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Influencing factors and stage characteristics of intelligent construction of rural tourism in Fujian

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ABSTRACT

With the help of qualitative analysis software Nvivo11, this paper makes a rooted analysis on the field text data of six rural tourism spots in Fujian Province. It shows that the influencing factors of the intelligent construction of rural tourism mainly including human capital, performance expectation, effort expectation, social impact, market demand and capital conditions. In the initial construction stage of rural tourism, the influence of capital conditions and human capital is stronger; in its development and construction stage, the impact of performance expectation is the most critical, followed by effort expectation and capital conditions; In its relatively mature stage, performance expectation and effort expectation are the dominant factors, followed by social influence. To promote the intelligent construction of rural tourism, effective measures should be taken according to the key factors in different development stages. It should be guided by the actual needs of tourists, pay attention to the fit with the positioning of rural tourism destination and target market, and avoid being intelligent for the sake of intelligence.

Keywords: rural tourism; smart tourism; influencing factors; Nvivo11 qualitative analysis; Fujian Province

1. Introduction

Intellectualization of rural tourism, that is, through the intelligent rural tourism management platform, using the Internet of things, cloud computing, RFID and other high-end technologies, with the help of the perception system, actively perceive, identify, judge and timely release the rural tourism information about rural tourism resources, activities, tourists and other aspects, so as to fully realize the automation and intellectualization of the whole operation process of rural tourism, including service, management and marketing. A new rural tourism mode realized the sustainable development of rural tourism[1]. Although the practical construction of intelligent rural tourism in China is rising, there are few relevant studies because it is still in the initial stage. Especially in the research on the influencing factors and stage characteristics of the intelligent construction of rural tourism, no special article has been found in the literature. Only a few scholars mentioned the content related to influencing factors in the relevant research of rural tourism wisdom construction. For example, Zhao[2] pointed out that the

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necessity of accelerating the development of rural smart tourism industry in Hainan Province is reflected in the active promotion of the government and the requirements for the transformation and upgrading of rural tourism industry. Zhu et al.[3] pointed out that one of the reasons for the low integration of rural tourism and science and technology is that the local government, developers, operators and villagers lack Internet thinking and are not good at using scientific and technological means to update tourism products and optimize tourism services and experience. In addition, in the Internet era, the change of tourists' consumption habits and the market share of rural tourism[4–8] are also related to the process of rural tourism wisdom construction. These studies provide a reference for this paper to comprehensively explore the intelligent construction of rural tourism and its stage characteristics.

The wisdom of rural tourism is one of the effective means of rural tourism development. A detailed analysis of its influencing factors is conducive to promote the process of rural tourism wisdom construction, promote the development of rural tourism and promote rural revitalization. However, due to the different development stages of different rural tourism destinations, there is a large gap in the corresponding intelligent construction. The discussion of this topic will help different rural tourism destinations to have a target according to the development stage

Overcome construction difficulties and promote the wisdom construction process of rural tourism. Therefore, this paper analyzes the influencing factors and stage characteristics of its intelligent construction process through interviewing multiple rural tourism destinations and collecting various secondhand data, and puts forward development suggestions.

2. Research data and methods

2.1. Case introduction

From the development history of smart tourism, at present, the intelligent development of rural tourism in China is in the initial stage. However, even in the initial stage, different rural tourism destinations show different progress in intelligent construction due to different resource endowments, attention and development paths. Following the principles of criticality, uniqueness and enlightenment[9], this paper adopts the method of multi case study, selects six rural tourism destinations as the research object, divides them into three groups according to the characteristics of different stages, and explores the influencing factors and stage differences of different stages. The selection of these six sites is based on the investigation of typical rural tourist destinations under the jurisdiction of several prefecture level cities in Fujian Province (Xiamen Yuanqian community, Yunyang village, military camp village, baijiaoci village, qiange village, Tianyi village, Dadeng fishing village, Longyan Gutian, Peitian, hongkeng, Sanming Qingliu, Datian, Xiuzhu, Zhangzhou Changtai, Hua'an, Quanzhou Yongchun, Anxi, Nanping zhangdun, Guanmi, etc.), and a comprehensive selection of representative case sites. At present, there is no clear stage division standard for the intelligent construction of rural tourism. It is tentatively divided according to the results of field research and telephone interview. In the process of investigation, we can feel the differences of different stages of tourism development. Combined with the development status of rural tourism in each investigation point, the content of intelligent construction and the start time, the development stage is divided into three stages including start construction period, development construction period and relatively mature period. The basic information of the case site and the intelligent construction stage are shown in **Table 1.**

