

The Effects of Negative IWOM on Consumer Innovation Resistance: An Empirical Study on GMF in China

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ABSTRACT: Based on the reverse thinking of innovation diffusion and Informational Influence Theory, this paper constructs a path model of the negative Internet Word-of-Mouth influence on innovation resistance in the environment of Chinese Genetically Modified Food market. The empirical study results show that objective factual negative IWOM is more credible but subjective evaluated negative IWOM has greater impact on perceived risk. Compared with the center dominant media, negative IWOM in individual dominant media has more credibility and perceived risk. Also, lower consumer risk attitude and perceived risk lead higher perceived risk caused by negative IWOM. Credibility and perceived risk, in turn, would have a negative significant impact on the product attitude. Finally, comparing with delay adoption, consumer product attitudes affect refusing and opposition adoption more pronouncedly.

KEYWORD: GMF; Negative IWOM; Credibility; Perceived risk; Attitude; Innovation resistance

1 INTRODUCTION

New product and technology will be questioned or resisted by consumers in the diffusion process and develop innovation resistance[1]. According to researches, the failure rate of new product is 40%-90% and 47% of the market pioneer ended in failure too[2]. Amdt has studied new food sales, and found that positive word-of-mouth can promote sales but negative word-of-mouth can decline sales. Also, the effect of negative word-of-mouth on sales is twice as positive word-of-mouth which means consumers are more concerned with negative word-of-mouth[3]. Internet WOM has more significant influence on enterprise image than traditional WOM.

Genetically modified food (short in GMF) draw a heat discussion in diffusion process. According to the Chinese Livelihood Investigation Report (2014), 35.8% of interviewees worry about the GMF; 39.0% of interviewees are not familiar with the GMF and hold a low acceptance; 32.7% of interviewees refuse or don't accept the GMF[4]. Negative information of GMF, especially health detrimental information, is the primary factors that consumers' resisting. Ram pointed out that information dissemination mechanism, consumer characteristics and innovation characteristics are three factors affect innovation

resistance[1]. Costa-Font proposed the GMF accept path model. In this model, the trust from GMF information and its resource will affect consumers' perceived risk and perceived benefit. And then product cognition and behavior attitude will be affected which influence consumers' will purchase action in turn[5]. The experiment from Peng Guangmang etc has proved that GMF negative information has significant negative influence on receiver attitudes and behavior[6].

Based on the reverse thinking of innovation diffusion and Informational Influence Theory, according to the research on IWOM and innovation resistance, a path model about the influence of IWOM on innovation resistance in Chinese GMF market is constructed.

2 THEORETICAL BASIS AND HYPOTHESES

Innovation resistance has been defined as the opposition adoption or delay adoption by Ram firstly[1]. And innovation resistance coexists with innovation diffusion[7]. Ram thought that innovation resistance not means completely reject, but shown in different resist degree. He divided innovation resistance in delay adoption and refusing to adopt[1]. Szmigin and Foxall summarized innovation resistance as refuse, delay and opposition in their research on credit card payment[8]. Delay adoption

is that innovation meet consumer's need and consumer do not adopt directly but choose a proper chance to adopt later[7-8]. Delay adoption is mainly caused by situational factors, such as timing, necessary knowledge and effectiveness enhance. Refusing to adopt is consumer reject the innovation with high involvement, which means to understand the product information and find it does not conform consumer's requirements[7-8]. The suspicion that innovation not been proved and perceived risk contribute to consumer to refuse. Opposition adoption refers that consumer think the innovation is not appropriate and opposite to use. Also the consumer will against the innovation by transmitting negative IWOM or some other ways [7-8].

2.1 Relationship between Consumer Product Attitude and Innovation Resistance

Verdurme and Viaene propose that consumer's attitude to GMF determine consumer's purchase intention and the worse the attitude, the stronger consumer's intention to opposition[9]. Consumers in different countries and regions have different innovation resistance level to GMF in Europe[10]. Consumers in North Europe hold very strong negative attitude to GMF and they don't like the food which contain any genetically modified ingredients[11]. According to recent researches, U.S.A consumers have come to resist GMF [11]. The European Commission conducted a survey on 25,000 European consumers and found that 56% of them will delay to purchase GMF if it's healthier than traditional ones[11]. Integrating attitude and behavior model, Chen has found that Taiwan consumers' attitude has significant positive influence on purchase attitude and purchase attitude further affect purchase intention positively[11]. Costa-Font and Gil have verified consumers' attitude to GMF is positive correlated with purchase intention and, considering ethically, consumers will organize activities to against GMF spontaneously[12]. In their interviews, consumer doubt GMF generally. Considering GMF's safety, part of consumers will adopt it only when GMF proved safe. Some consumers don't trust GMF and won't buy it influenced by negative information. Also some consumers think GMF doesn't grow naturally and think it contrary to the laws of nature. So these consumers resist to put GMF into market very strongly and they will advice others do not buy GMF by releasing information on proper channels to resist it. So, following hypothesis is proposed:

H1: Consumer product attitude has significant negative influence on innovation resistance (H1a: delay adoption; H1b: refuse to adopt; H1c: opposition adoption).

2.2 Credibility, Perceived Risk and Consumer Product Attitude

Consumer's attitude to GMF is determined by perceived risk and perceived benefit [10]. An investigation shows that 32.7% of interviewees hold negative attitude to GMF and perceived risk is the biggest characteristic of these consumers [4]. Costa-Font etc point out that credibility of GMF information and its resource will influence the degree of perceived risk and perceived benefit which affect consumer to accept or refuse to GMF [5]. Later Costa-Font and Gil's empirical study found that credibility from expert researches and regulators will reduce consumers' perceived risks about health, nature and environment and also increase consumers' perceived benefits, such as relieving food shortage and improving economics income. Further, consumer perceived risk will affect product attitude negatively [12]. Chen Tao and Cai Yuting have found that IWOM has important positive influence on refusing to purchase[13]. The research on 3G mobile phone purchase behavior by Tao Xiaobo has proved that credibility effect consumer's brand trust and brand emotion negatively[14]. According to the interview, consumer perceived risk about health, psychology, environment and society when browsing negative word-of-mouth about GMF. Negative IWOM's effect on consumer firstly make consumer develop "credibility" and then change whole product perception and attitude which influence resisting purchasing behavior finally. Based on these, hypotheses as following:

H2a: The credibility has significant positive influence on consumer perceived risk in IWOM dissemination.

H2b: Consumer perceived risk has significant negative influence on product attitude in IWOM dissemination.

H2c: The credibility has significant negative on product attitude in IWOM dissemination.

2.3 Antecedent Variables of Negative IWOM Influence Path

2.3.1 Word-of-mouth Type

Hobbrook divides word-of-mouth information into objective factual ones and subjective evaluated ones[15]. Objective word-of-mouth is the description about product physical properties which contain more factual information and it can be evaluated by objective standard. While subjective evaluated word-of-mouth mainly descript product intangible characteristics which contain more judgments and evaluations. According to Jin Liyin's experiment, subjective evaluated IWOM which contains more using and purchasing experiences has greater impact on consumer purchase decision[16]. According to sender's emotional factors, Chen Tao

and Cai Yuting divide IWOM into rational and emotional. And it's found that rational IWOM has higher credibility and greater influence on refusing purchasing[13]. In their investigation, consumer's acknowledge on GMF is not high generally and objective negative word-of-mouth contains more factual information which is more easily to make clear cognition and easily to get higher trust from consumers. However, subjective evaluated negative word-of-mouth contains more subjective emotional information which makes fuzzy cognition and higher perceived risk on consumers. Thus, following hypotheses are proposed:

H3a: Objective factual IWOM has greater impact on credibility.

H3b: Subjective evaluated IWOM has greater impact on perceived risk.

2.3.2 Media

Bordewijk and Kaam summarize information media as two types: individual dominant ones and center dominant ones. Individual dominant media includes negotiatory type and conversational type, but center dominant media includes monitory type and registered type[17]. Comparing to center dominant media, the audience interaction and information influence are much higher in individual dominant ones. Taking high technology product as example, Tao Hongbo has verified that IWOM's influence on credibility is greater in individual dominant media[14]. Therefore, high interaction in individual dominant media will contribute high informativeness. And consumers' trust on word-of-mouth and perceived risk to product will be increased if the motivation of releasing negative word-of-mouth is helpful for consumers decision making. Hypotheses are proposed based on above theory:

H4a: The influence of IWOM on credibility is greater in individual dominant media.

H4b: The influence of IWOM on perceived risk is greater in individual dominant media.

