Study on the Perceived Risk about the Online Shopping for Fresh Agricultural Commodities and Customer Acquisition

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Abstract Fresh agricultural commodities have been entering the era of network marketing. However，the coverage population is still relatively small. In this paper，more than 400 online shopping customer survey data are statistically analyzed based on perceived risk multidimensional model by factor analysis method to classify the potential customers' perceived risk，concluding that food safety risks，mental health risk，relative convenience risk，liquidity risk，privacy risk and time risk are the most important risk factors that impact potential customers online shopping of fresh agricultural commodities. By using customers prediction model which is based on the classification and prediction methods to mining potential customers，it comes to the conclusion that men are more likely to purchase fresh agricultural commodities online，specifically，in the male sample，those whose average monthly net purchase cost equals to or is higher than 51 yuan or whose online shopping time equals to or is longer than 3 years and at the same time whose age is younger than 30 are the most potential customers. Finally，it puts forward corresponding countermeasures and suggestions from the perspectives of risk control and effective customer acquisition.

Key words Online shopping for fresh agricultural commodities，Potential customers，Perceived risk，Customer acquisition

1 Introduction

According to the latest statistics of 2012 *China's Online Shopping Market Research Report*，China's online shopping transaction volume reached 1.2594 trillion yuan in 2012，an increase of 66.5% over 2011，and the trade volume accounted for 6.1% of the total sales of social consumer goods；65% of users said that the online shopping reduced the shopping frequency[1]. With the continuous progress of logistics and Internet of things，the fresh agricultural commodities have also entered into the network platform，providing a new shopping choice for the majority of Internet users. By the online purchase，the customers can simply move the mouse to buy the freshest quality-traceable fruits，vegetables，meat and eggs at the best prices.

According to the relevant statistics released by Alibaba，the growth rate of fresh fruits and aquatic products purchased online in China was about 400% in 2012，and as of the end of 2012，there were more than 1.63 million network stores in Taobao and Tmall registered in the county，township and village，of which 0.26 million sold agricultural products，involving 10.04 million agricultural commodities[2]. According to the survey of Wuhan Evening News，currently there are 0.12 million people in Wuhan having access to "online vegetables"，involving 500 residential quarters.

Compared with the traditional purchase patterns of fresh products，the online shopping reduces the circulation links of supermarkets，distributors and wholesalers，and the price is nearly 30 percent cheaper than that of the traditional stores. Through the online order mode，it can connect the production and marketing，

which can help farmers to avoid blind production，and solve the marketing problems of fresh agricultural commodities.

However，the current online shopping for fresh agricultural commodities still narrowly covers people. According to the survey results of Zou Jun[3] in 2011，69% of people were willing to try the online shopping for fresh agricultural commodities，while 31% of customers made it clear that they were not willing to try the online shopping for fresh agricultural commodities.

Then is it possible that the online shopping for fresh agricultural commodities becomes the third largest purchase channel of fresh agricultural commodities after the farmer market and supermarkets？Compared with the traditional purchasing channels，what online shopping risks can be perceived by the potential customers？What kind of potential customers can become the main groups of online shopping fresh agricultural commodities after acquisition？What measures should be taken to encourage the targeted groups to try the online shopping for fresh agricultural commodities？This article will look for the answers through survey.

2 Literature review

Risk perception is the subjective judgment that people make about the characteristics and severity of a risk. The phrase is most commonly used in reference to natural hazards and threats to the environment or health，such as nuclear power. Several theories have been proposed to explain why different people make different estimates of the dangerousness of risks. Three major families of theory have been developed：psychology approaches，anthropology and sociology approaches（cultural theory）and interdisciplinary approaches（social amplification of risk framework）.

In the management science，it is often used to study the psychological and behavioral patterns of customers. There are many foreign studies on the customers' perceived risk，and it is believed

that the shopping pattern is an important factor triggering the risk[4].

