The Impacts of Consumer Rights Enthusiasm on Innovative Food Packaging Management

P Y Chen¹ and S H Chen²

¹ The College of Business of Jiangsu University of Technology, China
² Department of Marketing & Distribution Management, Oriental Institute of Technology, Taiwan
Email: chen88@mail.oit.edu.tw

Abstract. An urge for food packaging container safety and environmental protection has driven consumer rights enthusiasm towards an energetic and positive sense of innovative consumption consciousness. In this study, Taiwanese consumers were taken as the research objects, consumer rights enthusiasm as the independent variable, a desire for environmental protection and safety management in food packaging containers as the intermediate variable, and innovative consumption consciousness as the variable, to explore the strength of consumer rights enthusiasm on the safety and environmental protection in food packaging containers, and the impacts of its eagerness in innovative consumption consciousness of packaging containers. An empirical analysis was conducted to verify the results, and the study found that the stronger the consumer rights enthusiasm, the higher the desire for environmental protection and safety management in food packaging containers is. Also, the stronger the desire for environmental protection and safety management in food packaging containers, the higher the innovative consumption consciousness is.

1. Introduction

In 2011, the harm of the plasticizer incident had shocked the world. Besides illegal adding of industrial plasticizer in food, it also triggered a crisis that the plastic packaging containers had infiltrated with plasticizer. To create an all-green consumption environment is the development trend of a progressive society and a direction that must be taken to defend the earth and protect the ecological environment. The expectation of modern consumers in making a prime purchasing decision is to take the circular economy as the criterion to make safe and environmentally-friendly food packaging containers. The effective maintenance of safe and environmentally-friendly food relies on the conscience of the practitioners, and the close link of the overall supply chain. A strong self-protection attitude of the consumers is even the driving force for green marketing.

Consumer rights enthusiasm has significantly prompted a desire for zero-burden and zero-pollution in food packaging containers. However, amidst the world trend led by green packaging, such eagerness will advance alongside with continuous R&D on innovation and diversity simultaneously. Therefore, we should not only explore the relationship between consumer rights enthusiasm and a desire for environmental protection and safety in packaging containers but also further analyze its eagerness to influence innovation and diversified ideas in packaging containers. This paper proposes several research hypotheses and models after conducting an in-depth investigation and discussion on “the impacts of consumer rights enthusiasm on innovative food packaging management” through a quantitative analysis.
2. Literature review

2.1. Consumer rights enthusiasm
The rights mentioned in this study are explained from a legal point of view. In law, the rights refer to the rights and interests of citizens protected by law. In Article 2 of the Law of the People’s Republic of China on Protection of Consumer Rights and Interests, consumers need to purchase goods for their daily consumption and use the products or accept the services, the rights and interests of which are protected by this Law. For matters not otherwise specified by this Law, they are safeguarded by other relevant laws and regulations. Consumer rights enthusiasm is a will to boost the pursuit of consumer rights.

2.2. Environmental protection and safety management
The environmental protection mentioned in this study refers to the food packaging containers that will not add burdens and will not pollute the global environment. For example, the development of low-consumption, renewable and non-polluting, high-performance, recyclable, reusable, and easily degradable green packaging materials that can be produced by using recyclable resources and waste materials. And safety refers to the safeness of food packaging containers despite the changes in time, temperature, humidity, and other factors that would otherwise cause contamination to the contents or deteriorate the materials.

2.3. Innovative consumption consciousness
The innovation mentioned in this study refers to new thinking in food packaging containers and new R&D in traditional marketing. “Consciousness” is generally considered as the self-cognitive ability of people towards the environment and their cognitive clarity. Before transferring consumption consciousness to consumer behavior, the first thing people will do is choose. At this point, consumer psychology will generate some degree of risk perception, followed by anxiety, and then seeking ways to reduce risk until it has reached an acceptable level or disappear altogether. Only then will consumer purchase be developed [1]. The “innovative consumption consciousness” of this study is based on the “traditional” risk perception of consumers, finding new thinking in anxiety, and generating an innovative consumption consciousness to reduce risks.

