of regional economic growth with the panel data of China's regional economy in the period of 2010~2024. Then the spatial econometric model is introduced to explore the driving effect of low-altitude tourism product development on regional economic growth. It is found that the level of regional economic growth increases continuously during 2010-2024, with an overall increase of 48.76%. The level of low-altitude tourism product development has a significant driving effect on regional economic growth, i.e., for every 1% increase, the level of regional economic growth will increase by 0.608%. Therefore, accelerating the optimization of low-altitude tourism product development strategy can better satisfy consumers' personalized tourism experience and help promote the high-quality development of regional economy.*

KEYWORDS: *low-altitude tourism products; regional economic growth; coefficient of variation method; spatial econometric modeling*

1 Introduction

With the rapid development of the tertiary industry, tourism has also gradually developed into an emerging industry, and the development of tourism also promotes the increase of GDP in various regions, and all regions recognize that the inherent requirement of tourism development is the common development of the regional tourism economy, so that the common development of various places in the region can also be achieved [1-3]. The vitality of tourism products is where its characteristics lie, and the so-called characteristics are that tourism products have certain cultural themes. Creating the theme culture of the product allows tourists to learn more about the art and culture of the region while traveling, improves the sense of quality of the whole tourism, and then can improve the economic benefits of its tourism industry [4, 5]. In-depth market research and analysis in the design and development process of tourism products

*15663819866@163.com

<https://doi.org/10.65102/is2026961>

can avoid the emergence of overly market-oriented products, while taking the product specialization and branding as the goal to develop tourism products with their own characteristics [6, 7].

Along with the enhancement of people's consumption ability, in addition to meeting the needs of mass entertainment and leisure, consumers expect to obtain personalized tourism experience through their own participation. Air tours can enable travelers to save travel time costs, and re-examine and appreciate the different beauties from an overhead perspective, so low-altitude tourism products will become a new blue ocean in the tourism market [8]. Generally, low-altitude tourism product development is divided into three categories. The first category is low-altitude sightseeing products, and the development idea is to use general aviation aircraft as a tool to operate tour routes of urban landscape resources [9]. The second is low-altitude sports tourism products, with skydiving, hot air ballooning and paragliding as the main sports vehicles for experience activities, so that travelers seeking a sense of excitement can be close contact with low-altitude tourism products [10]. The third is to tournaments as the reason for hair up tourism experience activities, according to the local culture ad hoc planning potential events, such as the introduction of the Turkish experience, hot air balloon race set up in the appropriate region, to enhance the popularity and popularity [11]. The more investment in tourism product development and design, the quality of the region's tourism products will be well improved, unlike the over-commercialized products that flood the market, which can form the brand effect of the region, thus promoting the economic development of the region [12, 13]. As a result, a benign economic circle can be formed, and the regional economy can be revitalized together.

Domestic and foreign research on "low-altitude tourism" is mainly focused on low-altitude tourism products, technology research and management research. Literature [14] conducted a planning study on Guilin-style low-altitude tourism project, including the location and layout of the tourism project, and predicted the comprehensive economic benefits of the low-altitude tourism project from the economic, social and environmental levels based on artificial intelligence technology. Literature [15], in order to optimize the management mode of Guangzhou's smart tourism ecosystem, attempted to integrate low altitude technologies such as drones, AI, and Internet of Things (IoT) into the comprehensive tourism services, which provided tourists with an immersive tourism experience through real-time data processing and remote management, and paved the way for the development of low altitude travel products. Literature [16] analyzed the key indicators affecting the development of low-altitude tourism to explore an innovative path to optimize local low-altitude tourism, and the deep learning algorithm effectively extracted the parametric features of low-altitude travel development, and was able to propose a new development path according to its development status. Literature [17] analyzes the characteristics of low-altitude tourism, and through the field survey initially grasps the status quo of the low-altitude tourism project in Mianzhu Jiulong Low Altitude Sports Park, in order to provide professional development suggestions, and provide tourists with fashionable and exciting low-altitude tourism project experience. Literature [18] analyzed the behavioral intention of low-altitude tourism tourists based on the technology acceptance model and innovation diffusion theory, in which the fun factor provided by low-altitude tourism is the main influencing factor, and the tourists' own personality has an impact on their behavioral intention, while the social image of low-altitude tourism and friends' recommendation also increase the tourists' consumption behavior. Literature [19] conducted a relevant analysis of adventure tourism, and concluded that skydiving is an adventure tourism program that requires high professional skills, and is usually laid out in areas with poor accessibility, and this type of product is suitable for laying out around villages and towns with beautiful scenery. Literature [20] researchers in-depth experience of the entertainment space of

Jiande aviation town, pointed out that the aviation town can vigorously promote aviation culture is the focus of the current development of low-altitude tourism, in order to meet the needs of tourists need to continue to innovate, fully reflect the value of the aviation town to improve the competitiveness of the industry.

Research on the interactive impacts of the tourism industry and the regional economy began with a number of tourism economists who endeavored to use economic growth theory to explore the relationship between tourism development and economic growth [21]. Literature [22] explored the impacts of this form of tourism in terms of local communities, economy and environment by analyzing the market performance, supply and demand of rural tourism in the Czech Republic and concluded that rural tourism has a positive impact on the local economy and society in the Czech Republic, contributing to the increase of economic incomes, creation of employment opportunities, improvement of the quality of life and protection of the environment in rural areas. Literature [23] used various methods such as information analysis, comprehensive analysis and dialectical analysis to reveal the financial mechanism of rural green tourism affecting local economic development, and revealed the dependence between tourism and national GDP per capita through relevant regression analysis. Literature [24] assessed the extent to which the size of the tourism industry affects its economic policy response to the new crown epidemic based on 136 countries, and the results showed that the size of the economic stimulus is directly proportional to the size of the tourism industry, and that the countries that are heavily dependent on the tourism industry are more aggressive in their economic stimulus measures. Literature [25] explored the tourism industry in India over the period 1971-2012 and the results of the study found that the development of the tourism industry and economic growth had a positive impact on energy consumption, while the development of the tourism industry and economic growth were interlinked and the tourism industry had a significant impact on economic growth.

In addition, literature [26] constructed an analytical model based on tourism and ecological economy panel data of 30 provinces in mainland China to systematically study the association between tourism industry, technological progress and ecological economic development, and the study found that tourism has a positive impact on ecological economic development, and the promotion of technological progress on ecological economic development is long-term. Literature [27] used a combination of systematic and statistical research methods to explore the impact of the tourism industry in the Republic of Crimea on the development of the regional economy, and the economic development strategy provides for the main direction of the development of tourism as well, and has a catalytic effect on the development of regional tourism infrastructure, which in turn attracts more tourists to drive the economy. Literature [28] used ARDL cointegration model to test the relationship between tourism revenue and economic growth in the BRICS countries during the period from 1995 to 2013, the study utilized the economic development data of the BRICS countries to validate the hypothesis of economic growth dominated by the development of the tourism industry, which indicates that tourism has a positive impact on economic growth. Literature [29] explored the government's strategy to develop tourism, Riau Islands has 17 excellent regional tourist destinations with great tourism potential in terms of nature, culture and gastronomy, and it was learned through methods such as empirical evidence and literature analysis that the development of the local tourism industry effectively led to the growth of the creative economy percentage, which promotes the development of the local economy.

