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Influencing factors of consumer willingness-to-buy traceable foods: An analysis of survey data from two Chinese cities

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Abstract

Utilizing a survey method in the cities of Beijing and Xianyang, we investigated consumers' awareness, attitude and willingness to buy traceable food. A binary logistic regression model was used to identify the main factors influencing purchasing desires. Consumers were generally concerned about food safety issues; however, the awareness level with regard to traceable food was low. Consumer distrust of public policy and the public media blocked the effectiveness of a food traceability system. Consumers' willingness to buy traceable food is driven primarily by their evaluation of the safety of traceable food and acknowledgement of the importance of implementing food traceability. It is likely that with increased consumer awareness of the relationship between a food traceability system and food safety, their willingness to consume traceable food will increase significantly. However, according to this survey, due to higher prices, consumers currently are not willing to buy traceable food. Those consumers who are willing to buy traceable food pay 9% - 12% more than for non-traceable food.

Keywords: Traceable food; Consumer behavior; Willingness to buy; Influencing factors; Binary logistic regression model

1. Introduction

A number of food safety issues such as mad cow disease, foot and mouth disease, and avian flu, have arisen frequently in China's domestic and international food markets. Although China's food quality and safety level is gradually improving, a number of scares continue to occur. Recently, the Sanlu milk powder scandal did tremendous damage to the health of more than 6,000 babies (China Business Weekly, 2008), resulting in significant social repercussions and an extensive confidence crisis the Chinese food regulatory and production systems. The

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contaminated milk powder had been designated as "The product exempt from national quality surveillance inspection." Thus, setting up an effective food safety and quality supervision system is priority issue for the China's government.

Food traceability systems specify suppliers' responsibilities at different supply chain nodes. The goal is to overcome credence good problems by increasing monitoring of important food attributes [1 - 2]. These systems help overcome or mitigate incomplete and asymmetric information [3], thus making food traceability systems an important instrument for overcoming an important market failure. Ensuring food safety is becoming a global trend and thus the Chinese government is establishing a food traceability system to increase confidence in its food products both for domestic and international consumption. Beijing embarked on a home-made vegetable product traceability pilot study in 2005. The success of the 2008 Olympic Games provided great power to speed up the development of the food traceability system. The city of Xianyang initiated a routine quality and safety inspection system and a traceability system for agri-food in August 2008. At the same time, a number of rules and regulations have been issued to encourage food enterprises to implement their own food traceability systems. However, because consumers are the final buyers of traceable food, the food traceability system's effectiveness can be measured by gauging consumers' awareness of food safety issues and their willingness-to-buy food that has passed through the traceability system.

Several studies have examined consumer preferences and willingness-to-pay (WTP) for traceable food and its influencing factors. For example, Dickson et al. [7] studied the types of traceability information that consumers care about in both the European Union and the U.S. Matsumoto [8] analyzed consumer awareness and willingness-to-pay information, as well as the impact of food safety certification on price. Brown et al. [9] found that consumers with higher risk tolerance had lower willingness-to-pay for safe food. Makatouni[10] studied major factors influencing consumer purchase of organic food. Dickinson and Bailey [11] examined WTP for traceable meat and compared traceable meat systems in the U.S., Canada, U.K., and Japan and found that consumers were willing to pay a nontrivial premium for traceability, but they showed even higher WTP for traceability-provided characteristics if additional meat safety and humane animal treatment were guaranteed. Umberger et al. [12] identified that American consumers had higher preference for domestic beef, and then estimated consumers' WTP for country-of-origin labeled domestic beef.

Most of China's domestic research using empirical methods has focused on estimating consumers' WTP for specific certifications such as non-pollution food, green food, organic food, and genetically-modified food. With the exception of Wang's research [13] analyzing consumer WTP for HACCP certification, there is a lack of research on WTP for food safety guarantees. Currently, there is no research that studies the determinants of consumer purchase behavior for traceable food. This paper makes an attempt to fill this research gap by examining willingness-to-buy traceable foods, as well as the determinants of willingness-to-buy. This study uses information from surveys collected in Beijing and Xianyang.