After 20 years of research, the foreign scholars have classified the perceived risk of online shopping. In the 1990s, the western scholars divided the online shopping risk into financial risk, performance risk, social risk, payment risk, and privacy risk. Later with the continuous development of online shopping, the western scholars re-divided it on the basis of previous risk dimensions into economic risk, performance risk, psychological risk and time risk[5]. Time dimension is added to reflect the uniqueness of online shopping relative to other traditional buying patterns.

Moreover, Featherman[6], Machal, Ellen G et al[7] carried out different division of perceived risk in their respective areas of research. Even though their division is not the same, the division is based on the product characteristics, which provides a reference for the study in this article.

For risk mitigation measures, the domestic and foreign scholars have performed the interpretation from different angles, and a large number of empirical studies have found that reputation, brand loyalty, the relevant certificates and other strategies, play more important role than money back guarantee in reducing the customers' perceived risk. Anne Sophie from remote trading, network, website and product proposes 18 kinds of effective risk mitigation measures, and sequences the measures in terms of usefulness in descending order; he thinks that the secure payment is the most effective risk mitigation measure.

In recent years, there are abundant researches on online shopping risk at home. On the basis of the related foreign researches, some scholars classify the online shopping risk based on the Chinese culture, commodity characteristics and population characteristics. Sun Xiang et al[8] believe that customers' perceived risk under the B2C environment can be divided into interface risk, independent risk, authenticity risk, product risk, time risk, information search risk, return and exchange risk, and mutual risk of buyers and sellers. Through the empirical analysis of the customers' online shopping risk, Li Baoling[9] believes that the current online shopping risk that can be perceived by customers mainly focuses on economy, function, privacy, psychology, time and payment.

Through the empirical analysis of the college students' online shopping behavior, Yang Xiaoju[10] believes that the main risks faced by the college students during the online shopping include information leakage risk, service assurance risk, product function risk, customer psychological risk, and social assessment risk. Liu Beilei et al[11] and Zhou Jiani et al[12] use statistical analysis methods to study the risk mitigation measures, and they believe that guaranteeing the payment security, ensuring the product and service quality, strengthening the communication between buyers and sellers, and appropriate business credit propaganda, are all effective measures to reduce the risk.

The customer acquisition is the process that in the face of the huge custom source information, the marketing staff identify those customers with the greatest potential for development through the data analysis.

There are few studies on the customer acquisition currently in the academic world, but it is used more in practice, and especially in recent years, it is widely applied to the potential customer acquisition in telecommunications, real estate, retail business and other areas. In recent years, with advances in computer information technology, some scholars have started to pay attention to the research and application of customer acquisition, but these studies are mainly focused on the issues related to the development of mining systems.

Currently, there have been already some scholars beginning to focus on customer behavior analysis and decision-making model building, for example, Huang Xiongwei[13] and Peng Jianfang et al[14] use the customer acquisition method to build the online shopping customer behavior model. These studies provide a useful reference for these studies.

3   Data and sample status

The risk survey questionnaire on the online shopping for fresh agricultural commodities is a questionnaire specially designed for the study of risk of online shopping for fresh agricultural commodities, which includes the basic situation of customers' online shopping, the possible risks of online shopping for fresh agricultural commodities, the possible consumers' perceived risk, and the basic information on online shopping customers.

According to the relevant knowledge of mathematical statistics, in the case of sampling error of 5% and confidence level of 95%, if the number of overall survey object is greater than 2000, selecting 400 samples is reasonable. Therefore, in this research, 500 questionnaires are sent out to the Internet users with online shopping experience in major online shopping forums, online shopping QQ groups and online shopping post bars, as well as the residents in the surrounding communities of Wuhan. Finally 447 questionnaires are called back, with response rate of 89.4% and 435 valid questionnaires.

The proportion of male respondents is 58.16% while the proportion of female respondents is 41.84%. The proportion of respondents aged from 21 to 40 years reaches 77.24%; the proportion of respondents working in the business is 53.1%; the proportion of student respondents is 25.97%; the proportion of the staff in the government departments or public institutions is 17.47%.