3. Research hypotheses and model

3.1. Research hypotheses
3.1.1. A desire for consumer rights enthusiasm and environmental protection and safety management in food packaging containers
(1) The vital roles of packaging containers in food safety consumer rights
The evolution of food packaging in the United States is the main reason why they can remain to supply the safest food in the world. As packaging containers are an indicator of safe consumption in food marketing, they will directly affect safe consumption rights. Meanwhile, packaging technology must also comply with the principles of food protection, environmental pollution, etc. to cope with consumer rights [2]. This explains that not only does food packaging safety expected by today’s consumer rights is to protect the food, but also to safeguard the global environment from conforming to the world trend.

(2) The infiltration issue of food packaging container material is the starting point for the reform of environmental protection and safety consumer rights
The pollution issue regarding the migration of small-molecule chemicals into food in packaging materials, such as paper, plastics, and metals, has attracted the attention of countries all over the world [3]. This infiltration phenomenon is particularly severe on hot food or in a high humidity environment. Not only does the plasticizer crisis happens in food packaging, but also baby toys and even the
disposable PVC gloves are suspected of being a source of high DEHP content during cooking. Such infiltration crisis has caused considerable controversy in the consumer market [4, 5], as well as consumer psychology panic. Furthermore, DEHP and DBP can cause dangerous interference with endocrine [6]. The higher the concentration of plasticizer in pregnant women, the higher the intensity of plasticizer in the fetus is, and the lower the intensity of male hormones is. Not only do these findings heavily hit the mind and body of consumers, but also cause environmental pollution problems and the maintenance of consumer rights. Based on the above literature reviews and analyses, the study proposes the following hypothesis:

H1: The stronger the consumer rights enthusiasm, the higher the desire for environmental protection and safety management in food packaging containers is.

3.1.2. A desire for environmental protection and safety management in food packaging containers and innovative consumption consciousness

(1) The consumer expectation in environmental protection and safety of food packaging containers is a driving force for product innovation

While packaging is protecting food safety, it also brings environmental pollution at the same time and even causes ecological damage. So, the innovative design of food packaging should be simultaneously progressed along with environmental safety. The consumer’s love and protection on the global environment have virtually become a new force to urge food packaging to march towards the green trend. Thus, various new packaging materials and packaging technologies can accelerate the progress of human food culture [7] to meet the needs of human consumption and enhance the health of both human beings and global environment.

(2) The environmental protection and safety innovation design in food packaging containers is a trend of modern consumption

The new thinking in environmental protection and safety of packaging containers is the consumer expectation and the trend of the times. Therefore, when we review the green innovative packaging design from a “redesign” perspective, we can broaden our design ideas and enhance the healthy development of the packaging industry and economic society. When the redesign is seen as a countermeasure to solve ecological environment and energy problems, it has a significant theoretical and practical value [8]. The reason is that the positive direction of redesign and the sense of innovation can significantly increase the affirmation and love in consumers. The successful anti-counterfeiting packaging design must rely on constant development of new technologies and effective integration of packaging printing process and materials to achieve the best anti-counterfeiting purpose [9]. The successful R&D of a new anti-counterfeiting function of these integrated applications has enhanced consumer confidence. At the same time, the use of environmentally-friendly inks has become the trend of the times [10], and the safety ink quality in new packaging container designs has also formed an indicator of consumer consciousness. Based on the above literature reviews and analyses, the study proposes the following hypothesis:

H2: The stronger the desire for environmental protection and safety management in food packaging containers, the higher the innovative consumption consciousness is.

3.2. Research model

Based on the relationship between variables and research hypotheses, a research structure was established by this study, as shown in Figure 1.

3.3. Research methods
There are four questions (No. 1~4) in “Consumer Rights Enthusiasm,” as listed below:
1. When you discover that the food you bought is contaminated with packaging ink, you will immediately inquiry or return the food.
2. When you discover that the food you bought has inconsistent labeling of food packaging material, you will immediately inquiry or return the food.
3. When you accidentally bought or ate the food contaminated with packaging ink and cannot get reasonable compensation from the vendor, you will definitely appeal and confine to the relevant unit.
4. When the packaging material of the food you want to buy has unclear labeling, and the vendor refuses to explain, you will definitely appeal and confine to the relevant unit.

There are four questions (No. 5~8) in “A Desire for Environmental Protection and Safety Management in Food Packaging Containers,” as listed below:
5. You will pay attention to the labeling on packaging material when buying food.
6. You will pay attention to the real-time information about environmental protection and safety in food packaging.
7. You will often read books and listen to expert explanations of green packaging materials.
8. You will often give advice or participate in discussions with the relevant units.