Table 1. Basics of the venue and stages of its smart construction

Construction stage	Village name	City, county and town	Honorary title	Intelligent construction	Starting time
Initial construction period	Guanmi Village	Guangze County, Nanping City	China rural tourism model village; National ecological village; Ten charming villages in Haixi, etc.	Not yet. Free WIFI and security monitoring are planned to be built	In 2013, Guangze was listed as the key county of poverty alleviation and development in Fujian Province, and Guanmi village developed characteristic rural tourism based on resource endowment
	Qiange Village	Tingxi Town, Xiamen	Wenming village, Fujian Province; Key construction villages of beautiful villages in Fujian Province; Class I characteristic village of rural tourism in Fujian Province	WIFI covers part of the plan, building intelligent navigation, electronic brake, electronic tickets, and official account of wechat.	Promote the construction of rural tourism in 2015; The construction of public WIFI was put into operation in early 2017
Development and construction period	Xiuzhu Village	Jianning County, Sanming City	Fujian rural tourism characteristic village; The top 20 tourism characteristic villages in Fujian Province; National agricultural tourism demonstration site	WIFI coverage, built electronic brake, security monitoring, scanning code guide, wechat official account, rural e-commerce network	Xiuzhu Heyuan, the main scenic spot in the village, was rated as a national agricultural tourism demonstration site in 2007; In 2017, it was managed as a closed scenic spot
	Shanzhong Village	Changtai County, Zhangzhou City	National ecological demonstration village; Famous scenic villages with national characteristics; The first batch of four-star rural tourism business units in Fujian Province	WIFI covers part of the project, including OTA ticket, electronic brake, intelligent voice guide, scenic safety monitoring, wechat official account.	In 2004, Changtai County established mayangxi ecotourism area to vigorously develop the tourism industry, and the tourism development of Shanzhong village began to start
Relative developed	Hongkeng Village	Hukeng Town, Yongding District, Longyan City	Tulou folk culture village; Provincial garden village; Provincial Health villages; The most beautiful countryside in Fujian; Provincial civilized scenic spot; The 10th provincial civilized village; Key villages for the construction of "427" new countryside in Chengdu.	We have built up the online ticketing system, WIFI, IP broadcasting, intelligent voice guide, electronic brake, security monitoring, wechat official account, LED information management screen, travel electronic touch inquiry machine, official website, microblog, and intelligent travel official service platform.	In 2007, Fujian Tulou Tourism Development Co., Ltd. Was established and put into information construction successively. In 2015, it began to make greater efforts to carry out information construction
	Xibei Village (Gutian Conference site)	Gutian Town, Shanghang County, Longyan City	Top ten tourism and leisure market towns in Fujian Province; National civilized villages and towns; National ecological civilization education base; National ecological villages and towns, etc.	It is built up electronic ticketing system, electronic gate, big data platform, monitoring platform emergency system, intelligent voice guide, docking network evaluation system, wechat official account, intelligent parking system.	In 2008, the site of the Gutian Conference was selected by the former National Tourism Administration as a 4A-level tourist attraction. In 2016, informatization construction has been carried out.

2.2. Data collection

The data were obtained by semi-structured interview, on-site observation and second-hand data collection, and the obtained data were transformed into text data for analysis. From October to December 2017, through the interview outline sorted out in advance, the person in charge of the construction of the case site and relevant practitioners (administrative personnel, enterprise leaders, employees, etc.) Were interviewed. Each interview lasted about 50–90 minutes. The interviewees were selected by pre selection and snowball method. Firstly, the person in charge of the construction of the case is selected as the interview object to obtain the interview materials to the greatest extent. Then, the snowball method is adopted, and the interviewers recommend follow-up candidates to increase the interviewees. Through on-site observation, we can intuitively understand the infrastructure construction and intelligent infrastructure construction of the case site, and subjectively feel the rural tourism experience under the background of intelligent construction. Secondary data collection includes documents, official account of Tourism Development Committee, official website of enterprises, contents of wechat public address, micro-blog content, and Internet media coverage.

