Journal of Global Change Data & Discovery. 2021, 5(1): 89-98
DOI:10.3974/geodp.2021.01.12
www.geodoi.ac.cn



# Developing Process of Questionnaire Statistics Dataset from Guangdong-Taiwan Agricultural Cooperative Experimental Area in Shaoguan of China

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**Abstract:** The diffusion of innovative technology is the biggest bottleneck facing the development of agricultural science and technology in China. There is an urgent need to realize the strategy of "storing grain in the ground and storing grain in the technology". It is important to explore the factors influencing the spread of China's Taiwan orchid planting technology in China's Mainland from the perspective of farmers, using the Guangdong-Taiwan Agricultural Cooperation Pilot Zone in Shaoguan city as an example, as well as establishing an index system from three dimensions, namely "farmer dimension", "China's Taiwan agriculture dimension", and environment dimension". A total of 217 valid questionnaires were collected in this questionnaire survey. Each questionnaire contained 25 index data in addition to basic information. In this paper, data collection method, representative analysis, data processing process, and data validity were analyzed.

**Keywords: farmer's perspective; China's Taiwan agricultural technology; influencing factors; structural equation**

**Dataset Availability Statement:**

The dataset supporting this paper was published and is accessible through the *Digital Journal of Global Change Data Repository* at: https://doi.org/10.3974/geodb.2021.01.01.V1.

## 1 Introduction

The issue on agriculture, including agriculture, rural areas, and farmers, is one of keys for China's economic development, it is always the very first arrangement each year during the last 18 years in yearly plan of China. "Implementing fully the strategy of storing grain on the ground and on technology" was put forward in Central Document No. 1, 2017. Meanwhile,

**Received:** 28-12-2020; **Accepted:** 22-02-2020; **Published:** 25-03-2020
**Foundations:** National Natural Science Foundation of China (41771136); Guangdong Provincial Project (GD17CGL13); Fujan Provincial Project (2018R1101006-2); Project of Shaoguan City (2019SN081)
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**Data Citation:** [1] Li, H. F., Wei, S. Q., Wei, S. B. Developing process of questionnaire statistics dataset from Guangdong-Taiwan agricultural cooperative experimental area in Shaoguan of China [J].*Journal of Global Change Data & Discovery*, 2021, 5(1): 89–98. https://doi.org/10.3974/geodp.2021.01.12.
[2] Li, H. F., Wei, S. Q., Wei, S. B. Questionnaire statistics dataset from Guangdong-Taiwan agricultural cooperative experimental area in Shaoguan of China [J/DB/OL]. *Digital Journal of Global Change Data Repository*, 2021. https://doi.org/10.3974/geodb.2021.01.01.V1.

"Promoting the implementation of food storage on the ground and technology" was put forward in Central Document No. 1, 2019. The diffusion of innovative technology is urgently needed to realize the strategy of "storing grain in the ground and storing grain in the technology", and it is the biggest bottleneck facing the development of agricultural science and technology in China today. China has recorded achievements in agricultural science and technology every year, but its conversion rate is significantly low[1]. There are many practical cases on S&T application in Taiwan province's agriculture, which could help for the S&T applications in Guangdong province of China.

The Guangdong-Taiwan Agricultural Cooperation Pilot Zone (Wengyuan Core Zone, hereinafter referred to as the Pilot Zone) in Shaoguan city, Guangdong province, was established in November 2009, which is the fifth Guangdong-Taiwan Agricultural Cooperation Zone in Guangdong province. The development of the orchid industry in the pilot area began in 1998 with the drive of Taiwan province businessmen. Under this drive and the promotion by the local government, the orchid industry in Wengyuan has developed rapidly. In 2018, Wengyuan Orchid Industrial Park became the first provincial modern agricultural industrial park in Guangdong province. At present, the planting area of flowers is 1,787 ha in the Orchid Industrial Park (orchid planting area of 1,200 ha). The park has orchid varieties of more than 1,000, forms about a 10 km long orchid corridor, and has an annual output value of more than 1.8 billion RMB. It has become the largest national orchid production base, and was regarded as "China's orchid town", and "The first county of China's orchid". There are currently 412 enterprises in the park, including one state-level leading poverty alleviation enterprise, four provincial leading agricultural enterprises, 15 municipal leading agricultural enterprises, 46 orchid farmers professional cooperatives, 24 family farms, and 16 high-tech tissue culture, breeding, and seedling enterprises. Currently, 7,785 households participate in the production and management of orchids and other characteristics of modern tourism agriculture, with an average annual income of 15,000 RMB, representing an annual increase in labor income of 45,000 RMB.

