# Research on Digital Construction of Characteristic Towns in China under the Background of Digital Economy
## ——Taking the Field Investigation in 6 Provinces and 6 Towns in China as an Example

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**Abstract**
The digital reform of characteristic towns can effectively promote the high-quality development of rural areas in China, bridge the digital divide between urban and rural areas, and stimulate new vitality in rural development. This paper uses the principal component analysis method to select 22 projects in 4 aspects of industry, culture, tourism and society, and conduct a comprehensive evaluation of 6 characteristic towns in the concentrated area of China's characteristic towns. According to the evaluation scores, the differences in the construction of characteristic towns in different regions in China are analyzed. Based on this, it is suggested that the government should optimize and improve the promotion of digital reform.

***Keywords-****digital village; characteristic town; principal component analysis*

## 1.INTRODUCTION

### *1.1. Background*

The report of the Nineteenth National Congress of the Communist Party of China pointed out that promoting the construction of cultural tourism towns is an effective way to carry out local urbanization around the strategy of rural revitalization.[1]].At the same time, the CPC Central Committee has made a strategic decision to build a digital China, which is a new strategy for the development of national informatization in the new era[1].The development of digital culture industry is conducive to solving the problems of difficult inheritance of rural cultural heritage, small production scale, narrow communication channels and limited consumer market. To build a digital cultural tourism town is to redevelop and utilize rural cultural resources under the strategic background of rural revitalization, promote the creative transformation of rural excellent culture, and promote the innovative development of cultural industry. It is a new path for the development of characteristic towns [2][3].

Based on the background of digital China, the research team went to six characteristic cultural tourism towns in six provinces in different regions of China to explore the shortcomings in the process of digital development and establish a scientific digital evaluation system for characteristic cultural tourism towns. This paper evaluates the digital development level of Chinese cultural tourism towns at the present stage, and gives suggestions on the construction of digital characteristic towns with stronger vitality and more vitality based on the background of the times. As a representative of the construction of small towns with Chinese characteristics, the digitalization degree of Wenlu Town represents the digitalization level of small towns in China to a certain extent. At present, no domestic and foreign scholars have carried out relevant research. This study innovatively establishes the evaluation standard system of the benefits of digital construction of small towns, evaluates the


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representative cultural tourism towns in China, and provides scientific development suggestions for the digital construction of characteristic towns in China, which has certain reference value.

### *1.2. Domestic Research Status*

It is imperative to build an evaluation standard system for the benefits of digital construction in small towns. Beginning in 2016,Ministry of Housing and Construction、National Development and Reform Commission 、Ministry of Finance jointly issued a circular and decided to carry out the cultivation of characteristic towns nationwide. Wenlu Town has become a new trend of tourism development [4]. Jiang Zhenghua (2018), a scholar, believes that the establishment of an evaluation index system for small towns will establish a reference evaluation standard system for the construction of characteristic towns, prevent the construction of characteristic towns from losing their direction and going astray promote the healthy, high-quality and sustainable development of characteristic towns [5]. Domestic scholars Yang Shan, Tang Rong and Chen Zhengyang (2020) proposed that the digital upgrading of characteristic towns can build a good economic and ecological environment and realize the benign operation of small towns [6]. Affirmed the role of digital means in promoting characteristic towns. However, it does not specify how to measure the gain of digitalization to the construction of small towns. Nowadays, many Chinese scholars have established evaluation systems such as ecological evaluation and sustainable development evaluation for the evaluation of small towns, but there is still no evaluation standard system for the benefits of digital construction of small towns.

There are studies on the comprehensive benefit evaluation of characteristic towns in China, but they are limited to one province or even one city, which can not represent the development level of characteristic towns in China. For example, domestic scholars Shu Weiying and Xu Chunhong (2021) made an empirical evaluation and analysis of 15 provincial characteristic towns in Ningbo by constructing a comprehensive benefit evaluation index system for the high-quality development of characteristic towns. The results show that the number and quality of characteristic towns in Ningbo have increased, but there are still some problems such as low comprehensive benefits and weak innovation drive[7]. The construction of the comprehensive benefit evaluation index system for the development of characteristic towns in Ningbo has a certain reference for the benefit evaluation of other towns, but due to the objective existence of regional and force majeure differences still have limitations.