2.3. Research methods

The research on the influencing factors of the intelligent construction of rural tourism involves relatively complex situations, which belongs to exploratory research and is suitable for qualitative research methods. Therefore, multi case study method and grounded theory research method based on Nvivo11 qualitative analysis are adopted. The case study does not seek a universal explanation for all things and phenomena, but is used to reveal the complex laws of a certain kind of social phenomena, and make up for the impact of random events on society that may be ignored by the empirical method through the discussion of a certain accidental factor[10]. Using the method of multi case study, through the comparison between the research objects of six typical rural tourism spots, we find the law and explore the factors affecting the intelligent construction of rural tourism. The research method of grounded theory is a qualitative research method that uses systematic procedures to develop and induce grounded theory according to a certain phenomenon[11]. It is applicable to the fields where the existing theoretical system is not very perfect or it is difficult to effectively explain practical phenomena. The intelligent construction of rural tourism is a new social phenomenon, and the corresponding research is less. Based on the detailed interview data and second-hand data, this paper uses the open coding and spindle coding of grounded theory method to analyze the data. Open coding refers to the process of conceptualizing and categorizing the collected data, while spindle coding further finds and establishes various connections between conceptual categories and forms a more in-depth analysis. In addition, grounded theory emphasizes the continuous interaction between data and analysis. Through the standardized data analysis procedure of grounded theory, the strictness and scientificity of data analysis can be improved.

3. Research results and discussion

The respondents' perception of restrictive or promoting factors in the intelligent construction of rural tourism will be reflected in the number of times the respondents mentioned the problem. When the respondents mentioned an influencing factor, the interviewers made a code, and expressed the proportion of the influencing factor by the total number of codes of one influencing factor accounting for the total number of codes of six influencing factors.

3.1. Influencing factors during initial construction period

The data coding results and the proportion of

influencing factors in the initial construction period are shown in **Table 2**.

Table 2. Coding results and proportion of influencing factors in the initial stage of construction

Country name	Number of codes/time						
	Performance expectation	Effort expectation	Human capital	Social influence	Market demand	Financial conditions	Total
Guanmi Village	3	3	4	3	2	8	23
Qiange Village	3	5	5	2	3	5	23
Total	6	8	9	5	5	13	46
Percentage/%	13	17	20	11	11	28	100

Based on the average proportion of about 17% of the six influencing factors, the influencing factors greater than 17% are taken as the leading factors of stage development. According to the coding results, the leading factors affecting the intelligent construction at this stage include capital conditions (28%) and human capital (20%), of which the capital factor accounts for the largest proportion.

Funding is one of the main constraints of intelligent construction. Especially in the early stage of rural tourism construction, the construction needs of roads, toilets, sanitary environment improvement and relevant software and hardware facilities are far more important than the input and use of information technology. Therefore, under the condition of limited construction funds, most rural tourism spots choose to use the funds for infrastructure construction, or only choose necessary intelligent construction projects, such as WIFI and online publicity. These necessary intelligent construction projects are closely related to market demand. Market demand is one of the objective factors contributing to the intelligent construction of rural tourism. The requirements of tourists for intelligent construction (such as WIFI) or the change of tourists' behavior habits (such as relying more on the Internet to search for tourism information) promote the corresponding construction of rural tourism spots to meet the needs of tourists. Therefore, although market demand is not the leading factor, its importance has also attracted attention. Human capital factors mainly refer to the personnel related to rural tourism construction. In the initial construction period, as the main promoter or executor of the intelligent construction of rural tourism, their role is more obvious. If they have insufficient knowledge of intelligent construction or do not have corresponding knowledge and skills, the process of intelligent construction will be limited to a certain extent. **Table 3** lists some original data and coding results during the initial construction period.

