

The Influencing Factors of E-commerce Development on Agricultural Products in Gansu Province

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Abstract. Gansu is a major middle west province with rich agricultural products, so it is of great practical significance to develop the e-commerce of agricultural products in Gansu province. By means of quantitative analysis and qualitative analysis (AHP), the main factors affecting the development of agricultural products in Gansu province are analyzed and studied. The results show that the can be seen through the analytic hierarchy process (AHP), trading main body's perception of agricultural e-commerce, degree of agricultural products brand, trading main body information level, the degree of security of e-commerce transactions, the awareness of the trading platform and the degree of the standardization of agricultural products on the impact of developing agricultural e-commerce in Gansu province is significant. Aiming at the factors affecting the development of agricultural e-commerce in Gansu province, put forward relevant Suggestions: (1) to strengthen agricultural enterprises in Gansu province, farmers and other agricultural products e-commerce to participate in the main body of training education, increase participation main body of agricultural e-commerce awareness and engagement. (2) to establish standardized agricultural product quality testing system and agricultural product sorting and packaging system to enhance the awareness of agricultural products brand in Gansu province. (3) to formulate relevant electronic business transaction safety regulations and improve the safety awareness of participating subjects. (4) to improve the Internet marketing awareness of e-commerce platforms and strengthen the promotion and promotion of online platforms.

Introduction

Gansu Province, cultivated land and woodland area are ranked first in the country, per capita arable land is about three times higher than the national level, with good prospects for the development of agriculture, however, due to the weak agricultural products, agricultural information itself as well as the asymmetric dispersion and social contradictions in agricultural production market, leading to a variety of difficult to sell phenomenon the relative surplus of agricultural products, structural, seasonal, regional. Due to the advantages of electronic commerce in information collection and dissemination of information, in an open, fair and impartial environment of agricultural products e-commerce can alleviate the current difficulties faced by the trade of agricultural products to a certain extent. Developing e-commerce of agricultural products is not only the need of developing the trade of agricultural products in Gansu, but also the necessity of conforming to the development of the times. However, due to various factors, the development of e-commerce of agricultural products in Gansu province is still faced with some difficulties, analysis of various factors affecting the development of e-commerce of agricultural products in Gansu Province, to help provide for the exchange of views of agricultural products in Gansu province the smooth development of the e-commerce. Because of the many factors that influence the development of e-commerce of agricultural products in Gansu province the number, and most of them do not have accurate indicators, it is difficult to achieve accurate quantitative analysis. Analytic hierarchy process (AHP) is a method of combining qualitative analysis with quantitative analysis. Through this method, the main factors that affect the development of e-commerce of agricultural products in Gansu province are analyzed and studied.

Model establishment

Random sampling survey of Gansu province through farmers, agricultural enterprises and agricultural economic management experts, a total of 208 questionnaires, 176 valid questionnaires, under the guidance of experts, a comprehensive collation and analysis, using AHP to analyze the influential factors. The level of the main factors affecting the development of e-commerce of agricultural products in Gansu Province, the overall goal for the A layer, the main factors for the B layer, the main factors for the decomposition of the C layer, a hierarchical structure model (see Figure 1).

Figure 1: Hierarchical structural model

Aim layer A	layer B	layer C
Main factors of e-commerce development of agricultural products in Gansu	B1:influencing factor of transaction subject	C1:Understanding of e-commerce of agricultural products
		C2: The informatization level of the trading entity
	B2:influencing factor of transaction object	C3:The scale of production of agricultural products
		C4:The degree of labeling of agricultural products
		C5:The degree of branding of agricultural products
	B3:influen cing factor of trading platform	C6:The degree of standardization of agricultural products transactions
		C7: Design level of trading platform
		C8: Popularity of trading platform
	B4:Influencing factors of trading environment	C9: The degree of development of electronic payment instruments
		C10:The security level of e-commerce transactions
		C11:Development degree of agricultural product logistics
		C12:Credit environment of agricultural products trading

Construct two Comparison Judgment Matrix

Design Judgment Scales. According to the scale of the B layer factors and the C layer of the importance of each factor between 22 to determine the importance of the comparison, the scale is shown in Table 1.

The Two Factors and Comparing the Judgment Result. According to the calibration table, through the questionnaire, the importance of the factors of 22 comparative analysis, collation, analysis on the removal of invalid data, between the same level factors construct 22 comparison judgment matrix, and to determine the matrix elements assignment (see Table 2, Table 3, Table 4, Table 5 and Table 6).

Table 1 scale method

1-9 scale	The relative importance of the two sub-elements
1	Equally important
3	Moderately important with one over another
5	Strongly important
7	Very strongly important
9	Extremely important
2,4,6,8	Intermediate values

Table 2 the comparison of the important degree of B Layer factors

item	B1	B2	B3	B4
B1	1	3	7	5
B2	1/3	1	4	2
B3	1/7	1/4	1	1/2
B4	1/5	1/2	2	1

Table 3 the comparison of the important degree of C layer factors under the trade subject factor B1

item	C1	C2
C1	1	3
C2	1/3	1

Table 4 the comparison of the important degree of C layer factors under the trade subject factor B2

item	C3	C4	C5
C3	1	1/2	1/7
C4	2	1	1/5
C5	7	5	1

Table 5 the comparison of the important degree of C layer factors under the trade subject factor B3

item	C6	C7	C8
C6	1	4	1/4
C7	1/4	1	1/8
C8	7	8	1

Table 6 the comparison of the important degree of C layer factors under the trade subject factor B4

item	C9	C10	C11	C12
C9	1	1/6	1/2	1/4
C10	6	1	4	2
C11	2	1/4	1	1/2
C12	4	1/2	2	1

Calculation weight

The main weight of the selection and method is the formula as $W_{i, sum} = \frac{1}{n} \sum_{j=1}^n \frac{a_{ij}}{\sum_{k=1}^n a_{kj}}$