2.3.3 The Personal Characteristics of Word-of-mouth Dissemination Participants

The personal characteristics of word-of-mouth dissemination participants are represented by risk attitude and product knowledge in this study. Risk attitude can be divided into three categories: risk loving, risk neutral and risk aversion. Risk attitude will affect consumer's judgment and perceived risk degree to information. While online trading, for example, risk averter usually focus on negative results and ignore positive results. Product knowledge means consumer's familiarity, professional knowledge and purchase experience to GMF. Mandal and Paul believe that consumer's GMF knowledge has more powerful impact on

product knowledge and attitude than expert advices[18]. Some studies have shown the negative relationship between GMF consumer knowledge and perceived risk [5][14]. Later, some experts have pointed out that product knowledge and perceived risk correlate positively if consumers belong to science and technology group; while the relationship is not remarkable if consumers belong to humanities and society group[19]. House etc divide product knowledge into subjective ones and objective ones and then find that both subjective knowledge and objective knowledge have significant negative influence on consumer perceived environment and technological risk[20]. During the interview and pretest, interviewees' subjective knowledge strongly consists with their objective knowledge. Also interviewees with clearer acknowledge to GMF have lower perceived risk. From above, hypotheses as following:

H5a: The lower consumer risk attitude is, the greater influence of IWOM on credibility is.

H5b: The lower consumer risk attitude is, the greater influence of IWOM on perceived risk is.

H5c: The lower consumer product knowledge level is, the greater influence of IWOM on perceived risk is.

The research model is proposed (shown in Fig.1) by summarizing hypotheses above.

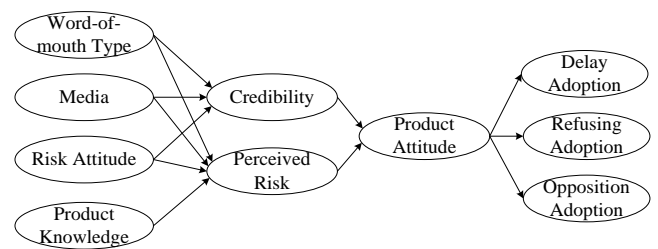


Figure 1. Research Model

3 RESEARCH METHODS

3.1 Research Scale

In order to know consumer's attention, firstly IWOM of GMF in internet community is analyzed. Then research scale is settled by literature studying and interviewing. Thereinto, word-of-mouth type is answered in either-or way (objective factual type and subjective evaluated type) based on Hobbrook's study. Word-of-mouth dissemination media is also answered in either-or way (individual dominant media and center dominant media) according to studies from Tao etc. Risk attitude is measured by 3 questions referring to Wang and Wang etc[21]. Product knowledge, including objective and subjective knowledge which is measured with 2 questions and 7 questions respectively, refers to studies of House etc. And questions are answered in right or wrong only and can get score from 1-7.

Credibility is measured with 3 questions according to Chen. Perceived risk is measured with 4 questions referring to Chen's study. Product attitude contains 3 questions according to Costa-Font's study. Based on Cornescu and Adam's studies, innovation resistance is divided into delay, refusing and opposition adoption which contain 10 questions. Besides word-of-mouth type and information media, there are 8 variables and 26 measurement items in total. All questions are measured with Likert 7-level scale.

3.2 Sample Composition

461 questionnaires are issued totally. Consumer age limitation is 18 in this study considering income factors. The questionnaire screening criteria are: (1) to delete questionnaires of which consumers have already used the GMF (26, 5.6%); (2) to delete questionnaires of which consumers never heard of the GMF (18, 3.9%); (3) to delete questionnaires that answered incompletely or wrong apparently (12, 2.6%). 405 effective questionnaires are got eventually with 87.9% of efficiency.

3.3 Results Analysis

3.3.1 Reliability and Validity Tests

Table 1. Reliability Analysis

	Question	Cronbach's α
Risk Attitude	3	0.710
Product Knowledge	3	0.966
Credibility	3	0.886
Perceived Risk	4	0.916
Product Attitude	3	0.954
Delay Adoption	3	0.732
Refusing Adoption	4	0.916
Opposition Adoption	3	0.940

Taking Cronbach's α as the judgment standard of reliability, reliability testing result is analyzed with SPSS19.0. The overall reliability value is 0.948 and each partial reliability values are higher than 0.710 which mean the scale has good reliability. Results are shown in Table 1.