The proportion of respondents with the experience of online shopping for fresh agricultural commodities is 20%, while the proportion of respondents with no experience of online shopping for fresh agricultural commodities is 80%. The respondents with online shopping experience of more than three years occupy the largest proportion, accounting for more than half of all samples, and the proportion of respondents shopping online 3 to 8 times per month reaches as high as 94.49%. In terms of the average monthly online shopping cost, 51 − 100 yuan and 100 − 500 yuan occupy a large share (concrete results are shown in Table 1).

This article defines those respondents with no experience of online shopping for fresh agricultural commodities as potential customers for study, in order to explore their perception of risk in the face of online shopping for fresh agricultural commodities.

Through the data mining, it explores what potential customers might become the practitioner of the online shopping for fresh agricultural commodities, and puts recommendations for promoting the businesses' customer acquisition and sales.

Table 1　Basic information of respondents

	Individual characteristics	Number of people	Percentage
Sex	Male	253	58.16%
	Female	182	41.84%
Age	20 years and below	56	12.87%
	21 – 30 years	159	36.55%
	31 – 40 years	177	40.69%
	41 – 50 years	39	8.97%
	51 years and above	4	0.92%
Years of education	9 years and below	4	0.92%
	9 – 12 years	96	22.07%
	13 – 17 years	213	48.97%
	17 years and above	122	28.05%
Career	Government or public institution staff	76	17.47%
	Enterprise workers	231	53.10%
	Individual businesses	2	0.46%
	Students	113	25.97%
	Freelancers	13	2.99%
Whether having shopped for fresh agricultural commodities online	Yes	87	20.00%
	No	348	80.00%
The average monthly frequency of online shopping	3 and below	303	69.66%
	4 – 8	108	24.83%
	9 and above	24	5.52%
The average monthly online shopping cost	50 yuan and below	36	8.28%
	51 – 100 yuan	205	47.13%
	101 – 500 yuan	180	41.38%
	501 yuan and above	14	3.22%
Online shopping experience	Less than 1 year	39	8.97%
	1 – 2 years	67	15.40%
	2 – 3 years	105	24.14%
	3 years and above	224	51.49%

In order to verify the reliability of the questionnaire scale, this article uses SPSS software and Cronbach's alpha coefficient estimation method to carry out the internal consistency test of risk perception scale and risk mitigation measure scale (results are shown in Table 2). a coefficient of risk perception scale is 0.894, indicating that scale reliability is high.

The analysis results of 27 items of perceived risk using principal component analysis show that KMO value of the risk scale is 0.894, and the significance of Bartlett sphericity test is 0.000, indicating that the validity of the survey data is good.

Table 2　Reliability and validity test of the risk scale

Risk scale	a coefficient	KMO value	Bartlett sphericity test
Perceived risk	0.894	0.894	0.0

4　Study on the potential customers' perceived risk of the online shopping for fresh agricultural commodities

The statistics show that 80% of customers in the current online shopping group have no experience of online shopping for fresh agricultural commodities, and even many people with 3 years of online shopping experience have not yet shopped for the fresh agricultural commodities online.

Why the customers feel afraid to try the online shopping for fresh agricultural commodities? Based on previous research results, the customers' perceived risk is an important factor affecting their purchase decisions. Then what on earth are these perceived risks?

Determining the risk dimension is the basis for researching the perceived risk issues[15]. In order to explore the possible perceived risks of the online shopping for fresh agricultural commodities, the article, on the basis of previous studies, coupled with the characteristics of fresh agricultural commodities, uses the expert interviews and survey to ultimately conclude a " list of possible customers' perceived risk factors" containing 27 expressions, in order to carry out study from the time risk, commodity quality, customers' mental health, physical health, logistics, information security, economic security and convenience.

This article uses data mining software Clementine to conduct factor analysis of the data, and uses principal component analysis to extract the common factor with eigenvalue of greater than 1. Through the analysis of variance, the risks of online shopping for fresh agricultural commodities perceived by the potential customers are mainly concentrated in 6 aspects, and the 6 factors can explain 68.134% of the variance of all variables (Table 3).