There are three questions (No. 9~11) in “Innovative Consumption Consciousness,” as listed below:
9. You have a stronger desire to buy food with a new environmental protection labeling.
10. You have a stronger desire to buy food with a new anti-counterfeiting packaging and safety quality design.
11. You have a stronger desire to buy food with vendors that pay more attention to the use or engage in R&D on green packaging.

4. Empirical analysis

4.1. Distribution of questionnaires
The questionnaires were issued starting from mid-February 2019, where a total of 50 pre-test copies were distributed. After conducting the reliability and validity analysis, a formal study was implemented, where 250 copies were distributed for the second time. A total of 250 valid questionnaires were distributed through the one-on-one method. (Table 1)

| Items          | Demographic factors | No | Percent |
|----------------|---------------------|----|---------|
| Age            | Male                | 127| 50.8    |
|                | Female              | 123| 49.2    |
|                | 16-19               | 58 | 23.2    |
|                | 20-39               | 66 | 26.4    |
|                | 40-59               | 68 | 27.2    |
|                | Above 60            | 58 | 23.2    |
| Education degree| Elementary school  | 12 | 4.8     |
|                | Junior higher school| 47 | 18.8    |
|                | Higher school       | 65 | 26.0    |
|                | College/University  | 71 | 28.4    |
|                | Above Master        | 55 | 22.0    |
| Occupation     | Student             | 70 | 28.0    |
|                | House-hold          | 31 | 12.4    |
|                | Freedom             | 42 | 16.8    |
|                | Salary class        | 47 | 18.8    |
|                | retiree             | 53 | 21.2    |
|                | Other               | 7  | 2.8     |

4.2. Statistical analysis
4.2.1. Reliability analysis
The Cronbach α coefficient of each latent variable was found to range from 0.909 to 0.941, indicating that the internal consistency between the questions and aspects of each latent variable was high.

4.2.2. Validity (factor) analysis
The continuity questions were performed with a layered separate factor analysis using the direct oblique rotation method. All of the above factors were extracted using the principal component analysis method, and only one common factor was extracted (the one where the eigenvalue was greater than 1). So, all the questions were retained. As only one common factor was extracted, it was unable to unwind the axis, so a composition matrix had failed to form after rotating the axis. Based on the factor loading values, these questions were of great importance in their common factors. As the commonality was high, it showed that there were many common features among the variables and other variables, so these questions were of great importance. The analysis of each latent variable showed that there was the existence of a common factor among the variables, so it was deemed suitable to carry out a factor analysis. (Table 2)

| Latent variable                      | Consumer rights enthusiasm | Environmental protection and safety management in food packaging containers | Innovative consumption consciousness |
|--------------------------------------|---------------------------|---------------------------------------------------------------------------|--------------------------------------|
| Factor loadings                      | 0.859-0.943               | 0.905-0.958                                                                | 0.871-0.917                          |
| Communality                          | 0.737-0.889               | 0.818-0.918                                                                | 0.759-0.841                          |
| Eigenvalue                           | 3.275                     | 2.641                                                                     | 4.050                                |
| Cumulative the explanation of variance | 81.881%                  | 88.040%                                                                   | 91.009%                              |
| KMO                                  | 0.846                     | 0.733                                                                     | 0.842                                |
| Bartlett’s test Chi-sq test          | 726.985 **                 | 600.768 **                                                                | 1047.064 **                          |
| df                                   | 6                         | 3                                                                         | 10                                    |
| Sign.                                | 0.000                     | 0.000                                                                     | 0.000                                |

4.2.3. Regression analysis
From the literature reviews and analyses, it is known that “consumer rights enthusiasm” is closely related to “a desire for environmental protection and safety management in food packaging containers,” and its eagerness is closely associated with “innovative consumption consciousness.” So the above continuous variables were directly performed with a regression analysis after centralization to test the validity of the hypotheses. The regression analysis of Hypothesis 1 and Hypothesis 2 is shown in Table 3.