Low-altitude tourism products will become a new blue ocean in the tourism market as air tours allow travelers to save travel time costs and revisit and appreciate the very different beauties from an overhead perspective. Based on analyzing the development level of regional economic growth, this study introduces a spatial econometric model to explore the spatial

spillover effect of the development level of low-altitude tourism products on regional economic growth. Relying on the analysis results, it provides new research ideas for the optimization of low-altitude tourism product development strategy, which can fully enhance the stable development of regional economy on the basis of satisfying consumers' demand for low-altitude tourism.

2 Contribution of low-altitude tourism product development to the regional economy

Under the strong support of national policies, coupled with the great development of the navigation industry, it has made low-altitude tourism begin to flourish in recent years. However, in the process of developing and implementing low-altitude tourism products, if the heat is blindly pursued without starting from the actual situation, it will certainly face the risk of failure and will not be able to effectively contribute to the high-quality development of regional economic growth. This chapter is mainly oriented to the specific strategy of low-altitude tourism product development, to explore the impact on regional economic growth assumptions, to lay the foundation for the later development of data analysis.

2.1 Low-altitude tourism products and regional economic growth

2.1.1 Low-altitude tourism products

Low altitude tourism, also known as general aviation tourism, refers to the use of civil aircraft within the scope of low altitude airspace to engage in business, sightseeing, leisure, entertainment and other forms of tourism activities outside of commercial air transportation. Low altitude tourism products are actually the product of the combination of general aviation and tourism industry, which is the inevitable result of the extension and expansion of the general aviation industry chain in the field of tourism [30].

(1) Low-altitude sightseeing tourism is mainly the use of helicopters and other general aviation apparatus, along the pre-designed low-altitude tourism routes, allowing tourists to enjoy the natural scenery or urban beauty from the air tourism consumption activities. From the essential attributes of tourism activities, low-altitude sightseeing tourism still belongs to a superficial level of tourism activities, and general sightseeing activities are not fundamentally different.

(2) Low-altitude adventure tourism is more challenging, and its degree of excitement and danger is much higher than other forms of low-altitude tourism. Therefore, low-altitude adventure tourism not only requires consumers to have superior driving control technology and the ability to avoid risks, but also must have a very stable psychological quality and the will to be as tough as steel character.

(3) Low-altitude business tourism refers to the use of helicopters and other general aviation equipment, through the formation of small business team (less than 10 people), to the destination for business negotiations, sample ordering, conferences and exhibitions, scientific and technological and cultural exchanges and other activities, as well as a series of lodging, catering, sightseeing, recreation, entertainment and other visiting activities.

(4) Low-altitude theme tourism is a tourism activity for in-depth understanding and experience of a certain topic or a specific purpose, because it caters to the consumer psychology of tourists who show their individuality and are fond of newness and change, and thus has become the most fashionable and emerging mode of tourism activity nowadays.

2.1.2 Regional economic growth

Regional economy refers to the national economy formed by the geographical division of labor within a certain administrative area. In the process of long-time social and economic development, because of historical, geographical, political, economic and religious reasons, some settlements with more interconnections have gradually formed economic regions with their own characteristics. Regional economy is a dynamic system with numerous and comprehensive factors affecting its development [31].

Regional economic growth is different from economic growth, and an accurate grasp of these two concepts is the basis and premise of the research in this paper. In development economics, the economic growth of a region is regarded as part of the economic development process of this region. Economic growth refers to a country or region over a period of time, through the growth of employment, technological progress, and the accumulation of capital, which makes the economy expand quantitatively in size, so as to obtain higher output. Regional economic growth, then, is the growth of the region's productive capacity to provide products and services to its residents over that period of time. Economic development occurs first and foremost through economic growth, and healthy economic development is sustainable over time. Thus, by its nature, regional economic growth expresses only an increase in output, whereas development is a qualitative concept that relates to the interior of the economy.

2.2 Impact of low-altitude tourism products on the regional economy

2.2.1 Low Altitude Tourism Product Development Strategy

Low-altitude tourism is the development direction of the future tourism industry, and China's developed tourism industry, beautiful natural environment, rich airport resources and other advantages have laid the foundation for the development of low-altitude tourism. However, the development of low-altitude tourism products is easily affected by various factors, therefore, to ensure the smooth development of low-altitude tourism products, the following points need to be done:

(1) Develop various combination products. The development of tourism products should focus on diversity, and a single tourism product is often difficult to bring a continuous sense of freshness to tourists. In the context of the opening of low-altitude airspace, the construction of low-altitude towns can be considered to create a service system for low-altitude tourism, from ground sightseeing to aerial excursions, and from folk culture to the integration of modern science and technology, which can bring tourists a sustained sense of freshness and desire for exploration. In addition, it is also possible to combine low-altitude tourism with other means of transportation to build a product system that transforms from a single tourism experience to a three-dimensional tourism experience.

(2) Plan tourism programs according to local conditions. In the development of low-altitude tourism products, we should conduct sufficient research, according to the local specific conditions to design the line, to do according to local conditions, reasonable arrangements to ensure the smooth implementation of low-altitude tourism products. For the examination of a tourism route, it is necessary to follow the principles of complying with airspace control regulations, providing practical safety measures, emphasizing the effect of consumers' experience, taking into account the capacity of the source of passengers, the input-output ratio and not affecting the ecological environment.

2.2.2 Contribution to regional economic growth

Low-altitude tourism product development promotes the balanced development of regional

industries, strengthens the comprehensive strength of the region and drives economic growth, thus leading to the high-quality development of regional economic growth. First of all, under the new development pattern, low-altitude tourism product development not only responds to the people's demand for a better life, but also promotes the integration of regional economy and the transformation and upgrading of enterprises. Low-altitude tourism product development can help regions cultivate distinctive industrial clusters based on their own resources and industrial advantages, which can serve as a new driving force for economic growth. Secondly, low-altitude tourism product development strengthens the interconnection between cities and promotes the effective flow of talents and resources, thus promoting regional economic cooperation and connection. At the same time, low-altitude tourism product development is an important way for cities to build high-end industrial clusters, optimize industrial structure, and enhance urban competitiveness, which helps to realize the sustainable development of cities. By building high-end industrial clusters, cities can not only attract investment, but also enhance their competitiveness in domestic and international markets. Finally, low-altitude tourism product development can help city brand building, increase the city's popularity and enhance its attractiveness, and further improve the city's overall development level and social and economic vitality. Low-altitude tourism product development injects new kinetic energy into the comprehensive development of regional economy, and provides strong support for realizing the coordinated and high-quality development of regional economy.