The results from the data mining show that Common Factor 1 mainly covers the issues concerning the product quality and food safety, and it can be named " food safety risk". It may explain 14.687% of the overall variance, and the quality and safety of

fresh agricultural commodities is the risk that the potential customers are most worried about.

Common Factor 2 reflects some cases possibly caused by the form of "online shopping" bringing psychological discomfort to the customers, such as "seeing no real product but picture", "differ-

ences in the size, freshness and other aspects between real product and publicity picture", "anxious waiting for delivery" and "shopping failure", so it is named "mental health risk". It can explain 11.218% of the overall variance, and is the risk factor that the potential customers pay the secondary attention to.

Table 3   Total explained variance

Component	Initial eigenvalue			Rotation sums of squared loading		
	Total	% of Variance	Cumulative∥%	Total	% of Variance	Cumulative∥%
1	6.837	26.294	26.294	3.039	14.687	14.687
2	2.842	12.932	39.226	2.865	12.218	26.905
3	1.836	7.661	46.887	2.530	11.737	38.642
4	1.649	6.544	53.431	2.444	10.828	48.470
5	1.350	5.692	59.123	2.204	9.975	58.245
6	1.021	3.987	67.934	2.134	9.889	68.134
7	0.912	3.709	71.643			
8	0.852	3.386	75.029			
9	0.802	3.284	78.313			

Common Factor 3 reflects the unique risk of the online shopping for "fresh agricultural commodities". The return and exchanges of fresh agricultural commodities are a hassle. Dealing with the deteriorated or damaged goods will cause pollution to the customers' living environment, and at the same time, the products purchased online may not meet the needs of customers for cooking dishes.

After the online shopping, the customers are also likely to buy some dressings from vegetable fair or supermarket, which will cause some inconvenience, so this paper name this risk "relative convenience risk".

Common Factor 4 reflects that compared with the vegetable fairs, supermarkets and other traditional purchasing channels, the possible risks of online shopping for fresh agricultural commodities mainly include the reliability of online payment, and the reliability of logistics process. They can be understood as the cash flow and material flow problems, so it is named "liquidity risk".

Common Factor 5 contains the risks of personal information being leaked or stolen, and shopping habits being tracked, so it is named "privacy risk".

Common Factor 6 reflects the cost and time spent on the information gathering, making of purchasing decisions and communication with the website, so it is named "time risk". This risk reflects that the online shopping brings convenience to customers while consuming the customers' time on product information collection and screening, and this is the information confusion that people have to face in the information age.

The factor loading matrix is as shown in Table 4.

5   The prediction model of customers shopping for fresh agricultural commodities online based on classification and prediction methods

In order to study what kind of customers likely to become the actual customers shopping for fresh agricultural commodities online, this paper uses Exhaustive CHAID algorithm to build the customer

Table 4   The factor loading matrix

Rotated component matrix (a)	Component					
	1	2	3	4	5	6
10	0.782					
13	0.759					
12	0.727					
14	0.713					
7		0.801				
6		0.641				
5		0.638				
9		0.617				
3		0.602				
27			0.747			
24			0.606			
30			0.601			
28			0.585			
29			0.549			
8				0.772		
18				0.755		
16				0.659		
19				0.645		
25				0.606		
20				0.547		
15				0.502		
23					0.877	
22					0.844	
2						0.849
1						0.846
4		0				0.538

prediction model to provide data support for customer acquisition. CHAID is a type of decision tree technique, based upon adjusted significance testing (Bonferroni testing).

The technique was developed in South Africa and was published in 1980 by Gordon V. Kass, who had completed a PhD thesis on this topic. CHAID can be used for prediction (in a similar fashion to regression analysis, this version of CHAID being originally known as XAID) as well as classification, and for detection of interaction between variables. CHAID stands for CHi-squared

Automatic Interaction Detection, based upon a formal extension of the US AID (Automatic Interaction Detection) and THAID (THeta Automatic Interaction Detection) procedures of the 1960s and 70s, which in turn were extensions of earlier research, including that performed in the UK in the 1950s.