Table 3. Partial coding in the initial stage of construction

Some original data	Open coding		Spindle code
	Conceptualization	Categorize	
It must be very convenient for tourists to make an appointment for farmhouse and Farmhouse Inn through an information platform	Convenient for tourists	Perception usefulness	Achievements expect
At present, the biggest disadvantage of rural tourism management is that the labor cost is too high, so the main direction is to tend to be intelligent, which can save us a lot of labor costs	Save labor cost		
The country tour will especially rely on online sales, so we must establish a better intelligent platform; There are also many customers from the Internet, so it is necessary to be intelligent	Help marketing promotion		
If someone comes to help us install this system, he will come to help us train. At present, the employees have been trained to use it, which is not a big problem.	Technology company provides training	Technical company support	Strive expect

Table 3. (*Continued*)

Some original data	Open coding		Spindle code
	Conceptualization	**Categorize**	
We don't know how to do this. Many people who advocate smart cities now know this concept, but electronic information has not been considered yet.	Insufficient knowledge of information technology	Role of the person in charge	Human resources capital
That's for sure. It's all a network society now, because of the current rural tourism, intellectualization should be a major direction	Network society intellectualization	Social development trend	Social influence
Tourists will ask if there is WIFI. Before, the WIFI in the village set a password, and tourists will ask for the password	Visitors request WIFI	Tourist behavior	Market demand
But at present, it can only be promoted by the funds of the local government. The investment in tourism development is relatively large, there is still not so much investment in this aspect (intelligent construction)	Government funds push moving; Purpose of funds	Funding issues	Financial conditions

3.2. Influencing factors during development and construction period

The data coding results and the proportion of influencing factors during the development and construction period are shown in **Table 4**.

Table 4. Coding results and proportion of influencing factors in the developing stage of construction

Country name	Number of codes/time						
	Performance expectation	**Effort expectation**	**Human capital**	**Social influence**	**Market demand**	**Financial conditions**	**Total**
Xiuzhu Village	1	5	2	0	5	3	16
Shanzhong Village	8	2	3	4	1	4	22
Total	9	7	5	4	6	7	38
Percentage/%	24	18	13	11	16	18	100

During the development and construction period, funds (18%) still played an obvious role and paid more attention to market demand, rising from 11% in the initial stage to 16%. However, different from the key influencing factors in the initial construction period, the impact of performance expectation (24%) and effort expectation (18%) is more significant in this stage. At this stage, driven by market demand and relatively sufficient funds, rural tourism practitioners began to pay attention to the use of information technology. The use effect and difficulty of information technology have become the dominant factors, namely performance expectation and effort expectation.

Performance expectation refers to the degree to which rural tourism site builders believe that the use of information technology can help them achieve better performance at work, that is, the usefulness of intelligent construction perceived by users. Rural tourism spots, which are in the initial stage of intelligent development, have a certain foundation for tourism development after early construction, and begin to pay attention to the effects that information technology can bring. Their affirmation of the effect of intelligent construction further promotes their construction enthusiasm and perceived usefulness, including improving tourist experience, saving labor costs, making work more convenient, helping marketing promotion, etc. Effort expectation refers to the difficulty of rural tourism practitioners in using information. The support of technology companies, the help of family members and the understanding of the ease of system operation have become the help to promote their intelligent construction.

The coding of some data during the development and construction period is shown in **Table 5**.

Table 5. Partial coding in the developing stage of construction

Some original data	Open coding		Spindle code
	Conceptualization	Categorize	
The combination of experience culture and smart tourism can make customers feel better	Enhance the tourist experience	Perceived usefulness	Performance expectation
We are using both xiruan and OA. Office is still convenient	More convenient work		
Many of them know us through the official website and wechat	Help marketing promotion		
We don't need to know everything. We know the basic principle and then outsource services	Technology Outsourcing	Technical company support	Effort expectation
As long as the operators of this (information technology system) are more serious, they can get started faster	Competent in technical operation	Usability cognition	
Everyone will be willing to promote the application of information technology. Provincial Tourism Development Commission, Municipal Tourism Development Commission and County Tourism Bureau all attach great importance to this training	Personnel training	Organizational support	Human capital
The administrative department had requirements before (information construction content), but we didn't do it; Then he gave subsidies and let us do it	Government promotion/policy subsidies	Government policy factors	Social influence
It's mainly the needs of tourists. Tourists need to share their photos with their family and friends. The results can't be sent out. Tourists are unhappy. He said that there is no WIFI in that place, so no one wants to go	Tourists require WIFI; Sharing experience	Tourist behavior	Market demand
Smart tourism, after all, costs a little money and sometimes a lot of money. We are all spending small money now. We dare not spend big money	Capital constraints and intelligent construction	Funding issues	Financial conditions