2. Theoretical motivation for consumer willingness to buy for traceable food

The concept of *credence goods* whereby a consumer cannot determine important features of the good either before or after consumption (Darby and Karni, 1973) [14] can form a theoretical basis for understanding consumers' willingness-to-pay for traceable food. Credence goods are suitable for modeling food safety related issues because it is typically very difficult for consumers to establish a connection between the consequences of consuming a food product (e.g. illness or long term side-effects) and the innate attributes of the food product (e.g. whether the manufacturer undertook steps to ensure food safety). This suggests that it would be prohibitively costly for consumers to verify whether a manufacturer has undertaken the steps to ensure food safety, both before and after consumption. Consequently, if consumers value food safety, then they would benefit from a credible public food traceability system that ensures food safety, as this system would resolve a market failure. By implication, this might suggest that, *ceteris paribus,* consumers who are concerned about food safety will have an increased willingness-to-buy traceable food, where traceable food is certified by a third-party traceability system that potentially resolves the credence good problem.

Of course, in conducting an empirical test of theoretical implications, it is important to control for important factors such as demographics, the economic state of consumers, and their attitudes toward and awareness of food safety issues. We discuss these control variables in more detail in the next section.

3. Source of sample data and basic characters

The data used in this paper was obtained from a survey on consumer awareness and purchase behavior on traceable food. The survey was conducted face-to-face and each of the questionnaires took about twenty minutes to complete. Considering the differences in economic development level and density of population among different cities and different districts within the cities, as well as the differences in the sales and marketing of traceable food at different supermarkets and farmers' markets, we used stratified sampling and random sampling to draw our subjects. The specific sites for investigation were chosen based on the administrative function zoning in Beijing and Xianyang, and the number of questionnaires allocated was based on population density. Then we investigated food buyers randomly in farms markets, supermarkets, exclusive agencies, community parks, communities, and some other locations. The foods in this survey focused mostly on agri-food, such as grain, oil, fruit, vegetable, aquatic products, and meat products. The number of effective questionnaires from Beijing and Xianyang were 588 and 296, respectively.

As mentioned in the previous section, we had to control for demographics, the economic situation of consumers, and their attitudes and level of awareness toward food safety. In designing the survey, we collected information on the following:

Demographic factors: age, gender, education, state of health, occupation, family structure, role in the family and society, and capacity and opportunity to acquire information.

Economic factor: Consumers' income, the price difference between traceable food and ordinary food. Income is important because generally speaking, people with higher income pay more attention to food nutrition, quality and safety. In this paper, we use the proportion of expenditure on food to the whole family consumption (namely Engel coefficient) to substitute for the income variable. As income rises, the proportion of income spent on food falls, even if actual expenditure on food rises. Thus, consumers with a low Engel coefficient are expected to have an increased probability of buying traceable food.

Psychological factors that indicate attitudes and awareness: Psychological factors include information-seeking awareness, level of awareness of food certification and food traceability system, confidence in the degree of safety of traceable food, consumer awareness of regulation of food safety, confidence in information released by the government and the media, and after-purchase feedback mechanism.

4. Descriptive statistics of degree of consumer awareness and traceable food purchase behavior

Tables 1 and 2 present summary statistics related to consumer awareness and traceable food purchase behaviors. The summary statistics suggest that the consumers surveyed were generally concerned about food safety and considered it to be a serious issue. Consumers generally lacked an understanding of the food traceability system. Even in Beijing where consumer awareness of the food traceability system was higher, only 3% of consumers indicated they were very familiar with it. Additionally, respondents' willingness to buy traceable food was affected by price. Under the condition that the price of traceable food is similar to ordinary food, 93% of consumers thought they would benefit from the implementation of a food traceability system and believed this system was important; however, once that policy would result in price increases, the ratio of consumers believing in its importance dropped sharply (see Table 2, first row).