## 2 Metadata of the Dataset

Table 1 lists the metadata summary, including dataset title, authors, geographical region , dataset composition, data publishing and sharing service platform, data policy, etc.[2].

## 3 Data Collection Process and Methodology

The collection process of the dataset includes the following steps:

(1) The preparatory stage before the investigation.

First of all, the main job for the dataset development was to design a questionnaire, based on the structural equation model principle, our preliminary investigation, and the existing research literature[4–17], and by consulting with relevant experts (Figure 1). The complete questionnaire includes three parts: the behavior, attitude, and perception of farmers, the input-output data of farmers' orchid planting, and their social network. The data in this paper only involves the first part, namely the behavior, attitude, and perception of farmers, and contains the research hypothesis (Table 2).

(2) Questionnaire survey

Second, the questionnaire survey was conducted from March 2018 to July 2018. A total of 237 questionnaires were collected through centralized questionnaire distribution and dispersed household survey.

**Table 1** Metadata summary of the Questionnaire statistics dataset from Guangdong-Taiwan agricultural cooperative experimental area in Shaoguan of China

| Items | Description |
|---|---|
| Dataset full name | Questionnaire statistics dataset from Guangdong-Taiwan agricultural cooperative experimental area in Shaoguan of China |
| Dataset short name | QuestionnaireStatisticsShaoguan |
| Authors | Li, H. F., School of Tourism and Geography, Shaoguan University, lihangfei1980@126.com<br>Wei, S. Q., Institute of Geography, Fujian Normal University, suqiongwei@126.com<br>Wei, S. B., Institute of Geography, Fujian Normal University, 565059315@qq.com |
| Geographical region | Wengyuan county, Shaoguan city, Guangdong province: 24°07′30″N–24°37′15″N, 113°18′5″E–114°18′5″E |
| Year | 2018 |
| Date format | .xls |
| Date size | 69 KB |
| Date files | Excel data of 217 questionnaires and 25 indicators |
| Foundations | National Natural Science Foundation of China (41771136); Guangdong Province (GD17CGL13); Fujian Province (2018R1101006-2); Shaoguan City (2019Sn081) |
| Data computing environment | The software AMOS 17.0 was used for structural equation analysis |
| Data publisher | Global Change Research Data Publishing & Repository, http://www.geodoi.ac.cn |
| Address | No. 11A, Datun Road, Chaoyang District, Beijing 100101, China |
| Data sharing policy | ***Data*** from the Global Change Research Data Publishing & Repository includes metadata, datasets (in the *Digital Journal of Global Change Data Repository*), and publications (in the *Journal of Global Change Data & Discovery*). ***Data*** sharing policy includes: (1) ***Data*** are openly available and can be free downloaded via the Internet; (2) End users are encouraged to use ***Data*** subject to citation; (3) Users, who are by definition also value-added service providers, are welcome to redistribute ***Data*** subject to written permission from the GCdataPR Editorial Office and the issuance of a ***Data*** redistribution license; and (4) If ***Data*** are used to compile new datasets, the 'ten per cent principal' should be followed such that ***Data*** records utilized should not surpass 10% of the new dataset contents, while sources should be clearly noted in suitable places in the new dataset[3] |
| Communication and searchable system | DOI, DCI, CSCD, WDS/ISC, GEOSS, China GEOSS, Crossref |