Domestic research on the digital development level of small towns usually only focuses on one specific aspect. For example, scholars Chen Haipeng and Li Decai (2021) made a comprehensive analysis of the development status and characteristics of Wenchuang characteristic towns in Yangzhou, explored the path of digital transformation of characteristic towns, conducted a survey on the digitalization of characteristic towns in the region, and put forward the methods of digital transformation of small towns[8], provides the development direction of small town financial media development under the digital background, which has a positive effect on the development of cultural and creative towns, but there is still a lack of research on the other directions of small town development, such as industrial direction, ecological direction, tourism direction and so on.

As the "vanguard" of the construction of national characteristic towns, the digitalization degree of cultural tourism towns plays a certain representative role in the digitalization degree of all characteristic towns in China. At present, there is no comprehensive and targeted research on the digital evaluation of national cultural tourism towns in China.

### *1.3. Overseas Research Status*

The construction of small towns with foreign characteristics has been going on for decades, and its development has been quite mature, forming many successful examples of small town construction. Among them, the world-famous characteristic towns are Greenwich, Sinfin Town, Vitre and so on. The secret of the success of these towns is "industry". They have become "small but fine" industrial towns through highly digital industries[5], Zhao Qinghai (2017), a domestic scholar, commentedthat the construction of characteristic towns in Western countries is basically at the highest stage, and many towns with distinctive features and worldwide popularity have been formed. These successful towns with foreign characteristics have the characteristics of advanced foundation, perfect facilities and strong service standards[9].Digital information technology promotes the industrial development of small towns in the West. It has promoted the success of small towns in many ways, and has certain reference significance for the construction of small towns in China, but the article does not give the reference practice methods for small towns in China under the specific background of the digital age.

Some foreign scholars have studied the degree and level of the combination of a certain development direction and digitalization in the development process of small towns, and pointed out the benefits of digitalization to small towns, but did not give a specific evaluation model. Melanie Kay Smith (2015) focused on the renewal and revival process of small coastal towns in the UK, and found that through tourism and culture and modern digital means it can promote local private capital investment, stimulate local consumption level, and thus improve the economic benefits of small towns[10].

Some foreign scholars have studied the positive effects of digitalization in rural health care, industry and other aspects, and given a positive answer, but they have not established a comprehensive benefit evaluation model, which has a certain reference value for follow-up research. Hlzel M and other scholars (2021) pointed out that the degree of rural digitalization is increasing, and the gap between urban and rural areas is narrowing. Digitalization drives rural development[12].Joseph Kimuli Balikuddembe Et al. (2020) suggest that the proliferation of digital technologies is rapidly changing many activities in rural and remote areas of resource-poor countries. Digital technologies do not replace certain traditional activities, but rather optimize information access and communication, social satisfaction, rehabilitation workforce shortages, professional development, and capacity building[13].This paper gives the role of digital information technology in all aspects of rural construction under the background of globalization, and its research results have a certain reference value for the follow-up. N. Arakawa Through the study of community health departments in rural communities in northeastern Thailand, scholars (2018) found that digitization is very important for community health in rural areas, and information digitization provides necessary information for health policy[14]. It mainly reveals the role of digitalization in the community of small town construction.

### *1.4. Literature Review*

On the whole, characteristic towns are developing rapidly at home and abroad. The construction of characteristic towns in foreign countries is earlier than that in China, and the construction is relatively mature, and its successful experience has certain reference significance for the construction of small towns in China. More and more scholars are devoting themselves to the theoretical research of characteristic towns, and the relevant theories are becoming more and more abundant. After reading a large number of literatures and analyzing relevant materials, There is a lack of complete and reliable evaluation index system and scientific and reasonable evaluation methods in the evaluation research of characteristic towns under the current digital background.

At present, some scholars have carried out digital benefit evaluation research on one aspect of the construction of characteristic towns, which is too one-sided to reflect the overall level. Some scholars have established an evaluation system for the comprehensive benefits of characteristic towns in a certain region, but the research is too targeted, and the model can not be applied to small towns in the whole country, which still has limitations. At present, scholars have done a lot of research on the evaluation of characteristic towns, and designed a variety of research methods. At the same time, scholars have considered many factors affecting the construction of small towns in their research, which has reference significance for follow-up research.

Only based on the background of the times, can we better evaluate the digital construction process of small towns and build characteristic towns with stronger vitality and more vitality. After many field practices, this study selectively selected several representative new characteristic towns throughout the country, and established a digital benefit evaluation model for characteristic towns. Starting from the 4 aspects of economy, ecology, society and industry of small towns, this paper comprehensively evaluates the digital development level of small towns, which is representative of the digital level of small towns with national characteristics. This study provides a comprehensive evaluation model of digital benefits of characteristic towns, and provides a solution for the digital evaluation of characteristic towns in China. It fills the gap in this respect.