3.3. Relative maturity factors

The data coding results and the proportion of influencing factors in the relative maturity period are shown in **Table 6**.

Table 6. Coding results and proportion of influencing factors in the relatively matured stage of construction

Country name	Number of codes/time						
	Performance expectation	Effort expectation	Human capital	Social influence	Market demand	Financial conditions	Total
Hongkeng Village	8	6	6	2	4	2	28
Xibei Village	9	10	5	10	2	3	39
Total	17	16	11	12	6	5	67
Percentage/%	25	24	17	18	9	7	100

All influencing factors work together to promote the process of intelligent construction of rural tourism. Among them, the proportion of human capital and social impact is basically the same, 17% and 18% respectively; There is little difference between market demand and capital conditions, which are 9% and 7% respectively; The impact of performance expectation (25%) and effort expectation (24%) is more prominent.

Performance expectations and effort expectations. At this stage, the development of rural tourism itself is more mature and has a certain scale. It is relatively stable in infrastructure construction, service facilities construction, tourist source market, operation management, marketing and publicity, and has more spare efforts to invest in more information technology applications. At the same time, the effect

brought by the early intelligent construction has further strengthened their confidence, while the active docking of technology companies due to the expansion of the development scale of rural tourism and the ease of operation of the technology system weaken the difficulty of technology use.

Human capital. As in the first two stages, rural tourism practitioners, especially managers, play an important role in promoting the application of information technology. In terms of market demand and capital conditions, compared with the first two stages, the role of market demand has been affirmed in the development process. Thanks to the investment of state-owned enterprises and government subsidies, the restriction of funds is far less than that in the initial construction stage, so the influence of these two factors has decreased a lot.

On the contrary, the proportion of social influence increased to 18%. Social impact refers to the degree to which individuals are aware of whether others think they should use new information technology, including the cognition of whether their more important people think they should carry out a certain behavior and the degree of social recognition. In this study, it mainly refers to government administrative factors and social development trends, such as the corresponding intelligent construction required for the establishment of A-level scenic spots, "policy subsidies for multi card gate of" fresh Fujian tourism, and the general recognition that smart tourism is the general trend of development in the society. When the rural tourism spots develop to a certain scale, comply with the corresponding policy subsidies, and actively pay attention to the general trend of social development, the role of social influence begins to increase significantly.

The coding results of some data in relative maturity are shown in **Table 7**.

Table 7. Partial coding in the relatively matured stage of construction

Some original data	Open coding		Spindle code
	Conceptualization	Categorize	
For example, for QR code tickets, tourists get tickets with their ID cards. In the past, they had to calculate the number of people manually. Now they record as many people as they can	Convenient work	Perceived usefulness	Performance expectation
They all cooperate with Shenda, including QR code ticketing, automatic ticketing, gate, and network background data, big data monitoring	And technology Company cooperation	Technical company support	Strive
For a long time, each scenic spot should be equipped with its own technicians, but the demand is not so large, because technology companies are now very common, and it is easy for us to buy services	Technology Outsourcing		Expect
The management will actively promote the construction when he comes back from the inspection of other scenic spots outside and feels that these equipment are useful to tourists	Investigation and reference of intelligent construction	Role of management	Human resources Capital
Intelligence is a trend. Real intelligence is very easy to use. You can solve many problems if you have a mobile phone everywhere	Development direction	Social development trend	Social influence
It is linked to the market demand. The two earth buildings in Chuxi and Nanxi have less passenger flow and less intelligent investment; Gaobei and hongkeng have more intelligent investment	More passenger flow promotes intelligent investment	Tourist behavior	Market demand
Tourists come here to travel. If there is no Internet, they may stay for a day and leave; If there is an Internet, he can work here and stay a few more days	Intelligently extend the stay time of tourists		
Compared with other scenic spots, the funds of state-owned enterprises are relatively sufficient	Relatively sufficient funds	Funding issues	Financial conditions

3.4. Influencing factors and stage characteristics of intelligent construction of rural tourism

According to the previous analysis, the influencing factors of intelligent construction of rural tourism show different importance in different development stages.