(3) Indoor review stage

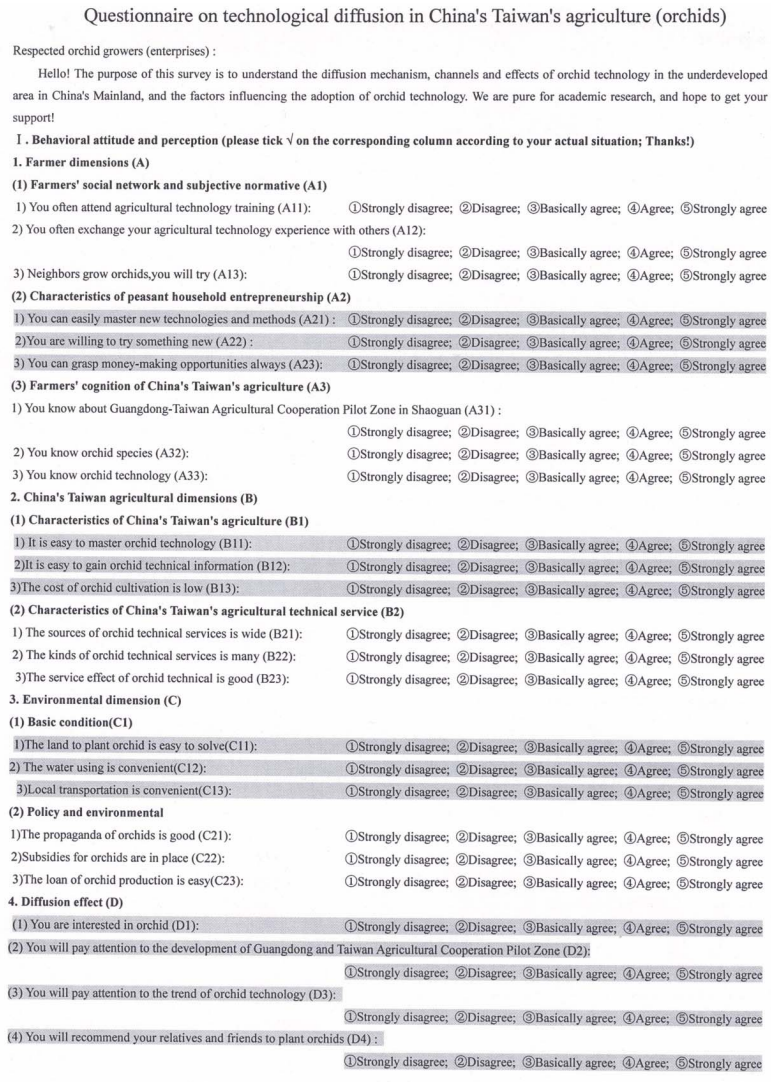
The last step is statistics in combination with the opinions of local village cadres and farmers, we screened the collected questionnaires and identified 217 valid questionnaires. We used a five-point Likert scale (Strongly disagree =1; Disagree =2; Basically agree =3; Agree = 4; Strongly agree =5) to quantify the data, and formed a 217×25 excel data sheet.

## 4 Data Results and Validation

### 4.1 Routine Test of Data

#### **4.1.1** Normal Distribution Test

We determined (Table 3) that the absolute value of skewness coefficient of all items (indicators) was less than 1; the absolute value of kurtosis coefficient of all items (indicators) was also less than 1, showing that the sample data met normal distribution[18].



Questionnaire on technological diffusion in China's Taiwan's agriculture (orchids)

Respected orchid growers (enterprises) :

Hello! The purpose of this survey is to understand the diffusion mechanism, channels and effects of orchid technology in the underdeveloped area in China's Mainland, and the factors influencing the adoption of orchid technology. We are pure for academic research, and hope to get your support!

**Ⅰ. Behavioral attitude and perception (please tick √ on the corresponding column according to your actual situation; Thanks!)**

**1. Farmer dimensions (A)**

**(1) Farmers' social network and subjective normative (A1)**

1) You often attend agricultural technology training (A11): ①Strongly disagree; ②Disagree; ③Basically agree; ④Agree; ⑤Strongly agree

2) You often exchange your agricultural technology experience with others (A12): ①Strongly disagree; ②Disagree; ③Basically agree; ④Agree; ⑤Strongly agree

3) Neighbors grow orchids,you will try (A13): ①Strongly disagree; ②Disagree; ③Basically agree; ④Agree; ⑤Strongly agree

**(2) Characteristics of peasant household entrepreneurship (A2)**

1) You can easily master new technologies and methods (A21) : ①Strongly disagree; ②Disagree; ③Basically agree; ④Agree; ⑤Strongly agree

2)You are willing to try something new (A22) : ①Strongly disagree; ②Disagree; ③Basically agree; ④Agree; ⑤Strongly agree

3) You can grasp money-making opportunities always (A23): ①Strongly disagree; ②Disagree; ③Basically agree; ④Agree; ⑤Strongly agree