## 2. EVALUATION SYSTEM CONSTRUCTION

### *2.1. Indicators Selection*

On the basis of following the typicality of the evaluation index system and the perceptibility of the crowd, according to the "Specifications for Evaluation of Characteristic Towns" with characteristic industries as the core and residents as the main body of construction goals, we put the secondary indicators in the document community, tourism, The eight dimensions of culture, ecology, image, government, enterprise, and market are recombined and classified. Enterprises and markets are merged into industries, culture and image are merged into culture, tourism is listed separately, and communities, government, and ecology are merged into communities. Finally, referring to the evaluation indicators of other scholars for supplements and deletions, a comprehensive evaluation index system of 22 small towns was designed from the 4 aspects of industry, culture, tourism and community[15-19]. Conduct a comprehensive evaluation to analyze the overall digital construction level of characteristic towns in China and the differences in digital construction of characteristic towns in different regions.

**Table 1** Evaluation index of digitalization level of characteristic towns in China

| Target layer | Primal indicator | Secondary indicator | Indicator definition |
|---|---|---|---|
| Digitization level of | Industry$Y_1$ | Technological innovation $X_1$ | Digitalization of industrial |

| | | | |
|---|---|---|---|
| characteristic town | | | management |
| | | Electronic commerce $X_2$ | Electronic commerce sales of featured products |
| | | Logistics distribution $X_3$ | Degree of logistics intelligence |
| | | Brand building $X_4$ | Network visibility of featured products |
| | | Media transmission $X_5$ | Digital dissemination of culture |
| | | Interpersonal communication $X_6$ | Sharing of local culture on social media |
| | | Online platform $X_7$ | Construction of online culture exhibition hall |
| | CultureY$_2$ | Off-line activity $X_8$ | Network propaganda of characteristic folk - custom activities |
| | | Succession of intangible cultural heritage $X_9$ | Digital protection of intangible cultural heritage |
| | | Characteristic figure $X_{10}$ | Building of featured IP |
| | | Guide system $X_{11}$ | Construction of scenic guide system |
| | | Digital platform $X_{12}$ | Construction of online tour platform |
| | Tourism $Y_3$ | Service quality $X_{13}$ | Smart tourism service quality |
| | | Tourist propaganda $X_{14}$ | Content release on network platforms |
| | | Tourism heat $X_{15}$ | Network attention status |
| | | Employment status $X_{16}$ | Employment growth through digital industries |
| | | Income $X_{17}$ | The increase of digital construction to residents' income |
| | | Infrastructure $X_{18}$ | Digital information infrastructure construction |
| | CommunityY$_4$ | Social insurance $X_{19}$ | Convenience of online participation in social security and medical insurance business |
| | | Ecological protection $X_{20}$ | Ecological environment dynamic data monitoring |
| | | Government affairs office $X_{21}$ | Development of digital government services |

| | | |
|---|---|---|
| | Stability and unity $X_{22}$ | Digital public security construction situation |

## 2.2. Data Acquisition

Since July 2016, the Ministry of Housing and Urban-Rural Development has announced two batches of 403 national-level characteristic towns. The characteristic towns are concentrated in the central and eastern regions. In the three major regions, there are more eastern than western, and more western than central. feature [20]. The team collected data on the distribution of characteristic towns across the country and analyzed it through ArcGIS, and found that the geographical distribution of characteristic towns in China has obvious geographical agglomeration characteristics. triangle area. This survey selects six characteristic towns in these six high-density geographic hotspots, which are typical and representative to a certain extent.

In February 2022, through field visits to Anfeng Town, Dongtai City, Yancheng City, Jiangsu Province, Weishui Town, Songzi City, Jingzhou City, Hubei Province, Deyuan Town, Pi County, Chengdu City, Sichuan Province, Dagangtou Town, Lishui City, Zhejiang Province , Cuihuangkou Town, Wuqing District, Tianjin City, and Putian Town, Jiedong District, Jieyang City, Guangdong Province, which are national-level characteristic towns in 6 provinces. Questionnaire survey was carried out on the industrial management of the characteristic town and its related supporting digital construction, the digital construction of cultural communication and brand building, the digital construction of tourism publicity and service management, and the digital construction of community construction and living environment. A secondary indicator is scored in the form of a five-level scale.