In practice, CHAID is often used in the context of direct marketing to select groups of consumers and predict how their responses to some variables affect other variables, although other early applications were in the field of medical and psychiatric research. Like other decision trees, CHAID's advantages are that its output is highly visual and easy to interpret. Because it uses multiway splits by default, it needs rather large sample sizes to work effectively, since with small sample sizes the respondent groups can quickly become too small for reliable analysis.

One important advantage of CHAID over alternatives such as multiple regression is that it is non-parametric. It does not require that the data are normally distributed. Exhaustive CHAID algorithm is the improved CHAID algorithm, presented by Biggs et al, and on the basis of retaining the merits of original CHAID algorithm, it is more conducive to accurately selecting the grouped variables[16].

Before carrying out the classification and prediction, we first make the variable importance analysis of the sample data. Through the condensation and refinement of the samples and variables, we identify those samples and variables important for classification and prediction, and at the same time, remove unimportant samples and variables.

The Clementine variable importance analysis results are as shown in Table 5.

Table 5　Effectiveness of the input variables

Grade	Field	Measurement level	Importance	Value
1	1, 6	Flag	Important	1.000
2	4, 1	Flag	Important	1.000
3	1, 5	Ordinal	Important	0.997
4	4, 2	Ordinal	General	0.912
5	1, 3	Ordinal	General	0.906
6	1, 1	Ordinal	Unimportant	0.869
7	4, 3	Nominal	Unimportant	0.594
8	1, 4	Ordinal	Unimportant	0.338

The above table shows that whether having browsed the sales information about fresh agricultural commodities online, the average monthly online shopping cost, sex, age and the length of online shopping time, are important to predicting whether the customers will try the online shopping for fresh agricultural commodities; the length of time of using the Internet, occupation and the average monthly frequency of online shopping, are of little significance.