Based on the above analysis, this paper puts forward the following hypotheses:

H1: Low-altitude tourism product development will significantly enhance the regional economic growth effect.

3 Trends in the level of development of regional economic growth

Since the opening up of low-altitude airspace, the low-altitude tourism market has started and continued to develop, and the demand for low-altitude tourism products has been increasing. The existing low-altitude tourism products have been innovated and upgraded through measures such as creating airport tourism destinations, developing combined tourism products, carrying out aerospace theme tours, and developing high-end tourism products of airlines, in order to meet the market demand and promote the high-quality development of low-altitude tourism products, which will in turn promote the high-quality development of the regional economic level.

3.1 Measurement of the level of development of regional economic growth

3.1.1 Economic growth evaluation indicators

A review of the existing literature reveals that the level of regional economic growth and development has been measured in a variety of ways and has not been standardized. This paper takes into account that regional economic growth and development has a rich connotation, not a simple economic scope, which covers all aspects of the economic development process. In this paper, when measuring the level of regional economic growth and development, we refer to the existing relevant studies [32], supplement more comprehensive indicators, from the economic growth dynamics, economic growth structure, economic growth performance and economic growth stability of the four aspects of the construction of the regional economic growth and development level of the indicator system, the specific content as shown in Table 1.

Table 1: Regional economic growth quality evaluation system

| Primary index | Secondary index | Code |
|-----------------------------|---|------|
| Economic growth drivers | Human capital | EG1 |
| | Innovation ability | EG2 |
| Economic growth structure | Industrial structure | EG3 |
| | Fiscal structure | EG4 |
| | Financial structure | EG5 |
| | Balance of payments structure | EG6 |
| Economic growth performance | Growth efficiency | EG7 |
| | The ecological and environmental cost of growth | EG8 |
| | Outcome distribution | EG9 |
| | The welfare effect of growth | EG10 |
| Economic growth stability | Employment fluctuations | EG11 |
| | Price fluctuation | EG12 |
| | Economic fluctuations | EG13 |

The sample interval selected for this paper is from 2001 to 2024, and the data used come from the statistical yearbooks of different provinces, autonomous regions and cities in different years, the China Statistical Yearbook, the China Environmental Statistical Yearbook, the Science and Technology Statistical Yearbook, as well as the Statistical Bulletin of National Economic and Social Development. Due to the fact that certain variables are missing for Tibet Autonomous Region and Inner Mongolia Autonomous Region, in order to ensure the continuity and accuracy of the results, this paper chooses to exclude these two provinces when conducting the analysis. In addition, the interpolation method is adopted to supplement individual missing data.

3.1.2 Combined assignment method for indexing

In order to avoid the uncertainty brought by a single assignment method, this paper adopts the comprehensive assignment method that combines the coefficient of variation method and entropy value method. When we utilize the comprehensive assignment method to calculate the weights of the indicators and the comprehensive score, it includes the following steps:

(1) Because of the existence of the outline of the data and the positive and negative direction of the indicators, the first step is to use the method of standardization of the polar deviation to carry out the dimensionless processing of the data. Namely:

$$\begin{cases} x_{ij} = \frac{X_{ij} - \min(X_{ij})}{\max(X_{ij}) - \min(X_{ij})} & X_{ij} \text{ is a positive indicator} \\ x_{ij} = \frac{\max(X_{ij}) - X_{ij}}{\max(X_{ij}) - \min(X_{ij})} & X_{ij} \text{ is a negative indicator} \end{cases} \quad (1)$$

where X_{ij} denotes the actual value of the j th indicator in the i th province, and x_{ij} denotes the value of the indicator after the standardization of the extreme deviation.

(2) Calculate the coefficient of variation V_j based on the mean \bar{X}_j and standard deviation S_j of X_{ij} as follows:

$$V_j = S_j / \bar{X}_j \quad (2)$$

where $\bar{X}_j = \frac{1}{n} \sum_{i=1}^n X_{ij}$, $S_j = \sqrt{\frac{\sum_{i=1}^n (X_{ij} - \bar{X}_j)^2}{n-1}}$.

(3) Calculate the weight W_{1j} of each measure based on the coefficient of variation V_j with the following formula:

$$W_{1j} = V_j / \sum_{j=1}^m V_j \quad (3)$$

(4) Calculate the weight of the i th regional indicator value under the j th indicator p_{ij} as:

$$p_{ij} = \frac{x_{ij}}{\sum_{i=1}^n x_{ij}} \quad (4)$$

where x_{ij} ($i=1,2,\dots,n; j=1,2,\dots,m$) is the value of the measured indicator of the studied variable after dimensionless processing, n is the total number of regions, and m is the number of indicators.

(5) Calculate the entropy coefficient e_j of the j th indicator as:

$$e_j = -k \sum_{i=1}^n p_{ij} \ln p_{ij} \quad (5)$$

where $k = 1/\ln n$, satisfying $e_j > 0$.

(6) Calculate the information redundancy g_j of the j th indicator as:

$$g_j = 1 - e_j \quad (6)$$

(7) Calculate the weight W_{2j} of each indicator based on the entropy method as:

$$W_{2j} = \frac{g_j}{\sum_{j=1}^m g_j} \quad (7)$$

(8) Calculate the composite score for each region, i.e.:

$$z_i = \sum_{j=1}^m \left(\frac{W_{1j} + W_{2j}}{2} \right) x_{ij} \quad (8)$$

3.2 Trends in the level of regional economic growth

3.2.1 Analysis of the current state of economic growth

Before analyzing China's regional economic growth, it is necessary to conduct a descriptive analysis of the history and current status of China's overall economic growth, which is conducive to grasping the evolution of China's economic growth stage as a whole and facilitates a comparative analysis with regional economic growth. Figure 1 shows the overall development history of China's economic growth.