According to analyzing the whole sample data from the two cities, we found the following information. The percentage of consumers surveyed in the two cities who thought the government supervision level of food safety was "ordinary" or "not too good" were 39% and 35%, respectively. Only 1% consumers thought the supervision level was "very good." Moreover, consumers were not confident about the accuracy of information pertaining to food safety published by public media. Only 7% of them felt "very confident" about the information. Consumers also had a low level of confidence about the credibility of traceability information provided by food suppliers. Only 3% of the consumers trusted traceable information greatly.

Table1 Statistical tables about consumer awareness and attitude toward traceable food

Concern about the safety of agri-food quality	Extremely concerned	Above average level of concern	Ordinary level of concern	Some Concern	No concern

		Beijing	28%	44%	23%	4%	1%
		Xianyang	24%	40%	25%	6%	6%
Awareness level of traceable food			Very familiar	Know a little	Know very little	Never heard it	
		Beijing	3%	23%	38%	36%	
		Xianyang	1%	20%	32%	47%	
If consumers search for food safety information			Always	Sometimes	Ordinary	Seldom	Never
		Beijing	14%	40%	16%	26%	4%
		Xianyang	22%	42%	12%	21%	3%
Evaluation of current food safety problems			Very serious	Serious	Ordinary	Not too serious	Not serious
		Beijing	27%	47%	20%	5%	1%
		Xianyang	27%	48%	17%	4%	4%
Level of supervision of food safety			Very good	Good	Ordinary	Not too good	Not good
		Beijing	1%	11%	39%	33%	15%
		Xianyang	2%	6%	39%	37%	17%
Degree of confidence in food safety information published by media			Very confident	Confident	Ordinary	Not too confident	Not confident
		Beijing	6%	38%	30%	23%	3%
		Xianyang	8%	33%	30%	26%	2%
Degree of confidence in traceable information			Very confident	Confident	Ordinary	Not too confident	Not confident
		Beijing	2%	27%	42%	25%	4%
		Xianyang	6%	22%	40%	27%	5%
Do you agree that traceable food is safer?			Strongly agree	Agree	Ordinary	Somewhat disagree	Disagree
		Beijing	31%	44%	17%	6%	2%
		Xianyang	34%	35%	25%	4%	2%
Purchase Process	Do you consider food price important during purchase?		Very important	Important	Ordinary	Not too important	Not important
		Beijing	19%	57%	16%	6%	2%
		Xianyang	22%	60%	14%	4%	1%
	Do you consider food safety important during purchase?		Very important	Important	Ordinary	Not too important	Not important
		Beijing	47%	41%	6%	4%	2%
		Xianyang	59%	28%	9%	2%	2%
Importance to implement food traceability system	If the cost is the same as ordinary food		Very important	Important	Ordinary	Not too important	Not important
		Beijing	40%	40%	14%	5%	2%
		Xianyang	48%	33%	12%	5%	2%
	If the cost exceeds that of ordinary food		Very important	Important	Ordinary	Not too important	Not important

Beijing	23%	45%	20%	10%	2%
Xianyang	22%	47%	25%	5%	2%

With respect to willingness to buy, consumers' willingness to buy traceable food went up to 95% if the price factor is not considered. But given that the implementation of a food traceability system would raise the price of food, the number of consumers dropped dramatically who wanted to pay for traceable food. Consumers from Beijing had higher capacity to bear high food price. For those consumers who still wanted to buy traceable food even when it was more expensive, they only would pay 9% - 12% more than for ordinary food. We also got the following useful information from the survey. For those consumers who did not want to buy traceable food, "unreliable traceable information" and "higher price" were the main reasons they made that choice. Some consumers hoped that the price of food would not change due to the implementation of a food traceability system, and they thought ensuring that food is traceable is the food suppliers' responsibility.