In this survey, 597 questionnaires were collected, of which 109 questionnaires were classified as invalid questionnaires with obvious regularity, and 488 valid questionnaires were obtained, with a recovery rate of 81.74%. In this survey sample, after the paper questionnaire and electronic questionnaire data were integrated, the scores of each indicator in each town were averaged to obtain the final score of 22 indicators for each town. It can be seen from Table 2 that the age distribution of the samples in this survey is mostly concentrated in the 18-50 years old, and the age distribution is relatively average; most of the samples have undergraduate degrees, and the majority of the samples have high school or above, indicating that most of the samples have received secondary and higher education; The identities are mainly small town residents, followed by small town tourists. They can reflect the real situation of characteristic towns from both internal and external perspectives, which is representative to a certain extent.

**Table 2** Descriptive statistics of the study sample

| | Type | Percentage ( % ) |
|---|---|---|
| Age | 18 to 30 | 30.68% |
| | 31 to 40 | 29.74% |
| | 41 to 50 | 28.57% |
| | 50 or older | 11.00% |
| Education Background | Primary and below | 2.34% |
| | Junior high school | 15.46% |
| | Technical secondary school | 7.96% |
| | Senior high school | 20.61% |
| | Junior college | 18.50% |
| | Bachelor degree | 31.85% |
| | Graduate degree | 3.28% |
| Identity | Town builder | 7.26% |
| | Town visitors | 20.37% |
| | Town worker | 13.35% |
| | Town dweller | 59.02% |

## 2.3. Reliability analysis and validity analysis

In terms of reliability analysis, by using Cronbach's alpha coefficient, if the value is higher than 0.8, it means that the reliability is high; if the value is between 0.7 and 0.8, the reliability is good; if the value is between 0.6 and 0.6 0.7, the reliability is acceptable; if the value is less than 0.6, the reliability is poor.

**Table 3** Cronbach reliability analysis [21]

| Variable | Number of indicators | Cronbach αcoefficient |
|---|---|---|
| Industry | 4 | 0.788 |
| Culture | 6 | 0.873 |
| Tourism | 5 | 0.872 |
| Community | 7 | 0.879 |
| Aggregate | 22 | 0.947 |

From Table 3 1, we can see that the Cronbach α coefficients of the three variables of "culture", "tourism" and "community" are all greater than 0.8, and the Cronbach α coefficient of the "industry" variable is

greater than 0.7, indicating that the reliability of the research data is high, and any item was After deletion, the reliability coefficient will not increase significantly, so it indicates that the item should not be deleted[21][22]. In terms of validity analysis, the KMO value and Bartlett test were used to verify the validity. The KMO value was 0.776, which was between 0.7 and 0.8, and the research data was suitable for extracting information.

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**Table 4** KMO and Bartlett test [24]

| Variable | KMO and Bartlett test | | |
|---|---|---|---|
| Industry | KMO value | | 0.789 |
| | Bartlett sphericity test | Pseudo Chi-square | 400.276 |
| | | *df* | 6 |
| | | *p*-value | 0.000 |
| Culture | KMO value | | 0.894 |
| | Bartlett sphericity test | Pseudo Chi-square | 927.390 |
| | | *df* | 15 |
| | | *p*-value | 0.000 |
| Tourism | KMO value | | 0.867 |
| | Bartlett sphericity test | Pseudo Chi-square | 823.993 |
| | | *df* | 10 |
| | | *p*-value | 0.000 |
| Community | KMO value | | 0.861 |
| | Bartlett sphericity test | Pseudo Chi-square | 1239.369 |
| | | *df* | 21 |
| | | *p*-value | 0.000 |
| Aggregate | KMO value | | 0.949 |
| | Bartlett sphericity test | Pseudo Chi-square | 4619.826 |
| | | *df* | 231 |
| | | *p*-value | 0.000 |

From Table 3, we can see that the KMO values of the three variables of "culture", "tourism" and "community" are between 0.8 and 0.9. The research data is very suitable for extracting information. The KMO value of the industry variable is 0.727, between 0.7 and 0.7. Between 0.8, the research data is suitable for extracting information [23][24].

Through reliability and validity analysis, it is proved that the data of this questionnaire are true and valid. At the same time, the evaluation index system of this study is reasonably constructed and has certain reliability and validity.

## *2.4. Principal Component Analysis*

In this paper, the principal component analysis method is used to analyze the data of the indicators. First, we use the principal component analysis method to analyze the secondary indicators, and obtain the comprehensive evaluation scores of the 4 primary indicators. Then, based on the scores of the 4 first-level indicators, the principal component analysis was carried out again, and the comprehensive evaluation scores of the digital construction of each town were obtained. Finally, according to the difference between the comprehensive evaluation scores and the first-level index scores of different towns, the evaluation and analysis of the digital construction is carried out.