**(3) Farmers' cognition of China's Taiwan's agriculture (A3)**

1) You know about Guangdong-Taiwan Agricultural Cooperation Pilot Zone in Shaoguan (A31) : ①Strongly disagree; ②Disagree; ③Basically agree; ④Agree; ⑤Strongly agree

2) You know orchid species (A32): ①Strongly disagree; ②Disagree; ③Basically agree; ④Agree; ⑤Strongly agree

3) You know orchid technology (A33): ①Strongly disagree; ②Disagree; ③Basically agree; ④Agree; ⑤Strongly agree

**2. China's Taiwan agricultural dimensions (B)**

**(1) Characteristics of China's Taiwan's agriculture (B1)**

1) It is easy to master orchid technology (B11): ①Strongly disagree; ②Disagree; ③Basically agree; ④Agree; ⑤Strongly agree

2)It is easy to gain orchid technical information (B12): ①Strongly disagree; ②Disagree; ③Basically agree; ④Agree; ⑤Strongly agree

3)The cost of orchid cultivation is low (B13): ①Strongly disagree; ②Disagree; ③Basically agree; ④Agree; ⑤Strongly agree

**(2) Characteristics of China's Taiwan's agricultural technical service (B2)**

1) The sources of orchid technical services is wide (B21): ①Strongly disagree; ②Disagree; ③Basically agree; ④Agree; ⑤Strongly agree

2) The kinds of orchid technical services is many (B22): ①Strongly disagree; ②Disagree; ③Basically agree; ④Agree; ⑤Strongly agree

3)The service effect of orchid technical is good (B23): ①Strongly disagree; ②Disagree; ③Basically agree; ④Agree; ⑤Strongly agree

**3. Environmental dimension (C)**

**(1) Basic condition(C1)**

1)The land to plant orchid is easy to solve(C11): ①Strongly disagree; ②Disagree; ③Basically agree; ④Agree; ⑤Strongly agree

2) The water using is convenient(C12): ①Strongly disagree; ②Disagree; ③Basically agree; ④Agree; ⑤Strongly agree

3)Local transportation is convenient(C13): ①Strongly disagree; ②Disagree; ③Basically agree; ④Agree; ⑤Strongly agree

**(2) Policy and environmental**

1)The propaganda of orchids is good (C21): ①Strongly disagree; ②Disagree; ③Basically agree; ④Agree; ⑤Strongly agree

2)Subsidies for orchids are in place (C22): ①Strongly disagree; ②Disagree; ③Basically agree; ④Agree; ⑤Strongly agree

3)The loan of orchid production is easy(C23): ①Strongly disagree; ②Disagree; ③Basically agree; ④Agree; ⑤Strongly agree

**4. Diffusion effect (D)**

(1) You are interested in orchid (D1): ①Strongly disagree; ②Disagree; ③Basically agree; ④Agree; ⑤Strongly agree

(2) You will pay attention to the development of Guangdong and Taiwan Agricultural Cooperation Pilot Zone (D2): ①Strongly disagree; ②Disagree; ③Basically agree; ④Agree; ⑤Strongly agree

(3) You will pay attention to the trend of orchid technology (D3): ①Strongly disagree; ②Disagree; ③Basically agree; ④Agree; ⑤Strongly agree

(4) You will recommend your relatives and friends to plant orchids (D4) : ①Strongly disagree; ②Disagree; ③Basically agree; ④Agree; ⑤Strongly agree

**Figure 1** The questionnaire

**Table 2** Research hypothesis

| Dimension | Latent variable | Research hypothesis |
|---|---|---|
| Farmers dimension (A) | Peasant household social network and subjective norm (A1) | HA1: Farmers' social networks and subjective norms had positive effect on orchid diffusion |
| | Characteristics of farmers' entrepreneurship(A2) | HA2: The characteristics of household entrepreneurship had positive effect on orchid diffusion |
| | Farmers' cognition to China's Taiwan agriculture (A3) | HA3: Farmers' cognition to China's Taiwan's agriculture had positive effect on orchid diffusion |
| Agricultural dimensions in China's Taiwan (B) | Agricultural Characteristics of China's Taiwan (B1) | HB1: Agricultural characteristics in China's Taiwan had positive effect on orchid diffusion |
| | The characteristics of agricultural technical service in China's Taiwan (B2) | HB2: The characteristics of agricultural technical services had positive effect on orchid diffusion |
| Environmental dimensions (C) | Basic conditions (C1) | HC1: Basic conditions had positive effect on orchid diffusion |
| | Policy environment (C2) | HC2: Policy environment had positive effect on orchid diffusion |
| Diffusion effect (D) | | |