Table 2 Statistical tables about consumers' willingness to pay for traceable food

	The percentage of consumers willing to buy traceable food	
	Beijing	Xianyang
The same price as ordinary food	93%	97%
The price of traceable food is higher	55%	50%
Food category	The percentage higher than the original price	
	Beijing	Xianyang
Meat products	12%	11%
Vegetables	10%	9%
Fruit	12%	9%
Grain and oil	11%	10%
Aquatic Products	12%	12%

5. Analysis of the main factors influencing consumer purchase behavior of traceable food

5.1. Model specification and variable choice

The consumer utility function is the main theoretical foundation for investigating consumer willingness to buy traceable food. Holding other factors constant, assume that the implementation of a food traceability system results in an increase in the level of food safety to Q_1 from a lower Q_0. Consequently consumer utility increases; that is, $U_1(Q_1, I, X, \varepsilon_1) > U_0(Q_0, I, X, \varepsilon_0)$ where I is consumer's income, X stands for other influencing factors, and ε is a random error component.

To relate this to an empirical model, let Y=1 denote that the consumer chooses traceable food and Y=0 indicate that the consumer does not choose traceable food. Let Ph be the price that consumer is willing to pay for traceable food, and P denote the price of ordinary food. Let Z denote other factors influencing consumer's utility including food safety level Q, income I, and ε_0, ε_1 separately stands for random error component in two different choice situations. Then the utilities that the traceable food brings to consumer and the ordinary food brings to consumer are $U_{Y=1}(Z, P_h, \varepsilon_1)$ and $U_{Y=0}(Z, P, \varepsilon_0)$, respectively. Furthermore assuming that the utility function is a linear

function and that the random error component ε follows a Weibull distribution, if consumer chooses traceable food, then the utility contributed to consumer's choice is given by

$$U_{Y=1} = \alpha_1 + \beta_1' Z + \lambda_1 P_h + \varepsilon_1 \quad (1)$$

If consumer chooses ordinary food, then the utility obtained by consumer is given by

$$U_{Y=0} = \alpha_0 + \beta_0' Z + \lambda_0 P + \varepsilon_0 \quad (2)$$

Because the price of ordinary food P is the average price in real market, it is a constant. Equation (2) can be written as:

$$U_{Y=0} = \alpha_0 + \beta_0' Z + \varepsilon_0 \quad (3)$$

Where $\alpha_0 = \alpha_0 + \lambda_0 P$. We can't observe the utility in equation (1) and (3), but we can observe whether the consumer chose traceable food or ordinary food. If the consumer chooses traceable food, then $U_{Y=1} \geq U_{Y=0}$, and vice versa, if the consumer chooses ordinary food, then $U_{Y=1} < U_{Y=0}$. Subtracting equation (3) from equation (1) yields

$$U_{Y=1} - U_{Y=0} = (\alpha_1 - \alpha_0) + (\beta_1 - \beta_0)' Z + \lambda_1 P_h + (\varepsilon_1 - \varepsilon_0)$$

which can be written as:

$$U = \alpha + \beta' Z + \lambda P_h + \mu \quad (4)$$

According to equation (4) we can get a probability equation of the consumer choosing traceable food (Y=1)

$$P(Y=1) = P(U>0) = P[\mu > -(\alpha + \beta' Z + \lambda P_h)] \quad (5)$$

Domenrich and McFadden (1975) suggested that the difference of two random variables following Weibull distributions becomes a logistic distribution. Thus, the random error component μ in formula (5) follows a logistic distribution:

$$P(Y=1) = \Lambda(U) = [1+\exp(-U)]^{-1} \quad (6)$$

Plugging (4) into (6) allows us to obtain the linear logit model:

$$\ln\left[\frac{P(Y=1)}{1-P(Y=1)}\right] = \alpha + \beta' Z + \lambda P_h \quad (7)$$

The left hand side of (7) is the proportional odds of consumers choosing traceable food. As a result, the factors influencing consumer's utility also have an effect on consumer's willingness to buy. So we can examine factors influencing consumer's willingness to buy traceable food by estimating the logit regression function (7).

The vector Z contains a list of control variables that influence consumer's willingness to buy traceable food. These control variables include consumer's personal characteristic, social-economic factors, consumer's awareness, and consumer's purchase behaviors. See Table 3 for a complete list. The statistical package eviews 5.0 was used to analyze the data, and the estimated results are shown in table 4, which had eliminated insignificant independent variables (they are variables regarding career, population, infor, importance-1, m-belief, and safe).