We processed the data collected from the questionnaire, and averaged the indicators of the 6 characteristic towns to obtain the average scores of the 22 secondary indicators of the 6 characteristic towns. The evaluation score model is then constructed. Let Yij represent the score of a first-level indicator of a characteristic town, where i represents the ith town, and j represents the jth first-level indicator. Anfeng Town in Jiangsu Province, Wushui Town in Hubei Province, Deyuan Town in Sichuan Province, Dagangtou Town in Zhejiang Province, Cuihuangkou Town in Tianjin City, and Putian Town in Guangdong Province represent i=1~6 respectively, and the 4 first-level indicators are respectively It is represented by j=1~4. Let Xik represent the secondary indicators of a characteristic town, and the 22 secondary indicators are represented by k=1~22 respectively. At the same time, we use aik to represent the corresponding weight of each secondary indicator. From this, we construct the following evaluation model:

$$\begin{cases} Y_{i1} = \sum_{k=1}^{4} a_{ik} X_{ik} \\ Y_{i2} = \sum_{k=1}^{6} a_{ik} X_{ik} \\ Y_{i3} = \sum_{k=1}^{5} a_{ik} X_{ik} \\ Y_{i4} = \sum_{k=1}^{7} a_{ik} X_{ik} \end{cases} (i = 1,2,3,4,5,6) \quad (1)$$

In formula (1), we obtained the scores of 4 first-level indicators of 6 characteristic towns by weighting and summing the average scores of the second-level indicators under the first-level indicators of each characteristic town.

We extracted the principal components according to the eigenvalues and cumulative contribution rate of variance of the 4 first-level index data, and obtained 4 different dimensions of data in Tables 5 to 8.

**Table 5** Population variance of industry indicator interpretation

| Number | Characteristic root | | | Principal component extraction | | |
|---|---|---|---|---|---|---|
| | Characteristic root | Variance interpretation rate % | Accumulation % | Characteristic root | Variance interpretation rate % | Accumulation % |
| 1 | 2.460 | 61.503 | 61.503 | 2.460 | 61.503 | 61.503 |
| 2 | 0.578 | 14.451 | 75.954 | - | - | - |
| 3 | 0.528 | 13.207 | 89.161 | - | - | - |
| 4 | 0.434 | 10.839 | 100.000 | - | - | - |

**Table 6** Population variance of culture indicator interpretation

| Number | Characteristic root | | | Principal component extraction | | |
|---|---|---|---|---|---|---|
| | Characteristic root | Variance interpretation rate % | Accumulation % | Characteristic root | Variance interpretation rate % | Accumulation % |
| 1 | 3.678 | 61.307 | 61.307 | 3.678 | 61.307 | 61.307 |
| 2 | 0.583 | 9.714 | 71.021 | - | - | - |
| 3 | 0.523 | 8.723 | 79.744 | - | - | - |
| 4 | 0.445 | 7.418 | 87.162 | - | - | - |
| 5 | 0.398 | 6.642 | 93.804 | - | - | - |
| 6 | 0.372 | 6.196 | 100.000 | - | - | - |

**Table 7** Population variance of tourism indicator interpretation

| Number | Characteristic root | | | Principal component extraction | | |
|---|---|---|---|---|---|---|
| | Characteristic root | Variance interpretation rate % | Accumulation % | Characteristic root | Variance interpretation rate % | Accumulation % |
| 1 | 3.309 | 66.184 | 66.184 | 3.309 | 66.184 | 66.184 |
| 2 | 0.549 | 10.987 | 77.171 | - | - | - |
| 3 | 0.422 | 8.446 | 85.617 | - | - | - |
| 4 | 0.373 | 7.454 | 93.071 | - | - | - |
| 5 | 0.346 | 6.929 | 100.000 | - | - | - |

**Table 8** Population variance of community indicator interpretation

| Number | Characteristic root | | | Principal component extraction | | |
|---|---|---|---|---|---|---|
| | Characteristic root | Variance interpretation rate % | Accumulation % | Characteristic root | Variance interpretation rate % | Accumulation % |
| 1 | 4.080 | 58.287 | 58.287 | 4.080 | 58.287 | 58.287 |
| 2 | 0.954 | 13.622 | 71.909 | - | - | - |
| 3 | 0.551 | 7.879 | 79.788 | - | - | - |
| 4 | 0.461 | 6.585 | 86.372 | - | - | - |
| 5 | 0.374 | 5.339 | 91.712 | - | - | - |
| 6 | 0.323 | 4.608 | 96.320 | - | - | - |
| 7 | 0.258 | 3.680 | 100.000 | - | - | - |

We can see from Tables 5 to 8 that the cumulative contribution rates of the 4 principal components whose eigenvalues are greater than 1 are 61.503%, 61.307%, 66.184%, and 58.287%, respectively. Therefore, one principal component for each of the 4 primary indicators is reserved here. composition [25].