With the above important variables as the input variable, and "whether to try the online shopping for fresh agricultural commodities in the future" as the target variable, the Exhaustive CHAID algorithm is used for modeling, and the derived model is shown in Fig. 1.

```
Sex = male [mode: yes] (194)
  The average monthly online shopping cost = 50 yuan and below [mode: will try ] => 1.0 (14; 0.714)
  The average monthly online shopping cost = 51-100 yuan or 101-500 yuan or 501 yuan and above [mode: yes] (180)
    The length of online shopping time = 1 year and below or = 1-2 years or 2-3 years [mode: yes] => 1.0 (75; 0.893)
    The length of online shopping time = 3 years and above [mode: yes] (105)
              Age ≤ 30 years [mode: yes] => 1.0 (97; 1.0)
              Age ≥ 30 years [mode: yes] => 1.0 (8; 0.875)
Sex = female [mode: yes] => 1.0 (154; 0.656)
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Fig. 1　The model based on Exhaustive CHAID algorithm

As shown in Fig. 1, out of 348 samples involved in the analysis, 282 (81.034%) say that they will try the online shopping for fresh agricultural commodities.

The analysis conclusions are as follows:

(i) If it is female (154 samples), then they are willing to try the online shopping for fresh agricultural commodities, and the confidence level is 65.6%.

(ii) If it is male (14 samples), and the average monthly online shopping cost is less than 50 yuan, then they are willing to try the online shopping for fresh agricultural commodities, and the confidence level is 71.4%.

(iii) If it is male (75 samples), the average monthly online shopping cost is 51 yuan and above, and the length of online shopping time is less than 3 years, then they are willing to try the online shopping for fresh agricultural commodities, and the confi-

dence level is 89.3%.

(iv) If it is male (105 samples), the average monthly online shopping cost is 51 yuan and above, and the length of online shopping time is 3 years and above, then they are willing to try the online shopping for fresh agricultural commodities.

On this basis, the age is an important dividing point: the customers aged less than 30 years are more inclined to try the online shopping, with sample size of 97 and confidence level of 100 %, while few of the customers aged more than 30 years are willing to try the online shopping, with sample size of 8 and confidence level of 87.5%.

The specific decision tree is shown in Fig. 2.

As can be seen from the above figure, sex is a very important grouped variable, and the importance degree of this predictor variable is 0.82. In the male samples, 93.299% of them say that
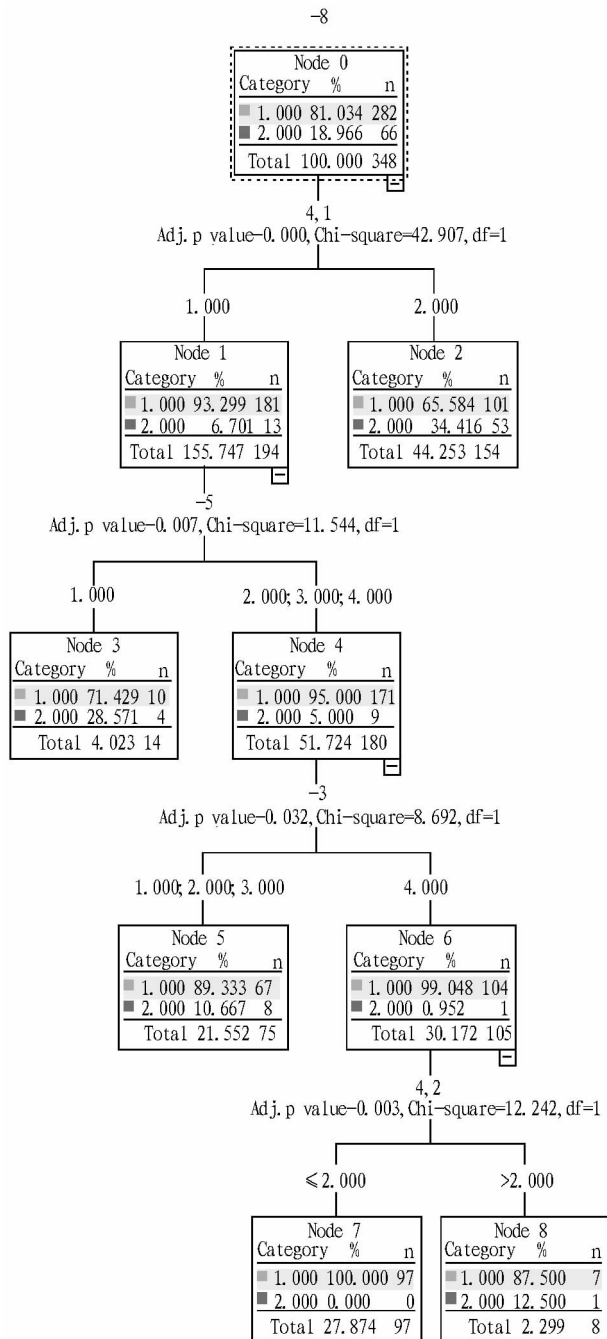
−8

Node 0
Category	%	n
■ 1.000	81.034	282
■ 2.000	18.966	66
Total	100.000	348

4, 1
Adj. p value−0.000, Chi−square=42.907, df=1

1.000   2.000

Node 1
Category	%	n
■ 1.000	93.299	181
■ 2.000	6.701	13
Total	155.747	194

Node 2
Category	%	n
■ 1.000	65.584	101
■ 2.000	34.416	53
Total	44.253	154

−5
Adj. p value−0.007, Chi−square=11.544, df=1

1.000   2.000; 3.000; 4.000

Node 3
Category	%	n
■ 1.000	71.429	10
■ 2.000	28.571	4
Total	4.023	14

Node 4
Category	%	n
■ 1.000	95.000	171
■ 2.000	5.000	9
Total	51.724	180

−3
Adj. p value−0.032, Chi−square=8.692, df=1

1.000; 2.000; 3.000   4.000

Node 5
Category	%	n
■ 1.000	89.333	67
■ 2.000	10.667	8
Total	21.552	75

Node 6
Category	%	n
■ 1.000	99.048	104
■ 2.000	0.952	1
Total	30.172	105

4, 2
Adj. p value−0.003, Chi−square=12.242, df=1

⩽2.000   >2.000

Node 7
Category	%	n
■ 1.000	100.000	97
■ 2.000	0.000	0
Total	27.874	97

Node 8
Category	%	n
■ 1.000	87.500	7
■ 2.000	12.500	1
Total	2.299	8

Fig. 2   **Exhaustive CHAID classification and prediction decision tree**