Table 3 Definition of independent variables in the model

Variable name	Definition	Value assignment	Expected effect
Demographic characteristic variables			
Gender		0=male，1=female	?
Age		1= 20~29 years old，2=30~39 years old，3=40~49 years old，4=50~59 years old，5=over 60 years old	?
Edu	Education level	1= Elementary School & Junior Middle School , 2= Senior High School or Technical School, 3= undergraduate, 4= graduate	+
Career		0=not related to food industry，1= related to food industry	+
Health	Health condition	1=excellent，2=ordinary，3=weak	?
Structure	Family structure	0=no old person or children，1=have old person or children	+
Population	The size of family	natural value	+
Ratio	the proportion of expense	1= ≤10%，2= 10%~25%，3= 25%~50%，4=	-

	on food to the consumption expense	≥50%	
Pre-purchase variable			
Matter	Whether consumers experienced food safety problems	0=no，1=yes	+
Infor	Whether consumers always search food safety information	1=always，2=some times，3=ordinary，4=seldom，5=never	-
y-safety	evaluation for current food safety problems	1=very serious，2=serious，3=ordinary，4=not too serious，5=not serious	-
Ag-care	concern about the safety of agri-food quality	1= concern too much，2= more concern，3= ordinary，4= less concern，5= no concern	-
y_care	concern about traceable information	1= concern too much，2= more concern，3= ordinary，4= less concern，5= no concern	-
Certif	awareness level to food certification	0=don't know what it is，1=know what it is	+
y_recogn	awareness level to traceable food	1=very familiar，2=know a little，3= know very little, 4=never heard it	-
Importance-1	Is it useful for buying safe food to know all the information about food	1=very useful，2=useful，3=ordinary，4=not too useful，5=not useful	-
Importance-2	importance to implement food traceability system	1=very important，2=important, 3=ordinary，4=not too important，5=not important	-
Importance-3	importance to implement food traceability system (If cost exceed ordinary food)	1=very important，2=important, 3=ordinary，4=not too important，5=not important	-
y-regul	level of supervision of food safety	1=very good，2=good，3=ordinary，4=not too good，5=not good	-?
m-belief	confidence degree to food safety information published by media	1=very confident，2=confident，3=ordinary，4=not too confident，5=not confident	-
i-belief	the confidence degree to traceable information	1=very confident，2=confident，3=ordinary，4=not too confident，5=not confident	-
Safety	Do you agree with traceable food is safe?	1= strongly agree，2=agree, 3=ordinary，4=don't agree all，5=don't agree	-
Purchase process variables			
Time	How long does it take to select food	1=very quickly，2=a little short，3=ordinary，4= choosing for a while，long 5= repeated comparisons，very long	+
Safe	Do you consider food safety important during purchase?	1=very important，2=important, 3=ordinary，4=not too important，5=not important	-
Price	Do you think food price important during purchase?	1=very important，2=important, 3=ordinary，4=not too important，5=not important	+
After-purchase variables			
Continue	Whether consumers continue to purchase after experiencing food safety problems	1=always，2=some times，3=ordinary，4=seldom，5=never	+
Remind	Whether consumers remind other people after experiencing food safety problems	1=always，2=some times，3=ordinary，4=seldom，5=never	-
Responsible	The importance to prosecute of those who should be responsible for contaminated food	1=very important，2=important, 3=ordinary，4=not too important，5=not important	-