Calculate the weight of each element in the B layer. According to the formula we have

$W_i^B = (0.597, 0.233, 0.067, 0.121)$, That is to say, the total order of the factors in the B layer is the trading body, the influencing factors B1, the trading object, the influencing factors B2, the trading environment, the influencing factors B4, the trading platform and the influencing factors B3.

Calculates the weight of each element in the C layer relative to the B layer element. According to the formula we have

$W_c^{B_1} = (0.75, 0.25)$ $W_c^{B_2} = (0.094, 0.168, 0.738)$ $W_c^{B_3} = (0.227, 0.072, 0.072)$ $W_c^{B_4} = (0.074, 0.512, 0.138, 0.275)$

Calculates the weight of each element in the C layer relative to the B layer element. According to $W_i^B (i=1,2,3,4)$ and $W_k^C (k=1,2,3 \dots 12)$, According to the group, the weights of the C layer elements relative to the C layer are calculated, namely, the influence degree of C layer factors on the e-commerce of agricultural products

$W_c^A = (0.434, 0.145, 0.022, 0.039, 0.172, 0.015, 0.005, 0.047, 0.009, 0.062, 0.017, 0.033)$

The total ordering of the factors of C layer is subject to the transaction of e-commerce of agricultural products, agricultural products of the cognitive C1 brand of C5, the main trading information level C2, the electronic commerce transaction security level C10, the visibility of the C8 trading platform of agricultural products, the degree of standardization of agricultural products, the credit transaction C4 C12 environment, agricultural production scale C3, agricultural products logistics development level of C11, the trade of agricultural products standardization degree of C6, electronic means of payment, the development degree of C9, the design level of C7 trading platform.

Consistency Test

Computational Procedure. (1) the two comparison judgment matrix is multiplied by its characteristic vector (weight), and the resulting vector is called weighted sum vector.

(2) the weight of each weight and vector is divided by the component of the corresponding eigenvector (weight), that is, the weight of the I weight and the component of the vector are divided by the component of the I eigenvector.

(3) calculate the average of the second step results, that is, lambda max.

(4) Computational consistency index CI,

$$CI = \frac{\lambda_{max} - n}{n - 1}$$

(5) Calculated consistency rate, CR

$$CR = \frac{CI}{RI}$$

Among them, RI is the average random consistency index, and the value of RI depends on the number of comparison items (see Table 7).

Table 7 the consistency index numerical value of mean random

dimensionality	1	2	3	4	5	6	7	8	9
RI	0	0	0.58	0.9	1.12	1.24	1.32	1.41	1.45

If $CR < 0.1$, Express satisfactory consistency by means of consistency check.

Calculation result. (1) the calculation steps available, consistent B layer factors were: $CR = 0.012 < 0.1$, the consistency test; consistency factor B1 under the C layer rate is: $CR = 0 < 0.1$, the consistency test; consistency factor B2 under the C layer rate is: $CR = 0.016 < 0.1$, the consistency test; consistency factor B3 under the C layer rate is: $CR = 0.05 < 0.1$, the consistency test; consistency factor B4 under the C layer rate is: $CR = 0.039 < 0.1$, through the consistency test.

(2) Consistency test of C layer factor relative to A (target layer) layer:

$$CR = \frac{b_1CI_1 + b_2CI_2 + b_3CI_3 + b_4CI_4}{b_1RI_1 + b_2RI_2 + b_3RI_3 + b_4RI_4}$$

and $b_i (i=1,2,3,4)$ is the Weights for each factor of the B layer, and

$$CI_i (i=1,2,3,4).$$

For the C layer on the upper layer (B layer) factors factors of single level sequencing consistency index, average random consistency index is calculated by RIi, C, A (layer factors relative to the target layer) consistency test layer rate: $CR = 0.028 < 0.1$, through the consistency test.

Conclusions and Suggestions

Through the analytic hierarchy process can be seen, the transaction subject to the e-commerce of agricultural products, agricultural products brand cognitive degree, transactions subject to the level of information, e-commerce transaction security, transaction platform visibility, agricultural products standardization and other factors on the development of Gansu Province agricultural product electronic commerce has remarkable effect. According to the factors influencing the development of e-commerce

of agricultural products in Gansu Province, we hereby put forward the opinions: (1) to strengthen the training and education of Gansu province in the main agricultural enterprises, farmers and other agricultural products e-commerce, improve the participation awareness of agricultural products e-commerce and participation. (2) establishing standardized agricultural product quality testing system and sorting and packaging system of agricultural products, so as to enhance the brand awareness of agricultural products in Gansu. (3) formulate relevant e-commerce transaction security regulations, and improve the safety consciousness of the participants. (4) raise the awareness of e-commerce platform online marketing, and strengthen the publicity and promotion of the network platform.

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