Since entering the 21st century, the dividends of China's reform and opening up have been released at an accelerated pace, and China's economy has maintained a relatively long period of sustained and rapid growth, and the economic growth rate (i.e., the GDP growth rate) has been rising year by year. 2001 China's GDP growth rate was 8.34%, and in 2007 the value climbed to 14.23%, which reached the historical peak and increased by about 5.89 percentage points, and the average annual economic growth rate from 2001 to 2007 was 8.34%. The average annual economic growth rate from 2001 to 2007 was 10.85%, with a cumulative growth rate of 75.96% in seven years. However, the emergence of the global financial crisis in 2008 exposed the vulnerability of the international financial system, and China's sustained rapid economic growth trend was also severely impacted. 2008 China's GDP growth rate was 9.65%, a plunge of about 4.58 percentage points compared with the previous year, and in 2009 China's GDP growth rate was 9.4%, a further decline of about 0.25 percentage points compared with the previous year. Under the active regulation of fiscal and monetary policies, China's GDP growth rate rebounded to 10.64% in 2010, an increase of about 1.24 percentage points from the previous year, getting back close to the average growth level before the global financial crisis. However, the short-term adjustment effect of macroeconomic policies is difficult to be sustained, and with the deepening of reform and opening-up, various deep-rooted institutional obstacles to China's economic development have gradually come to the fore. Since 2011, China's GDP growth rate has begun to slow down year by year, with China's GDP growth rate in 2011 at 9.55%, and falling to 5.95% in 2019, a decline of about 3.6% between 2011 and 2019. 2019 decreased by about 3.6 percentage points, with an average annual GDP growth rate of 7.35%, and China's economy thus shifted from a stage of high-speed growth to a stage of high-quality development. 2020 and 2021 were special years under the influence of the epidemic of the century, with GDP growth rates of 2.24% and 8.11%, and during the period from 2022 to 2024, China's total GDP data also consistently showed a growth trend, and the growth rate, though slowing down, has laid down set of spiked tigers for economic recovery and stable growth. Overall, China's economy shows strong economic resilience between 2001~2024, thus promoting the high-quality development of China's economy.

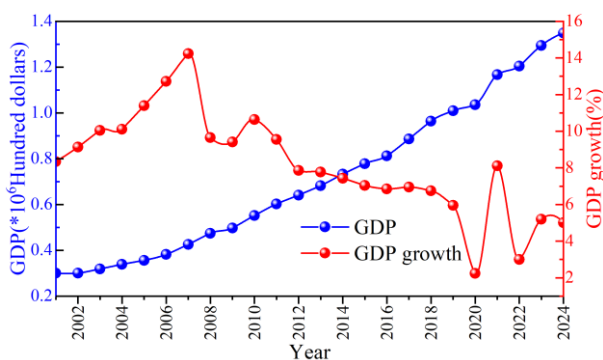


Figure 1: The overall development of China's economic growth

3.2.2 Regional levels of economic growth

Considering that the actual data exists the dimension, so this paper adopts the normalization method to process the real data measuring the development level of regional economic growth without dimension. Then, the weight of each indicator in the development level of regional economic growth is determined according to the coefficient of variation method and entropy value method. Based on the entropy weights of the above indicators of high-quality economic development, combined with the normalized data of each indicator, the final weighted average is obtained to measure the regional economic growth and development level of China's 29 provinces and cities during the period of 2010-2024. In addition, the processed data are organized according to the three regions of East, Central and West, and the regional economic growth and development levels of different regions are obtained as shown in Figure 2.

As can be seen from the figure, the average score of regional economic growth and development at the national level as a whole shows an increasing trend, indicating that China's regional economic growth level has been improving during the period of 2010-2024, with its value increasing from 0.322 in 2010 to 0.479 in 2024, with an overall increase of 48.76%. Among them, the growth rate of China's regional economic growth and development level slowed down in 2012-2016, and a rapid growth occurred in the period of 2017-2020, and after 2017, China's regional economic growth and development has been maintained at a higher position. This difference is mainly due to the new development concept put forward by the country after 2015. In 2017, the 19th Party Congress made the major judgment that "China's economy has shifted from a stage of high-speed growth to a stage of high-quality development", so at these two points in time, the growth trend of China's average regional economic growth and development scores has increased significantly.

In addition, there is a gradual upward trend in the development level of regional economic growth in all three regions of China, and the development level is ranked from high to low in the east, center and west. At the same time, compared with the national average, the development level of the central and western regions is low, and the eastern region is higher than the national average. This highlights the economic level disharmony and inconsistency that exists between regions, and it is easy to see that the eastern part of the country has made a great contribution to the country's economic development, which is in line with the reality that China's eastern coastal areas are currently developing faster than the inland areas in the central and western parts of the country. In the latter half of the period, the rising growth rate in the central and western regions for several consecutive years corresponds exactly to the upward trend of the national high-quality average, and it can be seen that in the central and western regions, forces are emerging to promote high-quality economic development. The level of regional economic growth in the central and western regions will determine the overall economic trend in China, and this will be the decisive force that will have an impact on the high quality level of regional economic growth in the future.

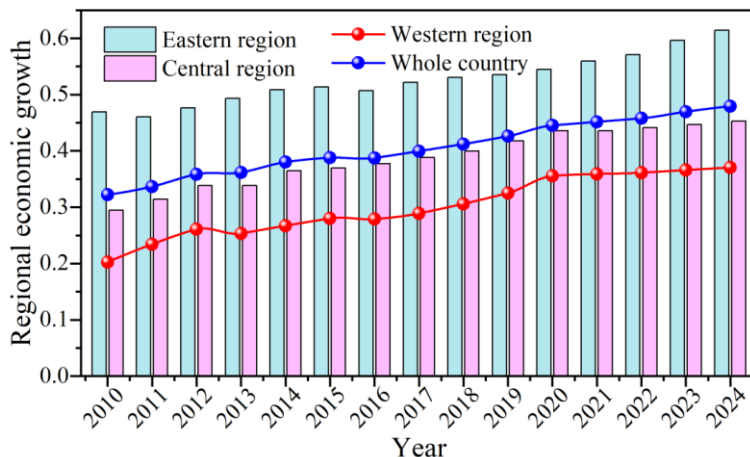


Figure 2: The regional economic growth and development levels of different regions

4 Impact of low-altitude tourism product development on regional economic growth

Low-altitude tourism as an experiential and personalized high-end tourism form is favored by tourists, and the development of low-altitude tourism products has become an important hand to further promote the high-quality development of low-altitude tourism. Along with the development of the tourism industry, the tourism market is becoming more and more perfect and mature, and the demand of tourists is also diversified, characterized and personalized, and the consumption behavior of tourists tends to be more rationalized. Relying on the development of low-altitude tourism market, laying the foundation for the high-quality development of the regional economy, in order to promote the steady growth of the market economy.

4.1 Spatial measurement modeling

4.1.1 Basic spatial measurement models

Spatial econometric models are able to test the spatial interactions between the variables in the model. The analytical logic of spatial measurement is to first determine the spatial correlation between the dependent and independent variables through the index, and then construct a spatial measurement model for estimation on this basis. Spatial econometric models are applicable to both cross-sectional and panel data, mainly including spatial lag model (SLM), spatial error model (SEM) and spatial Durbin model (SDM).

(1) The SLM model can test whether the variables have spillover effects within a certain spatial range, and its limitation is that it can only test the explanatory variables with spatial correlation, and it cannot well estimate the influence of spatial factors on the explanatory variables, and it is generally used for cross-sectional data. The model expression is as follows:

$$Y = \rho WY + \beta X + \varepsilon \quad (9)$$

where Y is the explanatory variable, X is the explanatory variable, W is the spatial weight matrix, ρ is the coefficient of the spatial lag term WY , which represents the spatial correlation of the explanatory variable, β is the parameter vector, and ε is the random error term.