Through the load coefficient value, we analyze the corresponding relationship between the principal components under the 4 first-level indicators and their second-level indicators [26].

**Table 9** Industry dimension load factor and component score

| Name | Loading coefficient | Common degrees (Common factor variance) | Element |
|---|---|---|---|
| | Principal component 1 | | Element 1 |
| Technological innovation | 0.813 | 0.661 | 0.330 |
| Electronic commerce | 0.810 | 0.656 | 0.329 |
| Logistics distribution | 0.746 | 0.557 | 0.303 |
| Brand building | 0.766 | 0.586 | 0.311 |

**Table 10** Culture dimension load factor and component score

| Name | Loading coefficient | Common degrees (Common factor variance) | Element |
|---|---|---|---|
| | Principal component 1 | | Element 1 |
| Media transmission | 0.762 | 0.580 | 0.207 |
| Interpersonal communication | 0.815 | 0.665 | 0.222 |

| Name | Loading coefficient | Common degrees | Element |
|---|---|---|---|
| | Principal component 1 | (Common factor variance) | Element 1 |
| Online platform | 0.780 | 0.608 | 0.212 |
| Off-line activity | 0.777 | 0.604 | 0.211 |
| Succession of intangible cultural heritage | 0.756 | 0.572 | 0.206 |
| Characteristic figure | 0.805 | 0.649 | 0.219 |

**Table 11** Tourism dimension load factor and component score

| Name | Loading coefficient | Common degrees (Common factor variance) | Element |
|---|---|---|---|
| | Principal component 1 | | Element 1 |
| Guide system | 0.803 | 0.645 | 0.243 |
| Digital platform | 0.809 | 0.654 | 0.244 |
| Service quality | 0.840 | 0.706 | 0.254 |
| Tourist propaganda | 0.827 | 0.685 | 0.250 |
| Tourism heat | 0.787 | 0.619 | 0.238 |

**Table 12** Community dimension load factor and component score

| Name | Loading coefficient | Common degrees | Element |
|---|---|---|---|
| | Principal component 1 | (Common factor variance) | Element 1 |
| Employment status | 0.751 | 0.564 | 0.564 |
| Income | 0.778 | 0.606 | 0.606 |
| Infrastructure | 0.763 | 0.583 | 0.583 |
| Social insurance | 0.789 | 0.622 | 0.622 |
| Ecological protection | 0.683 | 0.466 | 0.466 |
| Government affairs office | 0.804 | 0.647 | 0.647 |
| Stability and unity | 0.770 | 0.593 | 0.593 |

From Tables 8 to 11, it can be seen that the common degree values corresponding to all research items are higher than 0.4, which means that there is a strong correlation between the research items and the principal components, and the principal components can effectively extract information. After ensuring that the principal component can extract most of the information of the research item, then analyze the correspondence between the principal component and the research item [27][28].

## *2.5. Comprehensive evaluation score*

We calculate the weight by analyzing the load coefficient information, etc. First, calculate the linear combination coefficient matrix, and divide the load coefficient by the square root of the corresponding characteristic root. Next, the comprehensive score coefficient is calculated, and the linear combination coefficients are multiplied by the variance explained rate and accumulated, and divided by the cumulative variance explained rate. Finally, normalize the comprehensive score coefficient to obtain the weight value of each index, as shown in Table 13.

**Table 13** Secondary indicator weight

| Secondary indicator | Weight |
|---|---|
| Technological innovation $X_1$ | 25.93% |
| Electronic commerce $X_2$ | 25.84% |
| Logistics distribution $X_3$ | 23.81% |
| Brand building $X_4$ | 24.42% |
| Media transmission $X_5$ | 16.22% |
| Interpersonal communication $X_6$ | 17.36% |
| Online platform $X_7$ | 16.61% |
| Off-line activity $X_8$ | 16.56% |
| Succession of intangible cultural heritage $X_9$ | 16.10% |
| Characteristic figure $X_{10}$ | 17.15% |
| Guide system $X_{11}$ | 19.75% |
| Digital platform $X_{12}$ | 19.89% |
| Service quality $X_{13}$ | 20.66% |
| Tourist propaganda $X_{14}$ | 20.35% |
| Tourism heat $X_{15}$ | 19.35% |
| Employment status $X_{16}$ | 14.07% |
| Income $X_{17}$ | 14.58% |
| Infrastructure $X_{18}$ | 14.30% |
| Social insurance $X_{19}$ | 14.77% |
| Ecological protection $X_{20}$ | 12.79% |
| Government affairs office $X_{21}$ | 15.06% |
| Stability and unity $X_{22}$ | 14.42% |

