# Information System Analysis and Research on the Development of Tea Industry in Xunshi Town

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**Abstract.** China has achieved the goal of poverty alleviation in rural areas and has now entered the stage of promoting comprehensive rural revitalization. The new rural revitalization strategy places greater emphasis on the scientific field of informatization, scientific ecological mechanisms, and interactive mechanisms. This article establishes an information system analysis model, which objectively analyzes the development status of local rural areas through data collection and analysis, and recognizes the interactive logical relationship between different roles in promoting rural revitalization. Based on information analysis, The article proposes targeted measures to promote agricultural and rural modernization, analyzes the content and trends of training and guidance for rural residents, and analyzes the roles that governments, enterprises, universities, and farmers should play in this mechanism.

**Keywords:** Rural revitalization, industrial development, village improvement, information system analysis

## 1 INTRODUCTION

Numerous studies have been conducted on comprehensively promoting rural revitalization. Changfu Han[1] , director of the Office of the Central Rural Work Leading Group and Minister of Agriculture and Rural Affairs, elaborated on the key tasks of implementing the Rural Revitalization Strategy from the perspectives of rural industry revitalization, rural talent revitalization, rural ecology revitalization, rural culture revitalization, and rural organization revitalization. Chunguang Wang[2] analyzed the multiple practice subject and their relations of agricultural and rural modernization from the perspective of rural sociology and put forward some thoughts and suggestions on policy innovation. Zhixiong Du[3] analyzed some problems existing in rural revitalization from the aspects of agricultural and rural infrastructure construction, ecological and resource environmental pressure, the coexistence of rising production costs and imbalance between supply and demand structure, the deep integration and development of rural industries, the income gap between urban and rural residents, and the development quality of new agricultural business entities. Xuefeng He[4] believed that the implementation of the Rural Revitalization Strategy should focus on providing timely help to the general agricultural rural areas in the central and western regions, which account for the majority of rural farmers in China, and provide a guarantee for the production and life of farmers who lack the opportunity and ability to enter cities in rural areas. Xinquan Ge et al.[5] analyzed the problems existing in the process of rural industrial integration development from the

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perspectives of rural industrial integration, the driving force of new business entities, interest connection mechanism, factor bottleneck, and so on, and put forward some ideas. Jun Guo et al.[6] analyzed the integration of rural primary, secondary and tertiary industries and the increase of farmers' income from a case perspective. Yipei Zhou et al.[7] analyzed the current typical young and middle-aged population loss and talent shortage in rural areas from the perspective of developing new rural production and management organizations and realizing the local transfer of rural labor. The solution to various problems in the process of comprehensively promoting rural revitalization is not to solve problems in isolation, which is temporary. In the long run, the construction and optimization of a stable and sustainable ecological mechanism are crucial. There are few studies on the relationship and interaction among universities and colleges, local governments, enterprises, and farmers in the process of rural revitalization from the relevant literature. While many problems in the process of rural revitalization need the benign interaction of several aspects to promote together. Researchers have analyzed and studied the various problems existing in the process of rural revitalization, including the interpretation of policies related to rural revitalization, the analysis and elaboration of the connotation of rural modernization, the analysis of the problems existing in the development of rural revitalization, and the analysis of the main force of rural revitalization, which about "industrial development." However, it is short-sighted to attempt to solve certain problems in isolation in the process of comprehensively promoting rural revitalization. Building and optimizing stable and sustainable ecological mechanisms is crucial in the long run.

This article constructs an information system analysis model based on the actual development of township economy, designs evaluation dimensions and indicators, and analyzes the current development status of the local tea industry. The structural equation model for the economic development of the tea industry was optimized, and the relationship between the local tea industry development and various influencing factors was analyzed. At the same time, through the Apriori Algorithm, an analysis was conducted on the very important trend of farmers' training in the future, as this element will play an important role in promoting the development of local industries in the future. Finally, based on the analysis, it is proposed that rural revitalization can be continuously promoted, ensuring the sustainability of university support, strengthening the continuity of local policies, solving operational difficulties, and preventing rural residents from returning to poverty.