(2) The essence of the SEM model is to test the autocorrelation of the error term, that is, the

existence of spatial dependence of the error term, i.e., to test the impact of the error shocks of the explanatory variables in a certain region on the neighboring regions. The model expression is as follows:

$$Y = X\beta + \varepsilon \quad (10)$$

$$\varepsilon = \lambda W\varepsilon + \mu \quad (11)$$

where λ is the spatial error coefficient of the vector of dependent variables, β denotes the effect of the explanatory variable X on the explanatory variable Y , ε is the random error term, μ is the vector of normally distributed random errors, and μ is uncorrelated with ε .

(3) The SDM model is an extension of the above two models, the essence of which is to introduce the spatial lag factor into the spatial autoregressive model, which contains two spatial weight matrices to measure the spatial autocorrelation of the explanatory variables and the explanatory variables respectively. The specific expression of the model is as follows:

$$Y = \rho WY + X\beta + \gamma WX + \varepsilon \quad (12)$$

$$\varepsilon = \lambda W\varepsilon + \mu \quad (13)$$

where ρ is the coefficient of the spatial interaction of the explanatory variables, γ is the coefficient of the spatial interaction of the explanatory variables, and λ is the coefficient of the spatial interaction of the disturbance term.

4.1.2 Selection of the spatial weighting matrix

The spatial weighting matrix is a quantitative matrix that presents the location relationships between different regions. The choice of matrix as the basis for analyzing the spatial metrics analysis has an important impact on the following research. According to the first law of geography, “no region can exist in isolation, the closer two regions are geographically, the more relevant they are”, most scholars use 0-1 matrix or geographic distance matrix based on latitude and longitude to carry out the research. However, from a practical point of view, capital flows and economic development are both aggregated, which should be translated as “the smaller the economic gap between two regions, the more relevant they are”. Therefore, it is more in line with the research of this paper to construct the distance construction matrix by considering the regional economic gap in space.

First, the spatial geographic matrix W_1 is calculated using latitude and longitude, i.e.:

$$W_1 = \begin{cases} d_{ab}, & a \neq b \\ 0, & a = b \end{cases} \quad (14)$$

where d_{ab} is the distance from the geographic centers of a and b . Let the latitude and longitude of the geographic centers of regions a and b be $\alpha_1, \beta_1, \alpha_2, \beta_2$, and the radius of the earth be R , then:

$$d_{ab} = R \cdot \arccos[\cos \beta_1 \cos \beta_2 \cos(\alpha_1 - \alpha_2) + \sin \beta_1 \sin \beta_2] \quad (15)$$

After that, the generalized economic distance matrix W_2 is constructed as:

$$W_2 = \begin{cases} \frac{pgdp_b}{pgdp_a}, & a \neq b \\ 0, & a = b \end{cases} \quad (16)$$

where $pgdp_a$ and $pgdp_b$ are the average annual GDP per capita for the sample interval 2010-2024, respectively, and a smaller ratio of the two indicates that the two regions are more likely to be interdependent. Row normalization of matrix W_2 is obtained:

$$W_3 = \frac{W_2}{\sum_{a=1}^{30} \frac{pgdp_b}{pgdp_a}} \quad (17)$$

Distance normalization of W_3 with W_1 is obtained:

$$W_4 = W_1 * W_3 \quad (18)$$

Row normalization of W_4 yields the final economic spatial weight matrix W_{ab} as:

$$W_{ab} = \frac{W_4}{\sum_{a=1}^{30} W_4} \quad (19)$$

4.1.3 Study variables and panel model selection

(1) The explanatory variable is the regional economic development level (RED). Based on the evaluation index system and measurement model designed in the previous section, the comprehensive score of regional economic development level is obtained, and its data is shown in the solution in section 3.2.2.

(2) The core explanatory variable is the level of low-altitude tourism product development (LTP). For the level of low altitude tourism product development, this paper utilizes the word splitting tool to intercept relevant text data about low altitude tourism products from the Internet, so as to obtain the level of low altitude tourism product development in different regions.

(3) Control variables. Economic development will be affected by a large number of factors, in order to ensure the authenticity of the results, this paper, based on the combing of related research, selects a total of six control variables, namely, industrial structure upgrading (IND), the level of foreign direct investment (FDI), technological innovation (R&D), labor inputs (LAB), the degree of government intervention (GOV), and the level of informationization (IFL).

From the previous study, it can be seen that China's regional economies have obvious spatial correlations, and a spatial panel data model can be considered to be selected for exploration and analysis. Since there are three kinds of spatial panel models, correlation tests are needed to determine the final model. According to the selection ideas of related scholars, the LM test is firstly used to judge which model among SAR, SEM and SDM can fit better, and the LR test is further used to judge the reasonableness of selecting the spatial Durbin model. Finally, the Hausman test is taken to choose whether the fixed effect model or the random effect model. The test results are shown in Table 2.

As can be seen from the table, the p-values of the LM test are all less than 0.001, which suggests that both the random error shock and the spatial transmission mechanism act on the dependent variable, and the spatial panel model is required. Since the spatial Durbin model

contains the lag and error terms, the spatial Durbin model is preferred. According to the LR test results, the spatial Durbin model is the model with optimal reliability. Finally, according to the Hausman test, the P-value is less than 0.001, the original hypothesis of the existence of random effects should be rejected, and the fixed effect model is selected. After a series of tests, this paper finally selects the fixed effect spatial Durbin model.

Table 2: Panel model verification results

| Inspection method | Statistics | P value |
|---------------------|------------|---------|
| LM-Error | 38.972 | <0.001 |
| Robust LM-Error | 10.136 | 0.002 |
| LM-Lag | 35.497 | <0.001 |
| Robust LM-Lag | 8.015 | 0.001 |
| LR test(SDM or SAR) | 41.093 | 0.000 |
| LR test(SDM or SEM) | 52.105 | <0.001 |
| Hausman test | 45.364 | <0.001 |

Based on the above test results, this paper selects the spatial Durbin model to analyze the spatial spillover effect of low-altitude tourism product development on regional economic growth, and the specific form of the model is as follows:

$$\begin{cases} RED_{i,t} = \alpha_0 + \rho W_{ij} RED_t + \alpha_1 LTP_{i,t} + W_{ij} LTP_{i,t} \Phi_1 + \alpha_c Control_{i,t} \\ \quad + W_{ij} Control_{i,t} \Phi_c + \mu_i + \delta_t + \varepsilon_{i,t} \\ \varepsilon_{i,t} = \lambda W_{ij} \varepsilon_t + v_{i,t} \end{cases} \quad (20)$$

where ρ represents the spatial autoregressive coefficients, W_{ij} denotes the spatial weight matrix D, and Φ_1, Φ_c are the coefficients of spatial interaction terms of core explanatory variables and control variables.