By weighting and summing the average data of 22 secondary indicators of 6 characteristic towns, the comprehensive evaluation scores of 4 primary indicators of 6 characteristic towns are obtained. Based on the comprehensive evaluation scores of the 4 first-level indicators, principal component analysis is carried out, and finally the comprehensive scores of the digital construction of each characteristic town are obtained. We

ranked the first-level indicator scores and comprehensive scores of each characteristic town respectively, and obtained the results shown in Table 14.

**Table 14** The comprehensive score of digital construction of 6 national characteristic towns in China

| | Industry | Ranking | Culture | Ranking | Tourism | Ranking | Community | Ranking | Synthesis | Ranking |
|---|---|---|---|---|---|---|---|---|---|---|
| Anfeng Town, Jiangsu Province | 3.8356 | 1 | 3.5793 | 3 | 3.6099 | 3 | 3.7898 | 2 | 3.6837 | 3 |
| Weishui Town, Hubei Province | 3.7550 | 3 | 3.5593 | 4 | 3.3467 | 5 | 3.4129 | 6 | 3.5089 | 5 |
| Deyuan Town, Sichuan Province | 3.7963 | 2 | 3.7165 | 2 | 3.6229 | 2 | 3.7075 | 4 | 3.7035 | 2 |
| Dagangtou Town, Zhejiang Province | 3.7499 | 4 | 3.9930 | 1 | 3.8691 | 1 | 3.8996 | 1 | 3.8851 | 1 |
| Cui Huangkou Town, Tianjin | 3.6026 | 5 | 3.3133 | 6 | 3.1879 | 6 | 3.7825 | 3 | 3.4245 | 6 |
| Putian Town, Guangdong Province | 3.5600 | 6 | 3.5392 | 5 | 3.3993 | 4 | 3.6085 | 5 | 3.5135 | 4 |

## *2.6. Analysis of Scoring Results*

From the perspective of the industrial dimension score, the ranking from high to low of the industrial development level of the six representative towns is Anfeng Town in Jiangsu Province, Deyuan Town in Sichuan Province, Wushui Town in Hubei Province, Dagangtou Town in Zhejiang Province, and Tianjin City. The comprehensive evaluation values of Cuihuangkou Town and Putian Town in Guangdong Province are 3.8356, 3.7963, 3.7550, 3.7499, 3.6026, and 3.5600, respectively. The scores of the six representative towns are not much different, and they all have their own representative industries. Among them, the comprehensive score of Anfeng Town in Jiangsu Province is higher than that of other towns, with a score of 3.8356 points, and a high score for technological innovation. The following towns scored 3.7963, 3.7550, and 3.7499 respectively, which were less than 0.1 points away from Anfeng Town, Jiangsu Province, which scored the highest. Although the scores of the other two regions are low, the overall difference is not large. The low score of Cuihuangkou Town in Tianjin has a high score in the e-commerce index, but the score is not high in the two indicators of technological innovation and brand building, and the overall score of the industry is not high. lean back. The brand building of Putian Town, Guangdong Province, which has the lowest score, has a higher score, and the other three indicators have low scores, and the overall score is low. On the whole, there is little difference in the scores among the representative towns, and little difference in the level of industrial development.

From the perspective of cultural dimension scores, Dagangtou Town in Zhejiang Province has an obvious advantage, and Deyuan Town in Sichuan Province is also higher than the average level. The characteristic image and non-genetic inheritance scores of the two towns are relatively high, and the comprehensive score is relatively leading. The cultural dimension scores are followed by Anfeng Town in Jiangsu Province, Hushui Town in Hubei Province, and Putian Town in Guangdong Province. The comprehensive cultural scores of these three towns are 3.5793, 3.5593, and 3.5393, respectively, and the scores are not much different. The scores of online platforms and online activities are lower, the comprehensive score of cultural dimension is weaker than the first two towns, and the degree of digitization of cultural communication platforms is weaker. The lowest score is Cuihuangkou Town, Tianjin City, with a score of 3.3133. The town's characteristic image and media communication indicators score is not high, and the overall score is low.