All scale are measured by existing study and combined with the actual situation of Chinese GMF market, so scale content validity is good. "Word-of-mouth type" and "Word-of-mouth media" are processed as virtual variables in this study. Variables except above-mentioned two are processing confirmatory factor analysis with AMOS7.0 to test construct validity. Test results show that all questions' standardized factor loadings are 0.718-0.974 and significant at 0.000 level. Also, all factors' average variance extracted (AVE) values are 0.577-0.909 which mean scale has good convergent validity. Then, each AVE value and factor

correlation coefficient are compared and found that all AVE values are higher than factor correlation coefficients which means factors' discriminate validity is good. Summarizing the reliability and validity tests, collected data in this study has high quality and can be used to verify hypotheses.

3.3.2 Hypotheses Tests

Hypotheses are testing with AMOS7.0. For "Word-of-mouth type", "1" represents objective factual ones and "0" represents subjective evaluated ones; for "Media", "1" represents individual dominant ones and "0" represents center dominant ones. At the same time, considering the model identification, factor loading of word-of-mouth type and media is set as 1 and its errors of observed variables are set as 0. From the testing results, each fit index of initial model are higher than lowest critical value ($\chi^2/df=3.474$, GFI=0.792, TLI=0.866, CFI=0.854, RMSEA=0.126), so model's whole fitting degree is not good enough. Then the modified index show that χ^2 will reduce if some path are added. After modifying the research model, the fitting degree has increased a lot and all indexes ($\chi^2/df=2.614$, GFI=0.913, TLI=0.925, CFI=0.941, RMSEA=0.079) act the standard.

According to testing results, all hypotheses are supported except H1a. Objective factual word-of-mouth has higher credibility than subjective evaluated word-of-mouth ($\beta=0.487$, $p<0.001$), so H3a is supported. However, subjective evaluated word-of-mouth has greater influence on perceived risk ($\beta=-0.191$, $p<0.01$), so H3b is supported. Compared with center dominant media, negative word-of-mouth from individual dominant media has higher credibility and perceived risk ($\beta=0.306$, $p<0.01$; $\beta=0.091$, $p<0.05$), so H4a, H4b are supported. Risk attitude has significant negative influence on credibility and perceived risk ($p<0.01$), so H5a, H5b are supported; Product knowledge is negative correlated significantly with perceived risk ($p<0.01$), so H5c is supported. Credibility and perceived risk further negatively affect product attitude significantly ($p<0.001$) and the influence of perceived risk on product knowledge is higher than credibility's, so that is to say perceived risk play partial mesmeric effect between the relations of credibility and product attitude, H2a, H2b, H2c are supported. Product attitude eventually has significant negative influence on refusing adoption and opposition adoption ($p<0.001$), while the influence on delay adoption is not apparent, so H1b and H1c are supported. Hypotheses testing results demonstrate that consumers have negative impression on GMF during its information dissemination process. Consumers are afraid of GMF and choose to resist it considering negative word-of-mouth about health hazard. That's why most of consumers refuse or opposite to buy GMF.

On the other hand, traditional food has strong substitution with GMF and Chinese prefer to natural food, so more consumers choose opposition adoption for GMF.

4 RESEARCH CONCLUSIONS AND IMPLICATIONS

4.1 Research Conclusions

Main research conclusions: (1) Consumers feel higher perceived credibility from objective factual negative word-of-mouth but feel higher perceived risk from subjective evaluated word-of-mouth; comparing with center dominant media, negative word-of-mouth from individual dominant media makes higher credibility and perceived risk; the lower risk attitude and product knowledge is, the higher influence of IWOM on perceived risk is. (2) Both credibility and perceived risk have significant negative impact on consumer product attitude and perceived risk play a mesmeric effect between the relations of credibility and product attitude. (3) The influence of consumer product attitude on innovation resistance exist significant differences. Compared with delay adoption, consumer product attitude has more significant impact on refusing adoption and opposition adoption.

4.2 Management Implications

(1) Standardized information dissemination channels and deliver more objective factual and scientifically tested information. Relative management agencies should make sure the authenticity when releasing information about GMF. Also management agencies should dispel false negative information to avoid risk and negative influence deteriorating. Also, to increase consumer's trust on GMF, enterprises should establish communication platform and answer questions from consumer timely.

(2) Enterprises should pay more attention to GMF negative word-of-mouth from individual dominant media and response timely to get improvement. The advertisement of GMF should be divided into consumer perceived benefits and perceived risks to make sure the consumers' right-to-know and right-to-choose. Relative enterprises should pursue efforts to the popularization of GMF science.

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