## 2 Analysis of the current situation of tea industry development and relevant countermeasures

ChengDu Neusoft University and Xunshi Town have signed a school-site cooperation agreement to support the revitalization of local villages. In the past five years, Xunshi Town has focused on industrial restructuring, optimized industrial layout, and steadily developed as an agricultural leading industry, with the tea industry continuing to grow. Cultivate tea on 26 family farms and 6 cooperatives, with a tea planting area of 100 000 mu in the town. The comprehensive output value has increased from 570 million yuan to 1 billion yuan, with an annual growth rate of 12%. The development of the tea industry provides strong support for local development. In the development plan, the local government hopes to optimize the tea industry, solve existing problems in the industry, and finally bring in new growth points. Based on this, this article analyzes the relevant factors that promote the realization of the local rural

revitalization strategy, combines relevant factors, and refers to the existing simultaneous equation set model to partially replace variables, replacing exports with industrial cross-regional sales (CRS)[8], and replacing county economic levels with the industrial contribution to the local economic level. A simultaneous equation set model is constructed to calculate the residents' and industrial cross-regional sales income The internal relationship between the development of the tea industry and urban economic growth is analyzed through information systems. The endogenous variables in the simultaneous equations model refer to variables that are mutually or jointly dependent, while the exogenous variables are variables determined outside the equations system. Each endogenous variable needs to be represented by an equation. In the model, the cross-regional sales of tea, the development of the tea industry, and the contribution of the industry to the level of urban economic development are regarded as endogenous variables, while other variables are regarded as exogenous variables. Logarithmic processing is performed to reduce heteroscedasticity. The established simultaneous equation model is as follows:

$$\begin{cases} \ln crs_{it} = C_{10} + \beta_{10} \ln y_{it} + \beta_{11} \ln pgdp_{it} + \beta_{12} \ln open_{it} + \beta_{13} \ln fdi_{it} + \beta_{14} \ln er_{it} + \mu_{1it} \\ \ln y_{it} = C_{20} + \beta_{20} \ln crs_{it} + \beta_{21} \ln pgdp_{it} + \beta_{22} \ln natur_{it} + \beta_{23} \ln job_{it} + \beta_{14} \ln er_{it} + \mu_{2it} \\ \ln pgdp_{it} = C_{30} + \beta_{30} \ln y_{it} + \beta_{31} \ln crs_{it} + \beta_{32} \ln capital_{it} + \beta_{33} \ln labor_{it} + \beta_{34} \ln is_{it} + \mu_{3it} \end{cases}$$

Logically speaking, there should be a positive relationship between the cross-regional sales of tea, the development of the tea industry, and the level of urban economic development. In our actual analysis, there is a negative relationship between them. While the sales of the local tea industry are gradually increasing, the income of residents, enterprises, and their contributions to the local economy are not ideal. Based on this, we conducted further research and found that the development level of local cities and towns is to some extent affected by the output value of cross-regional sales, and there is a significant relationship between the output value and local tea profit margin, labor efficiency, enterprise management, enterprise competition, government policies, and other aspects. The author led the student team to conduct in-depth research on the development of the tea industry ,The research results reflected a series of issues affecting the development of the local tea industry, such as the insufficient role of government policies in promoting rural revitalization, the difficulties in the development of rural enterprises, low farmers' income, insufficient skilled personnel, and serious brain drain. Therefore, the results show a negative correlation.

### 2.1 The tea industry, the main force of rural revitalization, has obvious operational difficulties

We analyzed the data of local tea production enterprises through an information system, and the analysis results are shown in figure 1:

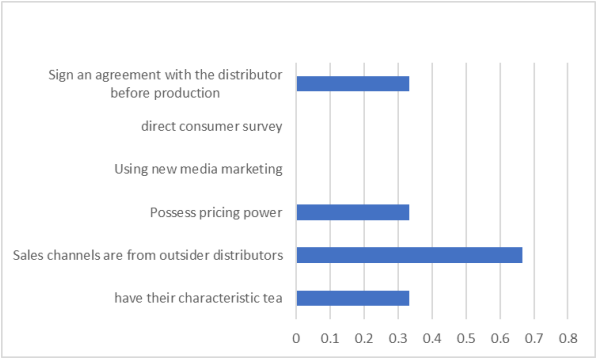


**Figure 1** Operation status of local tea enterprises

**Lack of enterprise characteristic products and weak competitiveness.**

The local black tea is Chuanhong, which is an intangible cultural heritage of Sichuan Province and was once one of the well-known black teas. However, local Chuanhong lacks influential corporate and product brands. Information analysis shows that only 33.3% of tea production enterprises have their own specialty tea. According to interviews, most local tea production enterprises only engage in basic processing based on the requirements and pricing of foreign distributors, and most do not have their characteristic tea, making them less competitive. among the types of tea produced by local tea producers, high-quality tea has a high-profit margin. It can be seen that another key point for improving the profit margin of tea enterprises in the future is the production and sales of high-quality tea, which also depends on the quality of raw tea provided by local tea farmers.