From the perspective of tourism dimension scores, Dagangtou Town in Zhejiang Province has the highest score, the service promotion and service popularity score is high, and the comprehensive score is high. Deyuan Town in Sichuan Province scored 3.6229 points and Anfeng Town in Jiangsu Province scored 3.6099 points. The scores of the two towns are not much different, mainly because the tourism popularity is not as high as that of Dagangtou Town in Zhejiang Province, and the overall score is higher. Putian Town in Guangdong Province scored 3.3993 points, and Hushui Town in Hubei Province scored 3.3467 points. Cuihuangkou Town, Tianjin, which scored the lowest in this dimension, scored 3.1879 points, which was 0.6812 points away from the first place. , There are significant differences in the development level of each town in the dimension of tourism.

In terms of social dimension scores, Dagangtou Town in Zhejiang Province has the highest score of 3.8996 points. The indicators of employment and income in the town have high scores, and the overall score is the highest. The scores of Anfeng Town in Jiangsu Province, Cuihuangkou Town in Tianjin City, and Deyuan Town in Sichuan Province are 3.7889 points, 37825 points and 3.7075 points respectively. The scores of the three are not much different in this dimension, and the scores of indicators such as infrastructure, social security, stability and unity are All are in the upper-middle level, and the scores of each indicator are relatively average. Putian Town in Guangdong Province scored 3.6085 points, and the scores of the town's infrastructure, social security and government affairs were much lower, and the overall score was lower. The score of Wushui Town in Hubei Province is 3.4129, the lowest score in this dimension, all indicators are at the middle and lower level, and the overall social dimension comprehensive score is low.

## 3.EVALUATION SYSTEM CONSTRUCTION

### *3.1. Reducing the dependence on traditional industries and strengthening digital industry innovation*

Small towns with relatively strong traditional industries, such as Cuihuangkou Town, known as the "Hometown of Carpets", have low scores in digital fields such as digital platforms and guide system indicators. Therefore, the characteristic image of the town and the score of the media communication index dropped in a chain reaction. It is worth noting that Cui Huangkou Town is famous for its digital e-commerce built around the industry, but it has flaws in digitalization. The reason is that the town's key e-commerce advantages have not spread, are limited to a single industry, are not innovative enough, and fail to drive the development of other industries. Observing that several other small towns such as Putian Town with a low score for digitalization all have the problem of single industrial development, and the high-tech industries in Putian Town have not brought digital convenience to the local people.

Therefore, the relevant government departments should strengthen the industrial transformation, and the development of characteristic towns should not be limited to "characteristics", and at the same time should pay attention to the development of other industries. The digital advantages of characteristic industries should gradually spread to other areas, further strengthen digital innovation, and explore new applications of small town characteristics.

### *3.2. Pay attention to infrastructure construction and improve the digital level of government affairs.*

Tourist towns represented by Wushui Town generally have weak infrastructure construction and government affairs construction. At the same time, the dimension of tourism is correspondingly higher, reflecting some characteristics In the development process of the town, the mentality of "only pay attention to the appearance, not the inside". Small towns with cultural tourism industry as the main feature put too much emphasis on the construction of facilities facing the outside world, but ignore the core development of people's livelihood construction, which seriously affects the sustainable development of such towns.

In the process of expanding construction around the existing local resources, the town government should pay special attention to the construction of local infrastructure, strengthen the level of government affairs, keep up with the trend of the times, and strengthen the digital management of government affairs. At the same time, the government should promote the integration of employment orientation and the characteristic industries of the town, so as to lay a human resource foundation for the future development of the town's characteristics.

### *3.3. Strengthen town brand building and develop online publicity channels.*

From data analysis, it can be seen that towns with higher characteristic image and non-genetic inheritance scores will have correspondingly higher town brand images, and their comprehensive scores will also be higher. Advantage. Observing the towns with the highest comprehensive scores, it can be clearly found that the local cultural communication platform has a high degree of digitization and has done better in terms of industrial technology innovation. Objectively speaking, towns with higher comprehensive scores have formed a virtuous cycle mechanism of construction-promotion-development. Local characteristic industries obtain more publicity opportunities through network digitization, thereby attracting more people with a more famous town image. Excellent talents have solved the key bottleneck of local development.

Establishing a small town brand image is an important part of the external publicity of a characteristic town. Relevant government departments should increase investment in town publicity, and develop new publicity channels through a combination of online and offline methods, so that the town's characteristics can be promoted. The scope of influence and influence continue to increase, improving the competitiveness of the town in the same type of town.

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