they will try the online shopping for fresh agricultural commodities; in the female samples, only 65.584% of them say that they will try the online shopping for fresh agricultural commodities.

It indicates that the majority of male netizens are the main force for the online shopping for fresh agricultural commodities in the future, which may be closely related to the transformation of man's social role today. In addition to going to work, the modern men also gradually become the important bearers of housework, and in order to avoid the daily cumbersome purchase of fresh agricultural commodities in the vegetable fairs and supermarkets, more and more men who like convenience and adventure become the leading role in the online shopping for fresh agricultural commodities. For women, their enthusiasm for trying the online shopping for fresh agricultural commodities is lower than men, and the reason is that most women do not like to take risks to try new things, and they do like go window-shopping instinctively.

Meanwhile, the average monthly online shopping cost is the second important grouped variable. Specifically, in the male samples, the customers with the average monthly online shopping cost of 51 yuan and above, the length of online shopping time of 3 years and above and the age of less than 30 years, are the customers with the greatest acquisition potential, and the confidence level is 100%. At the same time, the male customers with the average monthly online shopping cost of 51 yuan and above, and the length of online shopping time of 3 years and below, also have good acquisition potential.

The "analysis" node is added to the model built for the assessment of the model, and the specific precision test results of prediction model are shown in Fig. 3.

As shown in the above figure, the number of samples predicted correctly is 282, and the number of samples predicted wrongly is 66. The correctness rate of prediction model is 81.03%, the error rate is 18.97%, and the average correctness rate is 0.829. At the same time, this paper chooses 70% of the samples as the test set containing 244 samples.

Through the similar process of modeling and testing, it is found that 208 samples are predicted correctly, 36 samples are predicted wrongly, and the prediction model correctness rate of the test set is 85.25%. Overall, the prediction precision of the model is high.

6   Conclusions and recommendations

6.1   Conclusions   Research shows that the online shopping for fresh agricultural commodities has good prospects, and the majority of online shopping groups have a strong desire to try the online shopping for fresh agricultural commodities. However, due to the special nature of online shopping as well as a number of features of fresh agricultural commodities, the netizens are faced with double risks in the process of online shopping. These risks include food safety risk, mental health risk, relative convenience risk, liquidity risk, privacy risk and time risk, and they will make the consumers falter.

Meanwhile, the customer acquisition study shows that sex is an important factor restricting the online shopping for fresh agricultural commodities, and men are more willing to try the online shopping for fresh agricultural commodities than women. Specifically, in the male samples, the customers with the average monthly online shopping cost of 51 yuan and above, the length of online shopping time of 3 years and above and the age of less than 30 years, are the customers with the greatest acquisition potential.

6.2   Recommendations   In order to promote the development of

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⊟·· Results of output field -8
  ⊟·· Compare $R-8 and -8
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Correct	282	81.03%
Wrong	66	18.97%
Total	348	