**Table 3** Skewness and kurtosis values of sample data

| Item | Skewness | Kurtosis | Item | Skewness | Kurtosis | Item | Skewness | Kurtosis |
|---|---|---|---|---|---|---|---|---|
| A11 | –0.795 | 0.571 | B11 | –0.116 | –0.448 | C21 | –0.187 | –0.314 |
| A12 | –0.600 | 0.042 | B12 | –0.098 | –0.780 | C22 | –0.091 | –0.778 |
| A13 | –0.337 | 0.156 | B13 | 0.089 | –0.554 | C23 | –0.061 | –0.375 |
| A21 | –0.473 | 0.415 | B21 | –0.233 | –0.104 | D1 | –0.439 | –0.369 |
| A22 | –0.601 | 0.246 | B22 | –0.405 | –0.243 | D2 | –0.508 | 0.038 |
| A23 | –0.169 | –0.058 | B23 | –0.122 | –0.499 | D3 | –0.779 | 0.357 |
| A31 | –0.068 | –0.178 | C11 | 0.259 | –0.650 | D4 | –0.689 | 0.109 |
| A32 | 0.074 | –0.255 | C12 | –0.254 | –0.471 | | | |
| A33 | 0.198 | –0.616 | C13 | –0.431 | –0.043 | | | |

**4.1.2** Reliability and Validity Test

(1) Reliability Test

Internal consistency reliability analysis is a common method for reliability analysis, and "Cronbach's α" coefficient is the most widely used. Generally, if the coefficient is greater than 0.9, the reliability is excellent; above 0.8 is considered to be very good, and above 0.7 is moderate, while 0.5 is the critical value[18]. SPSS19.0 software was used to conduct the reliability analysis on various factors and overall data. The result indicated that the reliability test met the requirements (Table 4).

**Table 4** Reliability test results

| Inspection factors | Cronbach's α | Inspection factors | Cronbach's α |
|---|---|---|---|
| Peasant household social network and subjective norm | 0.676 | Infrastructure | 0.708 |
| Characteristics of farmers' entrepreneurship | 0.706 | Policy environment | 0.770 |
| Farmers' cognition to China's Taiwan agriculture | 0.788 | Diffusion effect | 0.865 |
| Agricultural Characteristics of China's Taiwan | 0.802 | The overall data | 0.936 |
| The characteristics of agricultural technical service of China's Taiwan | 0.856 | | |

(2) Validity Test

SPSS19.0 software was used to test the validity of the sample data in the dataset development, the KMO value was 0.907, greater than 0.9. The significance level of Bartlett's sphericity test was 0.000, and the validity of the sample data was good (Table 5).

**Table 5** Validity test

| Test methods | | Results |
|---|---|---|
| Kaiser-Meyer-Olkin | | 0.907 |
| Bartlett's test for sphericity | The approximate chi-square | 3,355.302 |
| | df | 300 |
| | Sig. | 0.000 |

**4.1.3** Multicollinearity Test

The correlation coefficient matrix R diagnosis method was used to conduct multivariate collinearity test for the sample data. The results showed that the value of the correlation between variables was between 0.064 and 0.650, and that the correlation coefficients of most variables were less than 0.4, indicating that there was basically no multivariate collinearity problem among the variables in the questionnaire[18].

## 4.2 Structural Equation Model (SEM) Data Verification

**4.2.1** Test of Latent Model Data

Structural equation analysis software Amos17.0 was used to test the data of the latent variable model A1 (the test method of the other latent variable such as A2, A3, B1, B2, C1, C2,

and D is similar), and the results are shown in Figure 2.