4.2 Empirical results and analysis

4.2.1 Model regression results

Based on the spatial Durbin model selected in the previous section, spatial Durbin regression analysis was conducted to explore the driving effect of the level of low-altitude tourism product development on the level of regional economic growth. The results and significance of each regression are shown in Table 3, where ***, ** and * indicate that they are significant at 1%, 5% and 10% levels, respectively.

As can be seen from the table, each variable passed the significance test at the 1% level, i.e., each driving factor has a significant effect on regional economic growth. Specifically, the coefficient of low altitude tourism product development level (LTP) is 0.608, although its coefficient is not the maximum value, but there is a significant positive promotion effect, proving the correctness of hypothesis H1, indicating that the level of low altitude tourism product development significantly promotes the regional economic growth, and has an obvious driving effect. Although low-altitude tourism product development needs to invest a certain amount of manpower and material resources, which costs money, the appropriate investment of funds helps to promote the level of regional economic growth. The coefficient of industrial structure upgrading is 0.241, industrial structure upgrading can improve the environment of local tourism product development and business environment, and can effectively promote economic growth. The coefficient of technological innovation is 0.123, which passes the

significance test at 1% level. Technological innovation can promote local enterprises to improve the development efficiency of low-altitude tourism products, which not only improves the local tourism environment but also promotes economic growth. The coefficient of labor input is 0.714, which has the largest positive impact among the control variables, indicating that improving the amount of labor input can significantly improve the level of regional economic growth. In addition, the coefficients of the degree of government intervention, the level of foreign direct investment, and the level of informatization are all negative, indicating that they hinder the regional economic growth to a certain extent at this stage, which may be related to the lag in obtaining the results of the corresponding inputs.

From the spatial lag results of the independent variables, the spatial lag coefficients of the level of low-altitude tourism product development, industrial structure upgrading, the level of foreign direct investment, and the level of government intervention are all negative, indicating that the input of the corresponding driving factors in the region will hinder the economic growth of the neighboring regions to a certain extent. Among them, the level of low-altitude tourism product development and industrial structure upgrading can significantly promote the economic growth of the region, but hinder the economic growth of neighboring regions. The level of foreign direct investment and the degree of government intervention can hinder the economic growth of the region and the neighboring regions, while the excessive input of government intervention directly leads to the decline of the regional economic level. Technological innovation and labor inputs have no significant effect on the economic growth of neighboring regions, which may be related to the geographical distance, and the inputs of related driving factors cannot have an effect on the economic growth of neighboring regions. The spatial lag coefficient of informatization level is 1.205, indicating that the informatization level of the region has a driving effect on the economic growth level of neighboring regions.

Table 3: Regression of the SDM model

| Variable | Main | W _x |
|----------|------------------|------------------|
| LTP | 0.608***(0.102) | -0.159**(0.035) |
| IND | 0.241***(0.035) | -0.241***(0.085) |
| FDI | -2.615***(0.428) | -2.094**(0.942) |
| R&D | 0.123***(0.019) | -0.005(0.036) |
| LAB | 0.714***(0.025) | -0.046(0.093) |
| GOV | -0.793***(0.142) | -1.045***(0.316) |
| IFL | -2.173***(0.334) | 1.205**(0.614) |

4.2.2 Decomposition of spatial effects

After selecting the individual fixed effects, the partial differential decomposition will be carried out to derive the direct, indirect and total effects of the influence of the relevant variables on the development of regional economic growth. The direct effect is the impact of the development of low altitude tourism products in the province on the regional economic growth of the province, and there is a feedback effect, that is, the impact of the development of low altitude tourism products in the province on the economic growth of foreign provinces is fed back into the economic growth of the province, which can be simply interpreted as the impact of the development of low-altitude tourism products in the province on the economic growth of the province, which includes the feedback effect. Indirect effect, meaning the impact of low-altitude tourism product development in foreign provinces on the economic growth of the province. The total effect is the average impact of changes in the level of low-altitude tourism product development in a region on the level of economic growth in all regions. The specific values are shown in Table 4.

In terms of direct effect, the coefficient of the impact of the level of low-altitude tourism

product development on the economic growth of the province is 0.152, and the coefficient of its feedback effect is 0.006. For every 1 percentage point increase in the level of low-altitude tourism product development, the level of economic growth of the province will increase by 0.152 percentage points, in which the feedback effect is an increase of 0.006%, which passes the test of the 5% significance level. Meanwhile, the improvement of industrial structure upgrading (IND), labor input (LAB), government intervention degree (GOV), and informationization level (IFL) among the control variables will promote the improvement of the level of high-quality economic development.

In terms of indirect effects, the significance test of the level of low-altitude tourism product development fails, indicating that the increase in the level of low-altitude tourism product development in foreign provinces will not have an impact on the economic growth of the province. Among the control variables, industrial structure upgrading (IND), the degree of government intervention (GOV), and the level of informationization (IFL) passed the significance test, but the coefficients are small, meaning that the relevant control variables in foreign provinces have little impact on the province. Foreign direct investment (FDI), technological innovation (R&D) and labor input (LAB) do not pass the significance test, which is consistent with the economic significance.

In terms of the total effect, the coefficient of the impact of the development level of low-altitude tourism products on regional economic growth is 0.254, meaning that for every 1% increase in the development level of low-altitude tourism products, the level of regional economic growth will rise by 0.254%, which passes the test of 5% significance level. The comprehensive spatial effect decomposition results show that the regional economic growth is more mainly influenced by the development of low-altitude tourism products in the region, while the influence effect of neighboring regions is smaller. Therefore, it is necessary to further promote the diversification and high efficiency of low-altitude tourism product development in order to provide reliable support for the high-quality development of regional economic growth.

Table 4: Individual fixed effect decomposition

| Effect | Variable | Coefficient | Z value | P value |
|-----------------|----------|-------------|---------|---------|
| Direct effect | LTP | 0.152 | 2.316 | 0.018 |
| | IND | 0.418 | 2.478 | 0.012 |
| | FDI | 0.054 | 1.762 | 0.068 |
| | R&D | 0.003 | 0.114 | 0.914 |
| | LAB | 0.046 | 2.315 | 0.025 |
| | GOV | 0.018 | 3.276 | 0.000 |
| | IFL | 0.079 | 4.417 | 0.002 |
| Indirect effect | LTP | 0.102 | 1.134 | 0.253 |
| | IND | 0.095 | 1.745 | 0.084 |
| | FDI | 0.018 | 1.208 | 0.232 |
| | R&D | 0.003 | 0.313 | 0.763 |
| | LAB | 0.015 | 1.426 | 0.157 |
| | GOV | 0.006 | 1.915 | 0.056 |
| | IFL | 0.019 | 1.743 | 0.089 |
| Total effect | LTP | 0.254 | 2.823 | 0.014 |
| | IND | 0.513 | 2.735 | 0.000 |
| | FDI | 0.072 | 1.796 | 0.074 |
| | R&D | 0.006 | 0.168 | 0.865 |
| | LAB | 0.061 | 2.323 | 0.023 |
| | GOV | 0.024 | 3.854 | 0.002 |
| | IFL | 0.098 | 4.368 | 0.000 |

4.2.3 Robustness Tests

The article analyzes the spatial spillover effect of the development level of low-altitude tourism products on regional economic growth by means of a benchmark regression model, and in order to verify the robustness of the results, two methods will be used in this part to conduct a robustness test on the results of the benchmark regression model, namely, replacing the spatial weight matrix and replacing the explanatory variables. The results of the robustness test are shown in Table 5.