**The enterprise only has a single sales channel and a single source of revenue.**

For the local market, limited by the vision and management level of enterprise operators, the tea sales channel is single. Information analysis shows that 66.7% of local tea production enterprises' products are mostly wholesale to outsider distributors, while only a small number of tea enterprises have their own sales channels or online sales channels. The main source of income for tea production enterprises is wholesale to foreign merchants, and the single sales channel has become an important factor affecting income.

**Enterprises lose pricing power and have thin profits.**

As one of the sources of tea, the wholesale price of local tea is determined by wholesalers, and internal low-price competition has also seriously affected the healthy development of local tea production enterprises, which even have no opportunity to go out and participate in domestic competition. Information analysis shows that 66.7% of enterprises produce tea based on the prices set by wholesalers and have lost their pricing power.The single sales channel and internal competition have become the fundamental reasons for the local tea production enterprises' lack of pricing power and low profits. We have also obtained confirmation through interviews. Due to pricing power issues, some enterprises' high-quality tea profits, which should have high profits, have also become very low or near losses, rather than due to poor quality of tea.

**The enterprises lacks sales promotion means.**

In the Internet era, enterprise marketing methods are emerging endlessly, especially the development of new media, which has brought more opportunities for enterprise operations. It should also be an opportunity for the development of rural enterprises, but it is not so for them. Information analysis show that most local tea production enterprises do not carry out promotional activities, and even if they use a WeChat circle of friends to promote, the effect is very low. After all, a WeChat circle of friends belongs to private domain traffic, and it is difficult to bring effective traffic without external promotion. Among the tea production enterprises we investigated, none of them adopt new media marketing methods for promotion and promotion.

**Operators do not understand customer needs.**

The needs of customers are the key to business operations. Local enterprises have no understanding of the consumer psychology of front-line consumers. Information analysis shows that most of the opinions obtained by tea production enterprises come from feedback from wholesalers in other places. Some of them even form simple business relationships with wholesalers without receiving feedback.

**Operators have weak contract awareness and insufficient self-protection capabilities.**

It is a basic and normal task for enterprises to protect their interests through agreements before production begins. However, for tea enterprises, only one-third of the production enterprises and wholesalers protect their interests through agreements. More enterprises still protect their interests through simple credit contracts, which is not conducive to the development of enterprises.

**The operators's information technology application level is weak and the ability to obtain external information is insufficient.**

In the Internet era, information is overwhelming, but for operators, limited by the level of information technology application, it is difficult to obtain more information on tea sales channels. Information analysis shows that the main sources of information for local tea enterprises are provided by tea farmers' markets and wholesalers.

**2.2 Rural revitalization is the target of common prosperity, and the development status of rural residents is worrying**

**Personnel outflow,The overall age of left-behind personnel is older, their education level is low, and their labor efficiency is low.**

Information analysis shows that The majority of young people go out to work, and among those left behind, tea farmers over the age of 50 are the majority. with the majority of elderly people left behind, a weak ability to accept new things, and low labor efficiency. most of the local families are composed of only two elderly people, all of whom are engaged in tea planting and other related work to support their livelihoods or have a family structure of three generations, all or most of whom are engaged in tea planting related work. At the same time, the majority of left-behind personnel are from primary and secondary schools and below, and their education level is limited. This type of population generally has poor use of information technology tools, and weak innovation ability and some older tea farmers have some difficulties communicating in Mandarin.

**Tea farmers have long working hours, low efficiency, and low income.**

Due to limitations in technology and tools, many tea farmers work long hours but are inefficient. According to Information analysis, in terms of working hours, labor hours are generally longer, and even older tea farmers are still working hard for their livelihoods. From the perspective of efficiency, the working efficiency of tea farmers is mostly around 2 kilograms per day. Based on interviews, we learned that there are also problems with the quality of raw tea picked by tea farmers. In terms of income, the Analysis showed that tea farmers with a monthly income of 2000 yuan to 3000 yuan accounted for 45.83%, while tea farmers with a monthly income of 1000 yuan to 2000 yuan accounted for 37.5%. Tea farmers with a monthly income of less than 1000 yuan and more than 3000 yuan accounted for 8.33% of the total survey population. shown in figure 2. Tea farmers earn very low profits from tea picking, and many local young labor forces have to work elsewhere due to their low income, resulting in a large number of young labor outflows, which has been confirmed here.