```
  ⊟·· Performance evaluation
```

1.000 000	0.0

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  ⊟·· Confidence value report of $RC-8
```

Range	0.654-0.99
Average correctness	0.829
Average incorrectness	0.686
Correctness always higher than	0.833 (Observed values 27.87%)
Incorrectness always lower than	0.654 (Observed values 0%)
Correctness of higher than 93.3%	0.654
Correctness of higher than 2.0	0.933 (Observed values 65.38%)

Fig. 3　The precision test results of prediction model

online shopping for fresh agricultural commodities, and protect the legitimate rights and interests of customers, the following recommendations are put forth:

(i) The relevant governmental departments should take a variety of measures to ensure food safety, strengthen the supervision of online shop, and further improve relevant laws and regulations, to ensure that there are laws to abide by for the online trading behavior.

(ii) The businesses should strive to improve the reliability of online shopping, reduce the customers' perceived risk[17], and take measures in product promotion, logistics improvement and customers' personal information protection, to ensure the safety, convenience and pleasure of shopping; guide people to accept the new pattern of online shopping for fresh agricultural commodities, make great efforts to reduce the threshold for online shopping, and cultivate people's online shopping habits[18].

Meanwhile, in the process of customer acquisition, the businesses should take the customers with the average monthly online shopping cost of 51 yuan and above, the length of online shopping time of 3 years and above, and the age of less than 30 years, as a key breakthrough area; make full use of information collection and release means in the information age to find the target customers for precision marketing.

References

[1] China Internet Network Information Center. Research report of shopping online market in China, 2012[R]. 2013 – 3. (in Chinese).

[2] Alibaba. The e-commerce of agricultural products(2012)[R]. 2013 – 1. (in Chinese).

[3] ZOU J. Influence factors research of intention to buy fresh produce online for cuntomer[J]. Consumer Economics, 2011, 24(4): 69 – 70. (in Chinese).

[4] CHEN R, HE F. Examination of brand knowledge, perceived risk and consumers intention to adopt online retailer[J]. Total Quality Management & Business Excellence, 2003, 14(6): 677 – 693.

[5] Forsythe Sandra M, Shi Bo. Consumer patronage and risk perceptions in Internet shopping[J]. Journal of Business Research, 2003, 56(11): 867 – 875.

[6] Featherman MS, Pavlou P A. Predieting e-services adoption: A perceived risk facets perspective[J]. International Journal of Human-Compute Studies, 2003, 59(4): 452 – 472.

[7] Michal, Ellen G, and S. Gender. Differences in the perceived risks of buying online and the effects of receiving asiter ecommendation[J]. Journal of Business Research, 2004(57): 769 – 774.

[8] SUN X, ZHANG SY, LONG DR, *et al*. The source of consumers risk and their perception in B2C E-commerce[J]. Chinese Journal of Management, 2005, 2(1): 45 – 49. (in Chinese).

[9] LI BL. Analysis model of consumer's influences on perceived risk[D]. Xi'an Jiaotong University, 2007: 21 – 36. (in Chinese).

[10] YANG XJ. Study on university students' perceieved risks of online shopping[D]. Shandong University of Financeand Economics, 2012: 26 – 30. (in Chinese).

[11] LIU BL, HE L, QIAN LC, *et al*. Research on influencing factors and subtraction paths of female's risk perception of online shopping[J]. Journal of Anhui University of Science and Technology, 2013, 15(1): 22 – 27. (in Chinese).

[12] ZHOU JN. An empirical study on Groupon mode group purchace by perceived risk theory ——Illustrated by catering group-buying[D]. Fudan University, 2012: 52 – 54. (in Chinese).

[13] HUANG XW. The research and application of customer behavior analysis based on Web data mining [D]. Wuhan University of Technology, 2011: 5 – 17. (in Chinese).

[14] PENG JF. An analysis of the online shopping behavior based on data mining[D]. Yunnan University, 2011: 30 – 46. (in Chinese).

[15] John Stanton. Influences on the perceived risk of purchasing online[J]. Journal of Consumer Behavior, 2003, 4(2).

[16] XUE W, CHEN HG. Clementine data, mining mthods and application[M]. Beijing: Punlishing House of Eletronics Industry, 2010: 168 – 172. (in Chinese).

[17] ZHAO DM, JI SX. Trust and perceived risk to online purchase intention: An empirical study[J]. Application of Statistics and Management, 2010, 29 (2): 3006 – 313. (in Chinese).

[18] LIN ZX. The effects of website characteristics and perceived risk on consumer s purchasing intentions[D]. Fudan University, 2007: 123 – 129. (in Chinese).