In model (1), the distance matrix is replaced by the proximity matrix, and in the spatial proximity matrix, the neighboring regions are 1, and the non-neighboring regions are 0. It can be found that after replacing the spatial weight matrix, the direct, indirect and total effects of the level of development of low-altitude tourism products on the regional economic growth are significantly positive, which is highly consistent with the regression results of the benchmark model. At the same time, by comparing the size of the regression coefficient of indirect effect in the distance matrix and spatial proximity matrix, it can be found that the regression coefficient of indirect effect in the spatial proximity matrix is 0.094, which is smaller than 0.102 in the spatial distance matrix, which indicates that the promotion effect of the development level of low-altitude tourism products on the economic growth of the neighboring regions is smaller than the positive impact on the economic growth of the surrounding region as a whole.

In model (2), the characterization variable of regional economic growth is replaced by GDP per capita from the index of regional economic growth level, and the regression results show that the direct, indirect and total effects of the development level of low-altitude tourism products and GDP per capita are all significantly positive. This indicates that the development level of low-altitude tourism products can not only promote the growth of regional GDP per capita, but also promote the growth of per capita GDP in the neighboring areas, and every 1% increase in the development level of low-altitude tourism products will increase the level of per capita GDP in the neighboring areas by 0.074%. After replacing the explanatory variables, the level of low-altitude tourism product development still has a positive spatial spillover effect on regional economic growth, which is consistent with the regression results of the benchmark model.

Since both sets of robustness tests are consistent with the regression results of the benchmark model, this indicates that the results of the benchmark model are more reliable.

Table 5: Robustness test of spatial spillover effect

| Variable | Model (1) | Model (2) |
|--------------------|-----------------|-----------------|
| Wx: LTP | 0.049**(0.228) | 0.038***(0.342) |
| Spatial: rho | 0.416***(0.793) | 0.467***(0.871) |
| Variance: sigma2_e | 0.011***(0.416) | 0.009***(0.298) |
| LR Direct: LTP | 0.048***(0.369) | 0.023***(0.315) |
| LR Indirect: LTP | 0.094***(0.528) | 0.074***(0.409) |
| LR Total: LTP | 0.142***(0.396) | 0.097***(0.464) |
| R^2 | 0.4382 | 0.6013 |

5 Conclusion

Starting from the low-altitude tourism product development strategy, the article put forward the hypothesis of the driving effect of low-altitude tourism products on regional economic growth, measured for the development level of regional economic growth, and introduced a spatial econometric model to analyze the spatial spillover effect of low-altitude tourism product

development on regional economic growth. It is found that China's regional economic growth level has been increasing from 2010 to 2024, and its value has increased from 0.322 in 2010 to 0.479 in 2024, and the coefficient of influence of low-altitude tourism product development on regional economic growth is 0.608, which is a significant positive driving effect at the 1% level, and there is an obvious spatial spillover effect. Therefore, low-altitude tourism product development needs to be based on local demand, further expanding the development efficiency of tourism products, and providing a strong impetus for the high-quality development of the regional economy.

Although the article has achieved certain research results, there are still some limitations. For example, when analyzing the spatial spillover effect of low-altitude tourism product development on regional economic growth, the spatial autocorrelation is not verified, which may lead to the spillover effect being affected by other factors. Therefore, in the subsequent study, the Moran index will be introduced to explore the autocorrelation test of the development of low-altitude tourism exhibits on regional economic growth, so as to ensure that the research results are more scientific and reasonable.

About the Author

Xue Sun earned her doctoral degree from Rattana Bundit University in 2025. Drawing upon extensive experience in the banking sector, she has held pivotal roles in commercial banks, thereby cultivating a robust foundation in financial practice. Her research primarily focuses on the fields of green finance and tourism finance. In the context of green finance, she pays special attention to the intersection of sustainable development and financial innovation. Committed to advancing the role of green finance in combating climate change and environmental protection, her work offers valuable insights for financial institutions navigating the green transition.

Yanan Wang obtained her PhD from the City University of Hong Kong, College of Business. She graduated from the National Institute of Development Administration with a Master's degree in Management (Thailand). She has received MBA and EMBA training in Belgium Business School, Zhejiang University School of Economics, Xiamen University School of Economics, Shanghai Tongji University, etc. He has worked in Zhejiang TV Economic Channel, China Beautéville, Hunting Beauty (Hangzhou) Network Technology Co., LTD., and other units, and has full practical experience in management team and economic and financial knowledge. During the doctoral study period, I have studied business management, green finance, ESG, industrial regional economic development, etc.

Xiaoliang Shi is a professor and graduate supervisor at the College of Economics and Management, Shenyang Agricultural University. He holds a Ph.D. in management. With 15 years of dedicated research experience in agricultural and forestry economics and policy, he has published over 150 papers in SCI- and CSSCI-indexed journals. He has led more than 10 national, provincial, and ministerial-level research projects, authored 3 monographs (as lead author), co-authored 3 others, contributed to 8 additional publications, and been granted 4 national invention patents. Professor Shi is recognized as a high-level talent of Shenyang City and a designated expert of the Science and Technology Innovation Think Tank of the Shenyang Association for Science and Technology. He holds numerous academic and professional roles, including: Executive Director of the Chinese Society of Forest Economics, and also serving on its Technical Economics Committee and Forest Ecological Economics Committee; Senior Member of the Chinese Society of Technical Economics; Reviewer for the Degree and Graduate Education Development Center of the Ministry of Education; Peer reviewer for several SCI journals including *Environment, Development and Sustainability*; Youth Editorial Board Member of the Chinese Journal of Forest Economics; Academic Committee Member of Viser

Publishing Group (Singapore); Oral Examiner for the National Tour Guide Qualification Examination (Shenyang Region); and Expert of the Liaoning Provincial Department of Culture and Tourism.