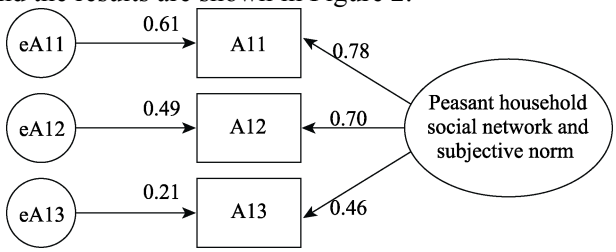



**Figure 2** Standardization path coefficient diagram of peasant household social network and subjective normative latent variable (A1) model

As shown in Figure 2, the path coefficient of A13, at 0.46, was the smallest but was greater than 0.4, indicating that the model quality was good[19]. The model fitting results (the relevant fitting standards are shown in Table 6) showed that the root mean square residual (RMR)=0.00<0.05, GFI=1.00>0.90, normal fit index (NFI)=1.00>0.90, incremental fit index (IFI)=1.00>0.90, and comparative fit index (CFI)=1.00>0.90, indicating that the model was reasonable. In addition, the regression analysis results showed that, except for the reference index A13, which was set as 1 and not estimated, the other regression coefficient values were all significant (significance level was 0.001), indicating that the inherent quality of the model was good[19]. The data test of the other seven latent models is similar, and the intrinsic qualities of the eight latent models were all good. All of them passed the significance test.

**Table 6** Commonly used fitting indexes

| Fitting index | RMR | GFI | NFI | IFI | CFI |
|---|---|---|---|---|---|
| Adaptability criteria or thresholds | ＜0.05 | ＞0.90 | ＞0.90 | ＞0.90 | ＞0.90 |

### **4.2.2** Confirmatory Factor Test

Constructive factor analysis was conducted on the sample data to test whether the relationship between the latent variables conforms to the theoretical requirements of the structural equation model, to judge whether it is acceptable or not. Due to limited space, only the peasant household dimension was taken as an example here, as the other two dimensions are similar.

First, we performed the model quality evaluation; the test method we used is consistent with the "latent model data test" method. The peasant household dimension includes three potential variables: peasant household social network and subjective norms, peasant household entrepreneurial characteristics, and peasant household's cognition to China's Taiwan agriculture. All three potential variables passed the test. Amos17.0 software was used to conduct the confirmatory test on the correlation of the three potential variables under the farmer dimension. The model fitting results showed that RMR=0.053>0.05, GFI=0.953> 0.90, NFI=0.915>0.90, IFI=0.954>0.90, CFI=0.953>0.90, indicating that the model fitting was ideal. The correlation coefficients were 0.58, 0.41, and 0.44 respectively (Figure 3), all of which passed the test at the significance level of 0.001. The model thus had good internal quality and was acceptable[19].

Second, we conducted the reliability test for the latent variables. The higher the reliability, the stronger is the internal correlation between the observation indicators, and the higher is the convergence degree of the latent variables. It is generally believed that its value should be above 0.6[18]. The calculation formula of reliability is shown in Equation (1).

$$\rho_c = (\sum\lambda)^2/[\ (\sum\lambda)^2+\sum\theta] \quad (1)$$

In Equation (1), $\rho_c$ is the reliability; $\lambda$ is the normalized parameter of the observed variable on the potential variable, namely the path coefficient. $\theta$ is the amount of error variation of the observed index variable. According to the path coefficient values of the ob-

served variables in Figure 3 (A11 was 0.75) and equation (1), the reliability $\rho_c$ values of the potential variables in the farmer household dimension were 0.691,4, 0.728,9, and 0.798,0, respectively, which are all greater than 0.6. The potential variables thus had a good convergence degree.

Third, we tested for the discriminant validity between the latent variables. In the structural equation model, the relationship between latent variables should be low-grade relevant or show significant differences. In general, the method of average amount of variance extraction is used to test (compare) whether the average variation extraction ($\rho_v$) of two potential variables is greater than the square of the correlation coefficient. If the average is larger, it shows there is an obvious difference between variables. The calculation method of $\rho_v$ is shown in Equation (2).

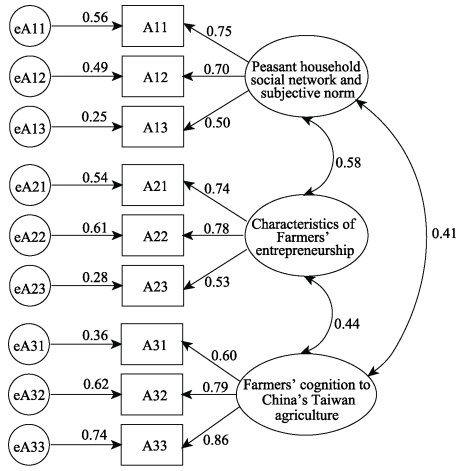



**Figure 3** Standardized path coefficient diagram of confirmatory factor analysis model of peasant household dimension

$$\rho_v=\sum\lambda^2/(\sum\lambda^2+\sum\theta) \quad (2)$$

In Equation (2), $\rho_v$ is the extraction amount of the mean variance of the potential variable. $\lambda$ is the normalized parameter of the observed variable on the potential variable, namely the path coefficient. $\theta$ is the amount of error variation of the observed index variable. According to Equation (2), the average variation extraction amount $\rho_v$ of each factor was calculated and the mean value was calculated. Combining with the correlation value of the three potential variables in Figure 3, the discriminant validity among the three potential variables was tested. The results are shown in Table 7.