5.2. Regression results and explanation

5.2.1. Model analysis of Beijing's consumers' willingness to buy for traceable food

Among consumer demographic characteristics, education level and family structure were the most significant factors influencing willingness to buy traceable food. The consumers holding higher education degrees were more likely to buy traceable food than others, and the purchase possibility was higher for those living with elders or children. The significant pre-purchase influence factors included the experience of food safety incidents, degree of concern about agri-food safety and quality, acknowledge of the importance of implementing a food traceability system in both cases where the price of traceable food is as same as the one of ordinary food or higher than that, and evaluation of the safety of traceable food. The consumers having experienced food safety incidents will pay more attention to food safety. Implementing a food traceability system will increase responsibility incentives to food suppliers, so traceable food could be safer than ordinary food. The consumers having more concern about agri-food quality were more likely to buy traceable food, and consumers who do not believe implementing a food traceability system was important were unlikely to buy. Those who thought the implementation of a food traceability system was originally important but who changed their previous stance, after implementing this policy, thought it would result in price increase and thus they would not have a high likelihood of buying traceable food. Additionally, if consumers did not think all traceable food was safer did not have a high willingness to buy traceable food. Those who were not concerned about food price had higher willingness to buy.

Consumer age and health condition had no significant impact on purchase decisions regarding traceable food. Their concern degree about food safety, awareness of food certification and traceability systems, whether they would continue to buy and remind other people not to buy same food after they experienced food safety issues and acknowledge of the importance of retracing those who should be responsible for the contaminated food also had no significant impact on willingness-to-buy, but the effect of these factors on the dependent variable was the same as expected.

5.2.2. Model analysis of Xianyang's consumers' willingness to buy for traceable food

The factors having significant influence at a 1% significance level on Xianyang's consumers' willingness-to-buy traceable food included consumers' awareness about food certification, confidence in food traceability information, acknowledgement of the importance of food safety factors, evaluation of the safety of traceable food, and whether they would continue to buy the same food after suffering food safety problems. Consumer's age, acknowledgement of the importance of traceable information, and the level of supervision of food safety were significant variables at a 10% significance level. The consumer, who is not likely to continue to buy the same food after experiencing food safety problems, will pay more attention to food safety and will have a higher likelihood to buy traceable food. The awareness level of food certification also indicates consumer concern about food safety, so the higher the awareness level, the more likely the consumers will be to buy traceable food.

Consumer awareness of traceable food did not influence their willingness-to-buy, and the influencing direction is opposite of that expected. Consumers with a lower confidence degree with regards to the safety of traceable food and the credibility of food traceability information do not likely have a higher willingness-to-buy level; the consumers who were not satisfied with the government's supervision level are more likely to buy traceable food in order to strengthen the possibility of purchasing safe food. It is because that even the level of supervision and inspection of the government for food safety problem is not high enough, consumers, after experiencing food safety problems, still have access to food traceability information in order to find out the source of problems and prosecute those who should be responsible for that by using a food traceability system.

Table 4 Estimation results of model excluding non-significant variables (I)

Variable name/city	Beijing	Xianyang
Gender	-0.3090	
Age	0.0308	0.2156*
Edu	0.5825***	0.0715
Health	0.0835	-0.2729
Structure	0.3769*	

Ratio		-0.0510
Matter	0.4943***	0.2380
y-safety		-0.2169
Ag-care	-0.1972*	
y_care	-0.1322	
Certif	0.0917	0.8736***
y_recogn	-0.0485	0.1332
Importance -2	-0.2480**	
Importance -3	-0.4574***	-0.3172*
y-regul		0.2753*
i-belief		-0.4315***
Safety	-0.2254**	-0.5227***
Time	0.0335	
Price	0.4398***	0.1360
Continue	0.0525	0.4059***
Remind	-0.0710	
Responsible	-0.1223	

Note: Single asterisk (*) indicates significance at a 10% level. Double asterisk (**) indicates significance at a 5% level. Triple asterisk (***) indicates significance at a 1% level.

In summary, the common significant influencing factors of the two models are consumers' evaluation for the safety of traceable food and acknowledgement for the importance to implement food traceability system. It indicates that consumers have a high concern about whether traceable food can guarantee food safety; if consumers can be ensured that the traceable food is safe, their willingness to buy traceable food will be strengthened significantly, and vice versa. Similarly, if consumers can be informed about the importance of implementing food traceability system, they also want to buy traceable food. In addition to that, consumers' willingness to buy traceable food in Beijing is mainly affected by consumers' education level, family structure, experience of food safety related incidents, concern about food quality and safety, and the price of food. The factors such as consumers' age, awareness level of food certification, the evaluation of government regulation of food safety, confidence degree for food safety information provided by food suppliers, and whether consumers continue to buy unsafe food after suffering food safety related issues have more influence on consumers' willingness to buy traceable food in Xianyang. Combined with the theoretical analysis at the second part, it's obvious that the purchase wishes of consumers in Xianyang were influenced mainly by psychological factors.

