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SECTION 24. Sociological research.

## WHAT MAKES DIFFERENT UNDERSTANDING OF INTERNET FOOD SAFETY INFORMATION? - BASED ON AFFECTING FACTOR ANALYSIS IN CHINA

**Abstract:** Information asymmetry is a fundamental cause of food safety problem, while the wide use of internet in China does change the way of information acquisition. Nowadays internet media has become into the principal channel of information dissemination instead of television and print media. As one of the most concerned information in Chinese daily lives, food safety information is inevitably impacted by the internet media. The development of internet provides a more convenient approach for people to obtain food safety information, so the main purpose of this paper is to study what factors that make a difference on people's understanding of Internet food safety information. The methods adopted are Grounded Theory and Regression Analysis. The statistics is collected by a practical survey, which is carried out in seven different types of urban field in China in the form of interview and questionnaire. First step is to determine potential affecting factors, then on the basis of interview results, to put forward six hypotheses and design questionnaires, finally after all questionnaires are filled out, to establish a multiple linear regression model to evaluate the effects of each affecting factor.

**Key words:** Internet Food Safety Information; Affecting Factor; Grounded Theory; Regression Analysis; China.

**Language:** English

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### 1. Introduction

There is a saying in China that *eating comes first*. As the necessity of life, what people care about is not only the taste of food, as well as its safety. However, it is usually difficult for most people to learn information about the production and circulation of the food they buy from market. As a result of the existence of information asymmetry, these non-transparent parts between production and consumption often become hidden trouble of food safety. On the other hand, with the development of science and technology, nowadays the society has entered the information era. The quantity of Chinese Internet users is increasingly 649 million by the end of December 2014, according to the 35th Chinese Internet development statistic report. [1] Network news media play a more and more important role in the process of information transmission and become a main channel for the public to gain information, food safety information included. Especially with the

prevalence of some new social platforms like Sina microblog and WeChat, food safety information is widely spread though internet, even sparking hot discussion from netizens over authenticity of those information at one time. [2]

Internet food safety information, if given a formal definition, refers to comprehensive conception containing regulation, opinion, attitude, cognition, emotion and will of food safety affairs, which are released and spread online by various social subjects. [3] Under the mode of information asymmetry, the public can be easily misled by the internet information. Unfortunately, few researches have paid enough attention to food safety information spread by internet media, still less the main affecting factors that can influence consumers' acquisition of food safety information from internet media. [4] [5] Affecting factors are always in the black-box of the reality, so in this research the key factor finding is treated as the first step, and the impact of internet food safety information on



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consumer is another step. Through these two steps, the adjustment proposals and policy suggestions are made.

## 2. Materials

Affecting factor analysis of social problem should be conducted by empirical study. In this study, 7 different types of cities in China (Beijing, Weifang, Hefei, Nanjing, Xinan, Lu'an, Jinzhai) were observed under the guidance of Grounded Theory method, and 250 questionnaires were

answered by different types of consumers (238 questionnaires were valid).

When asked opinions about Internet food safety information, The 35 interviewees shared what they think of in a consumer's perspective. The 35 interviewees chosen at random were firstly differentiated with gender and age, and after further conversation, more different characteristics were told that absolutely have effects on their attitudes towards Internet food safety information. What the interviewees ever said was recorded faithfully, which would be discussed with Grounded Theory method in the following paragraphs. Basic information of 35 consumers is as follows:

**Table 1**

**The basic information of 35 consumers (The lower limit is not included).**

characteristics	Ranges	Number (rate %)	characteristics	Ranges	Number (rate %)
Gender	male	17 (48.57)	Age	Under 18	2 (5.71)
	female	18 (51.43)		18—30	15 (42.86)
Income	Under 2000Yuan	2 (5.71)		30—40	6 (17.14)
	2000—4000Yuan	12 (34.29)		40—50	7 (19.33)
	4000—6000Yuan	10(28.57)		50—60	1 (2.86)
	6000—8000Yuan	6(17.14)		Above 60	4 (11.43)
	8000—10000yuan	4(11.43)	Time spending on internet	Under 2	6 (17.14)
	Above 10000Yuan	1 (2.86)		2—4h	10 (28.57)
Years of Schooling	Under 6	1 (2.86)		4—6h	12 (34.29)
	6—9	2 (5.71)		6—8h	5(14.29)
	9—12	6 (17.14)		8—10h	2 (5.71)
	12—16	15(42.86)	Above 10h	0 (0)	
	Above 16	11 (31.43)			