**Table 7** Differential validity test of the three latent variables under the farmer household dimension

| Dimension | Factor (potential variable) | Peasant household social network and subjective norm | Characteristics of farmers' entrepreneurship |
|---|---|---|---|
| Characteristics of farmers' entrepreneurship | $r(r^2)$ | 0.58(0.35) | |
| | $(\rho_v)$ | (0.48, 0.43) | |
| | $\overline{\rho}_v$ | 0.46 | |
| Farmers' cognition to China's Taiwan agriculture | $r(r^2)$ | 0.41(0.17) | 0.44(0.19) |
| | $(\rho_v)$ | (0.57, 0.43) | (0.57, 0.48) |
| | $\overline{\rho}_v$ | 0.50 | 0.53 |

Note: $r$ is the correlation coefficient between factors, $r^2$ is the square of the correlation coefficient, $\rho_v$ is the extraction amount of mean variance, $\overline{\rho}_v$ is the mean of the extraction amount of mean variance.

From the above analysis, the three latent variables under peasant household dimension were verified by confirmatory analysis. Similarly, the latent variables under Taiwan provinceagricultural dimension and the environmental dimension were validated.

### **4.2.3** Influencing Factors of Diffusion Effect Test

In order to verify the theoretical hypothesis in Table 1 with confirmatory factor analysis, the relationship between factors under the farmer dimension, Taiwan province agriculture dimension and environment dimension and diffusion effect should be verified by a full model. Due to space limitation, this paper only considered the peasant household dimension to conduct a full model analysis. The correlation fitting index of the model was as follows:

RMR=0.058> 0.05, GFI=0.926>0.90, NFI=0.90, IFI=0.946>0.90, CFI=0.945 > 0.90, indicating that the fitting result was relatively ideal.

Table 8 shows the significance test results of the whole model (estimation results of each parameter). Figure 4 is the full model diagram of the standardized path coefficient. In Figure 4, 0.68 on the right of "diffusion effect" is the square of the multiple correlation coefficient of the structural equation, representing the variation percentage, indicating that the internal potential variable "diffusion effect" can be explained by the external potential.

**Table 8** Estimation results of parameters

| Estimated item | Non-standardized estimates | Value of *P* |
|---|---|---|
| Diffusion effect <--- Peasant household social network and subjective norm | 1.042 | *** |
| Diffusion effect <--- Characteristics of farmers' entrepreneurship | –0.155 | 0.293 |
| Diffusion effect <--- Farmers' cognition to China's Taiwan agriculture | 0.290 | *** |
| A13<--- Peasant household social network and subjective norm | 1.000 | |
| A12<--- Peasant household social network and subjective norm | 1.382 | *** |
| A11<--- Peasant household social network and subjective norm | 1.404 | *** |
| A23<--- Characteristics of farmers' entrepreneurship | 1.000 | |
| A22<--- Characteristics of farmers' entrepreneurship | 1.463 | *** |
| A21<--- Characteristics of farmers' entrepreneurship | 1.287 | *** |
| A33<--- Farmers' cognition to China's Taiwan agriculture | 1.000 | |
| A32<--- Farmers' cognition to China's Taiwan agriculture | 0.828 | *** |
| A31<--- Farmers' cognition to China's Taiwan agriculture | 0.675 | *** |
| D4<--- Diffusion effect | 1.000 | |
| D3<--- Diffusion effect | 1.107 | *** |
| D2<--- Diffusion effect | 1.062 | *** |
| D1<--- Diffusion effect | 1.143 | *** |
| Peasant household social network and subjective norm <--> Characteristics of farmers' entrepreneurship | 0.137 | *** |
| Characteristics of farmers' entrepreneurship <--> Farmers' cognition to China's Taiwan agriculture | 0.178 | *** |
| Peasant household social network and subjective norm <--> Farmers' cognition to China's Taiwan agriculture | 0.163 | *** |

Note: *** indicates that *P* value is less than 0.001; 2. Standardization estimates were shown in Figure 4.