From different stages, in the initial construction period, human capital (20%) and capital conditions

(28%) are the dominant factors; During the development and construction period, performance expectation (24%), effort expectation (18%) and financial conditions (18%) account for more than 17%, and the influence is more significant; In the relative maturity period, the dominant factors are performance expectation (25%), effort expectation (24%) and social influence (18%).

From a single factor point of view, the proportion of performance expectation and effort expectation shows a phased improvement trend with the development of rural tourism construction stage. The role of human capital is more obvious in the initial construction period, and it decreases in the development and construction period and the relatively mature period. The role of social influence in the relatively mature period (18%) is significantly higher than that in the initial construction period (11%) and development construction period (11%). Market demand factors change greatly in different stages. Infrastructure construction is the focus in the initial construction period. Even if the intelligent construction needs of tourists are paid attention to, they have not been well met due to limited funds, lack of human capital and other factors. During the development and construction period, rural tourism destinations can put more energy and resources into meeting the market demand. At this stage, the market demand greatly affects the intelligent construction of rural tourism destinations. In the relatively mature period, in the longer-term development, the importance of market demand has been affirmed, so its role has begun to weaken and give way to social influencing factors. Capital conditions play an obvious role in the two stages of start-up and development. In the relatively mature period, the impact of capital problems is weakened due to the expansion of rural tourism spots and the diversification of capital sources.

4. Conclusions

Using the grounded method, six typical villages are selected to analyze the influencing factors of intelligent construction. It is found that the factors affecting the intelligent construction mainly include human capital, performance expectation, effort expectation, social influence, market demand and capital conditions; The factors affecting the intelligent construction of rural tourism destinations have certain commonalities and unique stage characteristics. Rural tourism destinations at different stages should take measures to promote the intelligent development of tourism according to the key factors, grasp the degree of intelligent construction according to the market demand, and achieve the balanced development of the two. They should not be intelligent in order to achieve intellectualization.

According to the research results, the following four suggestions are put forward to promote the intelligent construction of rural tourism.

Firstly, pay attention to the training related to the intelligent construction of rural tourism and strengthen human capital. The construction of intelligent rural tourism depends on the promotion and implementation of employees. Strengthening the intelligent training of administrative personnel and improving the level of intelligent management is one of the effective ways to strengthen human capital. In addition, smart content should be added to the existing rural tourism development training to carry out smart tourism exchange activities between different rural tourism spots.

Secondly, expand investment and financing channels and ensure sufficient funds. In addition to giving full play to the supporting and guiding role of financial funds and driving more financial capital and social capital to participate, we should also expand investment and financing channels, including cooperation with financial institutions; attracting foreign investment through various forms, such as exchange activities between enterprises or project roadshows or academic salons, to attract more enterprises to pay attention to the intelligent construction of rural tourism; introduce PPP mode, etc.

Thirdly, strengthen policy support and enhance social impact. The tourism administration department should guide relevant departments and enter-

prises to participate in the construction of rural tourism intelligence through technology output, capital investment, service outsourcing, resource sharing and so on. From the perspective of policy support, weaken the difficulty of employees in the application of information technology, expand the social impact of the intelligent construction of rural tourism, and promote the development of the intelligent construction of rural tourism.

Finally, grasp the market demand and promote the combination and development of intelligent construction and rural tourism destination. However, it is worth noting that market demand is the internal driving force for the intelligent construction of rural tourism. Wisdom construction of rural tourism should be oriented to the actual needs of tourists, and the degree of wisdom construction should be in line with the positioning and target market of rural tourism destinations to ensure that tourists are provided with satisfactory or even surprised rural tourism experience, rather than wisdom.

Conflict of interest

The authors declare no conflict of interest.

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