Through disposing statistics acquired by valid questionnaire, basic characteristics of samples could be seen as follows:

1. Gender. There are 142 men and 96 women 238 valid sample. The ratio calculated is about 1.5: 1.
2. Age.16 samples are under 18 (18 included) years old;58 samples are from 18 to 30; 92 samples are from 30 to 40; 45 samples are from 40 to 50; 18 samples are from 50 to 60; the rest 9 are above 60. Sample ages are intensively from 18 to 50

and ages from 30 to 40 account for most, about 38.66 percent.

3. Time spending on internet. People spending 2 to 4 hours online account for 43.70 percent, the second is 4 to 6 hours, whose rate is 30.25 percent. No one spend above 10 hours online.

4. Years of Schooling. More than a half have received college education even above.

5. Income.38.66 percent earn 2000 to 4000 Yuan monthly. The second is 4000 to 6000 Yuan, accounting for 26.89 percent.

**Table 2**

**The characteristics of 235 valid samples (The lower limit is not included).**

characteristics	Ranges	Number (rate %)	characteristics	Ranges	Number (rate %)
Gender	male	142 (59.67)		Under 18	16 (6.72)
	female	94 (40.33)		18—30	58 (24.37)

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Income	Under 2000Yuan	11 (4.62)	Age	30—40	92 (38.66)
	2000—4000Yuan	92 (38.66)		40—50	45 (19.33)
	4000—6000Yuan	64 (26.89)		50—60	18 (7.56)
	6000—8000Yuan	30 ((12.61)		Above 60	9 (3.78)
	8000—10000yuan	21 (8.82)	Time spending on internet	Under 2	50 (21.01)
	Above 10000Yuan	17 (8.40)		2—4h	104 (43.70)
Years of Schooling	Under 6	1 (0.43)		4—6h	72 (30.25)
	6—9	8 (3.36)		6—8h	10 (4.20)
	9—12	44 (18.49)		8—10h	2 (0.84)
	12—16	125 (52.52)	Above 10h	0 (0)	
	Above 16	60 (25.21)			

### 3. Methods

In this paper, Grounded Theory method was used in the first step to discovery key affecting factors. Rather than beginning with a hypothesis, this study marked the affecting factors with a series of codes which were extracted from the interview, data collection, data analysis and theory building. [6]

Grounded theory method, proposed by two scholars called Anselm Strauss and Barney Glaser from Columbia University, is a form of qualitative research that takes advantages of systematic program to work on a particular phenomenon, which can make an inductive analysis and extract core concept conclusion from initial data. [7]Its main purpose is to establish theory on the basis of empirical data. Generally, researchers don't put forward theoretical assumptions at the beginning of study. What they choose to do is to develop actual observation, with which they switch raw materials to common experience and finally conclude systematic theory. This is a method from down to up to build the essential theory, first to seek key concepts that reflects the nature of phenomenon on the basis of collective data, and then to construct relevant social theory through connections between these concepts. Grounded theory must have empirical evidence to support itself, but the main feature of it is not empirical, which lies in its abstraction of new concepts and ideas from empirical facts.

After the key affecting factors were defined, On the basis of interviews, six affecting factors were induced as gender, age, education, income, risk attitude, and time spending on internet and correspondingly six hypotheses were proposed to be confirmed. Then a questionnaire was designed in order to collect more information. Next, a multiple linear regression model was used to evaluate the influence of the affecting factors on the internet media information of food safety.