Figure 4 and Table 8 show that farmers' social network and subjective norms, as well as farmers' cognition of Taiwan province agriculture, had a positive and significant impact on the technological diffusion of Taiwan province agriculture (regarding orchids). The hypothesis presented in Table 1 thus passed the test. However, the characteristic factors of peasant household entrepreneurship did not pass the significance test at the level of 0.05. The relationship between the remaining two dimensions and the diffusion effect can be obtained through similar methods. The test results are shown in Table 9.

## 5 Discussion and Summary

Based on the principle of structural equation modeling, this study constructed index systems influencing the effect of Taiwan province agriculture (orchid) technology diffusion from three dimensions: farmers dimension (farmers' social networks and subjective norms, characteristics of farmers' entrepreneurship, farmers' cognition of Taiwan province agriculture), Taiwan province agriculture dimension (characteristics of Taiwan province agriculture, characteristics of Taiwan province agricultural technology service), and environment dimension (basic conditions, policy environment). A total of 217 valid questionnaires were collected through a questionnaire survey. Each questionnaire contained the qualitative data of

25 observation variables. The subjective cognition of each observation variable was quantified by a five-point Likert scale. The dataset formed by the questionnaire survey could better explain the factors influencing the Taiwan province orchid technology diffusion effect. This had a reference and guiding significance for the construction of the factors influencing agricultural technology diffusion index and can be used to research related agricultural technology diffusion. As there were many factors affecting the technological diffusion of Taiwan province agriculture (orchids) in the experimental area, this paper only selected a few factors (latent variables) according to the existing research results and the actual situation; the design of the questionnaire and its indicators still need to be further improved.

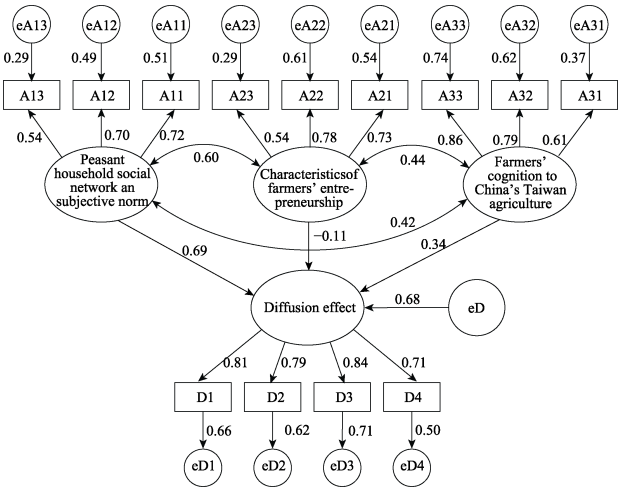



**Figure 4** Standardized path coefficient diagram of the relationship between peasant household dimension and diffusion effect

The results of data analysis and test showed that[20] two external latent variables, the characteristics of peasant household entrepreneurship and policy environment, had no significant influence on the technological diffusion effect of China's Taiwan orchid and failed the significance test. Five potential variables, namely, peasant households' social network and subjective norms, peasant households' cognition of Taiwan province agriculture, agricultural characteristics, agricultural technical service characteristics, and basic conditions, had a positive and significant influence on the technological diffusion effect of Taiwan province orchids in the test area. The results of the data analysis can be used as a reference for the development of the orchid industry in the pilot area. The management committee of the pilot area can formulate corresponding countermeasures according to the specific influencing factors to promote the quick development of the orchid industry.

**Table 9** The result of test

| Hypothesis | Standardized relation coefficient | Value of *P* |
|---|---|---|
| HA1 | 0.69 | *** |
| HA2 | –0.11 | 0.293 |
| HA3 | 0.34 | *** |
| HB1 | 0.49 | *** |
| HB2 | 0.25 | 0.018 |
| HC1 | 0.61 | *** |
| HC2 | 0.18 | 0.313 |

### *Author Contributions*

Li, H. F. and Wei, S. Q. designed the dataset. Li, H. F. and Wei, S. B. contributed to the data processing and participated in the field survey. Li, H. F. wrote the data paper.

### *Conflicts of Interest*

The authors declare no conflicts of interest.

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