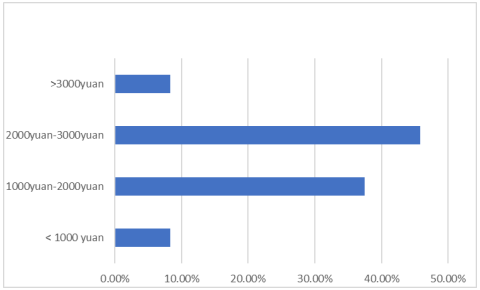


**Figure 2** Monthly income status of tea farmers

**Tea farmers have scattered tea planting areas and single sales channels.**

The Analysis data shows that the planting area of tea farmers presents two aspects of differentiation, namely 45.83% under 0.33 hectares of tea gardens and 37.5% under 0.33-0.66 hectares of tea gardens; The remaining land area is relatively small, with 0.66-1 hectares of tea farmers accounting for 12.5% of the total surveyed population, and 4.17% of tea farmers planting more than 1 hectares. shown in figure 3. Most tea farmers have their land to plant tea trees, but the planting is scattered and there is no resultant force. If it is necessary to uniformly plan tea planting in villages in the future, it is worth considering how to better utilize these lands and form economies of scale.

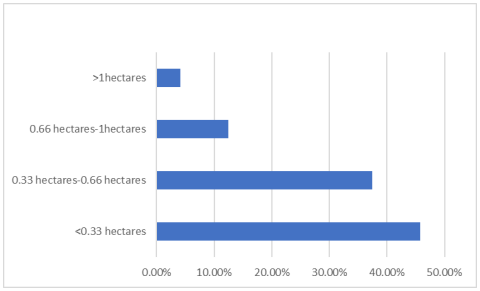


**Figure 3** Situation of owning tea garden area

**The application level of tea farmers' information technology is weak.**

Mobile phones are becoming increasingly popular, but there are still many tea farmers with old-fashioned mobile phones in villages and towns, accounting for 41.67% of the respondents, and 4.17% of the villagers never use computer phones. Although more than half of the people use smartphones, based on interviews, we understand that tea farmers' use of Internet tools is still relatively backward, and mobile phones are simply used as contact tools. Local governments need to focus more on how to integrate and cooperate with tea farmers to increase their income. While deepening digital agriculture, it is also possible to make good use of the advantages of communication equipment to supplement cultural knowledge, tea-picking skills, sales, and other relevant information gaps.

**Information analysis of Training Tendency of New Vocational Farmers Based on Apriori Algorithm**

Information analysis show that 76.18% of the respondents were willing to participate in training and guidance provided by the government and institutions. Currently, most rural youths choose to work in cities, with the majority of those left behind is the elderly. The main source of income for these farmers is agriculture, especially the tea industry. This group will be the main target of training services provided by the current government. In the future, as the conditions for the return of local young people improve, there will be more villagers who are likely to transform into new farmers. Many factors affect farmers' participation in government-provided training, including personal factors, training content, and training methods. To better understand the correlation between various factors and farmers' willingness to participate in training, this article uses the Apriori method to analyze and study them. The Apriori algorithm is a basic idea based on an iterative hierarchical search method. It finds frequent item sets through multiple scans of the database and generates strong association rules based on frequent item sets. The support level of item sets is higher than the minimum support level, and the association rules also need to meet confidence conditions. According to the research questions in the paper, relevant rules such as "voluntary participation in training", "36-65 years old", "basic training content", and "more inclined to on-site teaching" were selected for Information analysis . The variable symbol definition is shown in Table 1.

**Table 1** Symbolic Variable Definitions

| Symbol | a | b | c | d | e |
|---|---|---|---|---|---|
| Definition | voluntary participation in training | 36-65 years old | male | prefer basic training content | prefer on-site teaching |

To make the Information analysis results more reliable, the minimum support and confidence levels are set to 50% and 90%, respectively. After performing multiple cabinet scans of the database, frequent project sets are obtained one by one, as shown in Table 2.