6. Conclusion and policy implication

6.1. Main conclusion

Based on the descriptive statistical analysis and econometric model analysis, major conclusions were drawn as follows:

First, most consumers surveyed paid attention to food safety issues, and they considered current food safety problems serious.

Second, few consumers knew what a food traceability system was before the survey. There are two major reasons resulting in lacking of knowledge. On the one hand, the government and related organizations did not conduct vigorous public propaganda campaign about a food traceability system. Thus many consumers never heard about it, resulting in their lack of ability to understand the policy and apply it to their own decision making. The food traceability system has been introduced into China for only a short period of time to date, and what consumers face is the high cost brought by the policy. They have not yet seen the positive effect of this system, so many consumers in the survey took a wait-and-see attitude.

Third, most consumers considered the government's supervision level of food safety to be "ordinary" or "not good." Consumers were not confident in the food safety information released by media. Similarly, consumers did not completely believe in traceable food information provided by food suppliers. The low confidence in public policy and media prevented the food traceability system from quick promotion and development. However, consumers still believed that the traceable food was safer than ordinary food.

Fourth, consumers' willingness to buy traceable food was mainly affected by their evaluation of the safety of traceable food and acknowledgement of the importance of implementing food traceability. If the safety of traceable food can be assured and consumers can be informed of the importance of traceable food, consumers' willingness-to-buy will increase significantly. However, the increased cost brought by implementing a food traceability system will

reduce consumers' willingness-to-buy. Besides that, the willingness-to-buy of consumers in different cities was affected by other factors.

Fifth, consumer willingness-to-buy traceable food is not generally high. They are only willing to pay 9%-12% more for traceable food than ordinary food. For those consumers unwilling to buy, disbelieving traceable food information and high price are the two major reasons for this unwillingness. Some consumers preferred the price of traceable food was in the same level as ordinary food, because they considered the cost for implementing a food traceability system should be paid by food suppliers in order to ensure food safety and obtain high profit, and could not be shouldered by consumers.

Sixth, compared to the city of Xianyang, the food traceability system was introduced to Beijing earlier and developed faster, moreover, the education level of Beijing's consumers is relatively higher, which likely results in Beijing's consumers having more concern for food safety, higher awareness of the food traceability system and higher confidence in the safety of traceable food over ordinary food, as well as their increased willingness-to-pay compared to consumers in Xianyang city.

6.2. Policy implication

Based on the above conclusions, some policy implications follow: first, the government should provide more information about food safety to consumers by announcing and promulgating the implementation situation of a food traceability system to improve the degree of consumer awareness and concern level regarding traceable food based on the media releasing relative scientific, objective information. Second, the government should strengthen the supervision and regulation of the implementation of a food traceability system, especially guaranteeing the truthfulness of traceable information and revealing food safety problems emerging in a timely manner in order to enhance the degree of consumer confidence in traceable information. In another way, the government can adopt both a food traceability system and a food certification system simultaneously to provide double-insurance for food safety. This, combined with a strengthened supervision system, can improve consumer confidence. Third, food suppliers should pay attention to the effect of consumers' personal characteristics on their purchase behavior, locate the target costumer rightly, choose appropriate marketing channels and advance marketing strategy for traceable food. Fourth, a food traceability system should be established and implemented on those food categories which more easily induce food safety problems than other kinds so as to consumers take much care, and then extended to other kinds of food. Finally, in the early stages of inducing and developing a food traceability system, the government should give more policy support and subsidies to partially offset the cost increase of food-producing enterprises due to a traceability system.

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