The decision coefficient R² in the above table shows that the independent variables can explain the variance of variables 76.1% and 83.4%, so the predictive variables have significant explanatory power on dependent variables (β value is positively correlated, p<0.05, t values are 26.555, 33.352). These prove that Hypothesis 1 and Hypothesis are valid.
Table 3. Regression analysis

| Variable                                                                 | Independent variable                                  | $R^2$  | F            | Beta | t   | Sign. |
|--------------------------------------------------------------------------|-------------------------------------------------------|--------|--------------|------|-----|-------|
| Environmental protection and safety management in food packaging containers | Consumer rights enthusiasm                            | 0.761  | 705.145      | 0.872| 26.555| 0.000 |
| Innovative consumption consciousness                                     | Environmental protection and safety management in food packaging containers | 0.834  | 1112.380     | 0.913| 33.352| 0.000 |

5. Conclusion and discussion

5.1. Conclusion
Packaging containers are a primary checkpoint for food safety, and they are also the key to food safety. Meanwhile, the consumer rights enthusiasm is often tied up with physical health, the sustainability of the ecological environment, and eager anticipation for proper food packaging containers. However, this eager anticipation can inspire the packaging container practitioners to reform. It is a driving force for innovation because the practitioners understand that not only can near-zero pollution in green packaging meet the modern requirements, but also increase the consumer consciousness following the environment changes. The conscience and technology of the food packaging practitioners will thrust them to be self-motivated continuously due to the progress of the times, and continue to enhance self-discipline because they cherish life, love the earth, and like to maintain the companies’ reputation. Therefore, continuous R&D is a fundamental way for the government to supervise and reward practitioners.

5.2. Discussion
The consciousness of maintaining rights in food packaging can be an excellent educational topic, allowing all people to know its importance, and further generate a more positive and vigorous expectation in environmental safety management. Therefore, the relevant government units should properly plan education courses in the management aspects of food packaging containers. Only when consumers continue to seek knowledge will the practitioners continue to reform and innovate. The broader and more in-depth people are educated, the higher their environmental protection and safety consciousness are.
Different degrees of consumer rights enthusiasm can directly affect consumer consciousness and express it in consumer behavior. Hence, proper supervision of the practitioners by all people has much to do with food packaging management, and it is of great urgency for the government to plan relevant education courses. The research findings are worthy of reference for relevant government departments, prompting them to make earlier plans to consult and educate the public, thereby creating a safe and harmonious society, and a green ecological environment.

5.3. Future research directions
The limited personal ability and funding in this study may have caused a lack in the number of samples and areas and a discrepancy in considering the scale formulation. About the future plans, the study aims to enlarge the number of samplers in more extensive regions to analyze and compare the backgrounds of more people. Other plans include integrating the relevant literature more comprehensively, exploring the impacts of reformation and innovation on consciousness of maintaining rights in food packaging, and discussing and formulating more appropriate model variables in hope that the research findings can be more reverberation and resonance.
6. References

[1] Dou, G.L. (2010). A study on the safety design of food packaging. Master’s Thesis, Art and Design of Northeast Forestry University.

[2] Guo, R.L. (2003). Anti-counterfeiting food packaging technology. Packaging and Food Machinery, 21(6), 39-42.

[3] Hsu, W.T. Lee, D.L. and W, H. (2009). The research progress of food packaging safety at home and abroad. Packaging Engineering, 30(8), 86-88.

[4] Kenneth, M. and Betty, B. (2007). Food Packaging - Roles, Materials, and Environmental Issues. Journal of Food Science, 72(3), 39-55.

[5] Lei, K.H. (2014). The trend in using environmentally-friendly inks in printing paper food packaging containers to ensure food safety. China Food News. 2015.1.20. Abstracted from http://www.cnfood.cn/dzb/shownews.php?id=22771

[6] Lerner, I. (2001). Phthalate debate to affect plasticizers capacities. Chemical Market Reporter, 260(17), 22.

[7] Li, Y.W. (2008). A study on packaging redesign. Master’s Thesis, Jiangnan University.

[8] Taylor J.W. (1974). The role of risk in consumer behavior. Journal of marketing, 38(2), 54-60.

[9] Tsumura, Y. Ishimitsu, S. and Saito, I. (2001). Eleven phthalate esters and di (2-ethylhexyl) adipate in one-week duplicate diet samples obtained from hospitals and their estimated daily intake. Food Additives & Contaminants, 18(5), 449-460.

[10] Van Wezel, A.P. van Vlaardingen, P. and Posthumus, R. (2000). Environmental risk limits for two phthalates, with special emphasis on endocrine disruptive properties. Ecotoxicology & Environmental Safety, 46(3), 305-321.