**Table 2** Frequent Project Sets

| Candidate frequent item sets | | Support | Frequent item sets | |
|---|---|---|---|---|
| Candidate frequent item set 1 | C1={{a},{b},{c},{d},{e}} | 76.18%,70.47%,52.61%,79.40 | Frequent item set 1 | L1={{a},{b},{c},{d}} |

| | | | | |
|---|---|---|---|---|
| | | %,48.39% | | |
| Candidate frequent item set 2 | C2={{a,b},{a,c},{a,d},{b,d},{c,d}} | 62.28%,43.67%,51.36%,43.92%,50.87%,50.37% | Frequent item set 2 | L2={{a,b},{a,d},{b,d},{c,d}} |
| Candidate frequent item set 3 | C3={{a,b,d},{a,b,c},{a,d,c},{b,d,c}⇒C3={a,b,d}} | 5.59% | Frequent item set 3 | L3={{a,b,d}} |

According to Table 2, select a set of entries {a, b, d}, and calculate the confidence levels of the corresponding related rules. Calculate the {a} → {a, d} of 72.96%<90%, with a confidence level of 89.24%<90%; {d} The confidence level of {a, b}} is 78.87%<90%; {a, b} → {d} confidence level is 70.31%<90%; The confidence levels of {a, d} → {b}, {b, d} → {a} were 92.41% and 91.52%>90%, respectively. Then, the relevant rules that meet the 90% confidence level, that is, the frequency rules obtained by this study are: {a, d}, {b}, {b, d}, {a}. From the above relevant rules, it can be seen that in general, farmers who are interested in participating in the training are between the ages of 36 and 65, and are more willing to receive basic education. To address the above issues, government training providers need to provide training on basic knowledge content for tea makers, optimize the mix, and innovate to enhance farmers' willingness to participate。

## 3 There is still much room for improvement in the support means and methods of local governments.

After interviews and exchanges with relevant leaders, staff, and village cadres of the local government, we learned that the recognition of Sichuan Red Tea is currently at a slow growth stage, and the local government is also aware of the lack of its own unique tea brand characteristics. It is clear that tea enterprises mainly focus on primary processing, with a single sales channel, large internal competition, low profits, short industrial chains, and little room for profit appreciation. The local government has also done some policy support work and has begun to create a tea cultural atmosphere in the town, create cultural heritage and atmosphere, carry out tea farmers' tea art training, and combine local tourism resources to take the development path of tea tourism. Relying on the name of "Chuanhong Town", creating a regional brand, driving the sales of enterprise-characteristic tea, and increasing the income of tea farmers; Extending the tea industry chain and surrounding industries to attract the return of young talents, there is a great deal of cooperation space between universities and universities, as well as between schools and enterprises. we have put forward some feasible suggestions.

### 3.1 Policy Support

It is recommended to build and promote a small-town brand, carry out special brand series planning, rely on the development of internet technology, take measures to create a Chuanhong small-town brand, form an IP[9], and promote products in the region through different forms through relevant internet platforms. Guide the establishment of specialized industry associations

or professional trading tea enterprises with multiple tea production enterprises. fully utilize internet media technology to actively expand distribution channels and improve pricing rights. The government provides relevant guidance and policy support[10], and without affecting the overall interests of existing tea production enterprises, guides each village to establish specialized tea production cooperatives to improve the quality of tea production and harvesting efficiency in tea gardens. Introduce external intellectual support for tea production enterprises, and provide training on relevant enterprise operations. Aiming at the problems existing in tea picking among tea farmers, specialized technical training is conducted to improve the quality and efficiency of tea picking among tea farmers. The government provides certain resources and external coordination support; Improves the driving role of future tea tourism integration in the local area, and attracts the return of young labor; Actively understands the ideas of tea farmers and provides relevant support and support when possible.

### 3.2 Suggestions on the development of industry enterprises

Take enterprises with high-profit margins as an example, by promoting through various information channels, change existing concepts of other enterprises, and actively expand sales channels outward; Establish its brand and improve the quality level of tea production. Establish trading companies with various production enterprises as shareholders, utilize internet and new media related technologies, create unified brands, expand external markets, and enhance pricing power. Each village establishes tea garden production cooperatives to improve the quality and output of raw tea through training and external technical personnel guidance.

## 4 Conclusion

From the perspective of the existing problems and feasible solutions in the development of the tea industry, we can gain more inspiration. To achieve universality, the support and guidance of local policies for industries and residents should be targeted, implementable, and sustainable. The government's service procedures should be streamlined, Improving the application level of rural informatization, and service literacy should be continuously improved. The improvement of enterprise management and managers' level requires sustained external intellectual support, as well as sustained policy, resource, and talent support to strengthen competitiveness continuously. The talent retention environment in villages and towns, the improvement of residents' ability level, and the enhancement of economic income are also long-term and continuous processes that require the guidance of government policies, an attractive development environment, and the driving force of enterprise growth. The mechanism needs to be continuously optimized to build a long-term and sustainable positive interaction and form an ecological interaction mechanism.

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