Regression Analysis is mainly used to determine whether there is a certain relationship among variables. Under regression analysis, coefficients are calculated by computer program,

with which regression model can be set up. If the coefficient is positive, it means there is a positive correlation between the dependent variable and the independent variable, and if the coefficient is negative, it means there is a negative correlation relationship between the dependent variable and the independent variable. The P value is also an important index of regression analysis, the range of which is from 0 to 1.the closer to 0, the higher fitness of regression equation.

Regression models involve the following variables:

The unknown parameters, denoted as  $\beta$ , which may represent a scalar;

The independent variable X;

The dependent variable Y;

A regression model relates Y to a function of X and  $\beta$  in the following format:

$$Y \approx f(X, \beta)$$

In this research Y refers to I, which is defined as mean of the two sub-dependent—effect of food safety and reliability of food safety, to represent the general effect, and the X refers to risk attitude (Ra), time spend on internet (Int), years of schooling (Edu), monthly average Income (Inc), age (A), gender (G), so the format of the regression equation is as follow:

$$I \approx \beta_1 Ra + \beta_2 Int + \beta_3 Edu + \beta_4 Inc + \beta_5 A + \beta_6 G$$

With regard to the goodness of fit test and significance testing, if the P value is lower than 0.1, the results could be accepted. [8] The input data are summarized from questionnaires.

### 4. Results

#### 4.1 Results of Grounded Theory method

By stratified sampling from the 7 cities/towns, 35 consumers were deeply interviewed and observed. Through coding, conceptualization, and categorizing, the final category table was generated as follow:

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**Table 3**

### Final category of consumer understanding of food safety information by internet

Final categories	Categories	Description
Effect of Food Safety	A1 Food safety problem is serious; A7 Food safety problem deserves concern; A9 Food safety information highly affects consumers' choice of food	Food safety information is important to consumer, and highly influences people's daylily lives.
Reliability of Food Safety	A2 Food safety information sometime seems ridiculous; A3 Internet is filled with abundant messy information; A5 Food safety information on the internet need refine.	Sometimes Food safety information on the internet is unbelievable for some consumers.
Risk aversion	A4 Food safety problem should be avoided; A12 Food safety information on the internet forces consumers to carefully choose the diet.	If someone tries to avoid food safety problem, he/she will also focus on the food safety information
Time spent on the internet	A10 Time spent on the internet is relevant to the understanding of internet information. A6 More and more news come from internet.	When someone's time spent on the internet is longer, the curiosity of food safety information is higher.
Years of Schooling	A8 Education contributes to the understanding of food safety information on the internet. A11 Educated consumers pay more attention to food safety information.	Schooling time plays a significant role in the spread of internet food safety information.
Income	A14 Low Income people pay little attention to food safety information on internet. A13 High Income people focus on the quality of life which includes food safety information.	Income might affect the consumption capacity which is related with food choice.
Age	A15 The attitudes of youths and seniors to food information are different.	Age of consumer might affect the attitude to internet food safety information.
Gender	A16 Female seems pays more attention to food information than male.	There are different concerns on internet food safety between male and female

Based on the above Grounded Theory analysis, answers were eventually induced to eight aspects: effect of Food Safety and reliability of Food Safety, which were jointly regarded as the dependent variables, risk aversion, years of schooling, income, age and gender, which are regarded as the independent variables. Two and six (Table 2) were formed with six hypotheses: 1, the extent of risk aversion positively affects the internet media information understanding. 2, the more time spent on internet, the better the effect of internet media information; 3, the higher educational level of consumers, the better the effect of internet media information; 4, the higher income of consumers, the better the effect of internet media information; 5, the internet media effect of food safety is significantly different between the male and the female. 6, seniors are more concerned about the food safety problem than youths.

## 4.2 Results of multiple linear regression model

Based on the 238 valid questionnaires and the variables generated by ground theory method, the coefficients of each dependent variable were evaluated with different significant level (Since the variables are with different unit, a standardized method was used in all the quantitative variables).