References

- [1] Yang, Q., Yan, F., & Ye, F. (2011). An analysis of synergy degree of primary-tertiary industry system in dujiangyan city. *International Journal of Business and Management*, 6(8), 291.
- [2] Malik, S., Chaudhry, I. S., Sheikh, M. R., & Farooqi, F. S. (2010). Tourism, economic growth and current account deficit in Pakistan: Evidence from co-integration and causal analysis. *European journal of economics, finance and administrative sciences*, 22(22), 21-31.
- [3] Chen, J., Li, M., & Xie, C. (2022). Transportation connectivity strategies and regional tourism economy-empirical analysis of 153 cities in China. *Tourism Review*, 77(1), 113-128.
- [4] Qiu, L. (2020). Design of cultural and creative products of marine cultural tourism. *Journal of Coastal Research*, 112(SI), 100-102.
- [5] Demonja, D., & Gredičak, T. (2015). Tourism and culture in the function of local economic development. *Podravina: časopis za multidisciplinarna istraživanja*, 14(27), 0-0.
- [6] Geremew, Y. M., Alemayehu, H. B., & Meskele, A. T. (2017). Tourism marketing challenges and new tourism product development potentials: Practices from the Amhara National Regional State World heritage sites. *Journal of Hospitality Management and Tourism*, 8(1), 1-13.
- [7] Zheng, H., Fang, X., & Yu, W. (2025). The development strategy of cultural tourism integration in characteristic towns based on SWOT-AHP. *Journal of Computational Methods in Sciences and Engineering*, 14727978251346073.
- [8] Rink, B. (2017). The aeromobile tourist gaze: Understanding tourism ‘from above’. *Tourism Geographies*, 19(5), 878-896.
- [9] Zhao, T. (2016, August). Development Mode of Low Level Exhibition Tourism Derivatives and the Influences on Tourism Effect. In *2016 International Conference on Humanity, Education and Social Science* (pp. 44-47). Atlantis Press.
- [10] Erdem, A., & Akın, M. H. (2024). Mount Erciyes and sports tourism: A study to evaluate the current situation. *Journal of Multidisciplinary Academic Tourism*, 9(1), 9-18.
- [11] Özen, A., & Özdemir, E. G. (2020). Relationship between destination image change and behavioral intention: a study on Cappadocia hot air balloon experience. *Journal of multidisciplinary academic tourism*, 5(1), 39-54.
- [12] Sandvik, I. L., Arnett, D. B., & Sandvik, K. (2011). The effects of new product

- development proficiency on product advantage and tourism business performance: Evidence from the Norwegian hotel industry. *Journal of Travel Research*, 50(6), 641-653.
- [13] Wang, J. (2023). SWOT-based Analysis of Eco-tourism Product Development in Xuzhou City. *Journal of Social Science Humanities and Literature*, 6(4), 171-179.
- [14] Jin, Y. (2020, April). Preliminary study of low-altitude tourism forecast under the condition of artificial intelligence. In *Journal of Physics: Conference Series* (Vol. 1533, No. 3, p. 032027). IOP Publishing.
- [15] Luo, T. Y. (2025). Service model of smart tourism cities integrated with low-altitude technology. *ENGINEERING MANAGEMENT*, 17(1).
- [16] Liu, K., & Lian, L. (2024, September). Deep Learning Algorithm in the Investigation of Low-Altitude Tourism Development Status and Innovation Path Exploration. In *2024 Asian Conference on Intelligent Technologies (ACOIT)* (pp. 1-4). IEEE.
- [17] Ren, X. (2021, December). Integrated Development of Aviation Sports Tourism and UAV Industry Based on Information Technology. In *2021 International Conference on Forthcoming Networks and Sustainability in AIoT Era (FoNeS-AIoT)* (pp. 89-94). IEEE.
- [18] Guo, Y., Wang, Y., & Lin, Y. (2024). Behavior intention of low-altitude flight tourists based on the TAM-IDT model. In *Handbook of Tourism and Consumer Behavior* (pp. 114-125). Edward Elgar Publishing.
- [19] Buckley, R. (2007). Adventure tourism products: Price, duration, size, skill, remoteness. *Tourism management*, 28(6), 1428-1433.
- [20] Liu, W., Liu, Y., & Liu, Q. (2020). Research on Experiential Layout of Amusement Space in Jiande Aviation Town. In *E3S Web of Conferences* (Vol. 179, p. 01025). E3S Web of Conferences.
- [21] Gwenthure, Y., & Odhiambo, N. M. (2017). Tourism and economic growth: A review of international literature. *Tourism: An International Interdisciplinary Journal*, 65(1), 33-44.
- [22] Motyčka, M. (2021). Rural and Agro tourism in Czech Republic. *International journal of business management and economic review*, 4(2).
- [23] Yakymchuk, A., Popadynets, N., Valyukh, A., Skrypko, T., & Levkov, K. (2021). Rural “green” tourism as a driver of local economy development in the process of decentralization of power. *Agricultural and Resource Economics: International Scientific E-Journal*, 7(1), 232-259.
- [24] Khalid, U., Okafor, L. E., & Burzynska, K. (2021). Does the size of the tourism sector influence the economic policy response to the COVID-19 pandemic?. *Current Issues in Tourism*, 24(19), 2801-2820.
- [25] Tang, C. F., Tiwari, A. K., & Shahbaz, M. (2016). Dynamic inter-relationships among tourism, economic growth and energy consumption in India. *Geosystem engineering*, 19(4), 158-169.

- [26] Yang, W., Chen, Q., Dao, Y., Huang, X., & Shao, W. (2022). Ecological civilization and high-quality development: do tourism industry and technological progress affect ecological economy development?. *International Journal of Environmental Research and Public Health*, 20(1), 783.
- [27] Pavlenko, I. (2017). THE IMPACT OF TOURISM ON REGIONAL ECONOMY DEVELOPMENT. *The EUrASEANs: Journal on Global Socio-Economic Dynamics*, (6), 92-101.
- [28] Banday, U. J., & Ismail, S. (2017). Does tourism development lead positive or negative impact on economic growth and environment in BRICS countries? A panel data analysis. *Economics Bulletin*, 37(1), 553-567.
- [29] Wulandari, S. N. (2021). Tourism development policy and their impact on the regional economy in the Riau Islands Province. *Jurnal Bina Praja*, 13(2), 293-305.
- [30] Zhenzi GUO. (2025). Mechanism and Implementation Paths of Low-Altitude Economy in Promoting Transformation and Upgrading of Tourism Industry in Zhejiang Province. *Asian Agricultural Research*,17(08),13-15,26.
- [31] Hunag Chenhui, Muhammad Shahid Hassan, Sahar Afshan, Imran Hanif, Muhammad Umair & Olayan Albalawi. (2024). Renewable energy, regional tourism, and exports to tackle stagnant growth in developed economies. *Heliyon*,10(18),e37190-e37190.
- [32] Xinwen Lin & Angathevar Baskaran. (2025). Regional economic growth, digital economy and tax competition in China: mechanism and spatial assessment. *Journal of the Asia Pacific Economy*,30(3),886-912.