The standardized method could be described as follow: Standardized value of one sample= (Value of one sample - Mean value of samples)/ Standard deviation of samples. By this method, the sum of quantitative variables coefficient should be approximately equal to 1 (Gender was excluded, because this value is virtually qualitative variable)

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**Table 4**

### Definitions, descriptive statistics and regression results of Variables.

Variable Names	Variable definitions	Variable Values	Coefficient (Results) <sup>1</sup>	P
I	Dependent Variable	$I=0.5*(I_1+I_2)$	-	-
I <sub>1</sub>	Sub-Dependent Variable 1 (Effect of Food Safety)	1 to 5, importance degree of food safety information	-	-
I <sub>2</sub>	Sub-Dependent Variable 2 (Reliability of Food Safety)	1 to 5, credibility of food safety information	-	-
Ra	Independent Variable 1: Risk Attitude	1 to 10, risk aversion of food safety	0.648	0.00
Int	Independent Variable 2: Time spend on internet	Actual hours per day	0.193	0.00
Edu	Independent Variable 3: Years of Schooling	Primary school=6; Junior high school=9; Senior high school=12; Undergraduate=16; Master=19; Doctor=22	0.279	0.00
Inc	Independent Variable 4: Monthly Average Income	Amount (RMB Per Thousand)	-0.126	0.00
Age	Independent Variable 5: Age	Actual age	0.074	0.01
Gender	Independent Variable 6: Gender	Male=1, Female=0	0.133	0.00

The regression results shows that sex, education, income, risk attitude, time spending on internet significantly affect the internet media information understanding. The P values of these variables are equal to 0.00, and the coefficients are positive values except the income, showing the following conclusions: the internet media effect of food safety is significantly different between the male and the female; the extent of risk aversion positively affects the internet media information understanding; The more time spent on internet, the better the effect of internet media information; the higher income of consumers, the worse the effect of internet media information. As for age, the hypothesis that seniors are more concerned about the food safety problem than youths is not strongly confirmed, of which the P value is 0.01.

## 5. Discussions and Conclusions

With the combination of ground theory method and multiple linear regression model, hypotheses 1, 2, 3 and 5 were confirmed, hypothesis 4 was denied, and hypothesis 6 was not strongly confirmed.

Consumers who are in relative high educational level often have basic knowledge of food safety and their ability to understand information is more excellent, so they can have a better understanding of food safety information; When in a high level of risk aversion, consumers will pay more attention to Internet food safety information in order to ensure their health; the longer the time spent on the Internet, the stronger the discrimination of all kinds

of information, thus this kind of consumers won't be misled by false information. The higher the monthly income of consumers, the more space for them to choose daily food, in this way the possibility that being passive to consume unsafe food is small, so this kind of consumers do not care about food safety information so much.

This study discussed what factors impose on Internet food safety information. Ground Theory method was taken as the first step. Through deep interviews with 35 consumers, six affecting factors were listed as gender, age, education, income, risk attitude, and time spending on internet, and six hypotheses were proposed correspondingly. Then the questionnaire was designed to give out to 250 consumers (238 were valid) according to analysis of interviews, and finally regression analysis method was used to figure out how these six factors exerted on understanding of Internet food safety information. The results showed the effects of the gender made significantly difference on internet food safety information. It also showed that the effects of education, income, risk attitude, and time spending on internet were positive while age was negative. The hypothesis 6 that seniors are more concerned about the food safety problem than youths was not strongly confirmed possibly because of the limitation of samples, remaining to be further studied.

Food safety is of great importance for consumers, and Internet plays an increasingly vital part in the process of information dissemination, so there is no doubt that the combination of the two will provide people's life with great convenience. However, faced with the situation where the development of Internet still lack necessary controls,



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there are many false information in distribution and transmission, which can be a mislead to Internet users. [9] [10] Therefore, some efforts need to be made to make sure of consumers obtaining food safety information timely and accurately. For example, some relevant Internet platform should

strive to build mature service channels and try to expand coverage. On the other hand, relevant departments should strengthen the supervision of Internet information to avoid the occurrence of Internet rumors.

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