

Short Communication

Food risk management quality (FRMQ) of government and the private firms: Consumers' perspectives in China and Korea

Renee BoYoung Kim

Hanyang University, School of Business, 17 Sungdong-gu, Haengdang-dong, Hanyang University, Seoul Korea 133-791

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Abstract

Globalization brought increased market access to Agri-food traders and exporters and consumers are more exposed to products from foreign sources. This trend is expected to continue further as major trading countries are joining regional trade agreement to establish greater trading bloc and to expand export markets. Korea and China are major trading partners of agri-food products and have initiated Korea-China FTA talk late 2012. Korea-China FTA is expected to integrate agri-food markets of the two countries. Consumers in these countries are increasingly concerned about safety of food products both from domestic and foreign sources. To enable sustainable and efficient food supply chain between the two countries, it is critical that both governments ensure development of food risk management system which takes into consideration of major stakeholders in each country. In particular, consumers' perception on the quality of food risk management which is run by the public and the private sectors may have significant impact on how consumers accept the current food supply system. The private sector of Agri-food industry increasingly implements private food risk management as part of marketing strategies. By examining how consumers differentiate the FRMQ of the public and the private sector, this paper attempts to address important guideline which may provide directions for future development of the private and the public FRMQ system in China and Korea. Findings suggest that consumers in the two countries show different expectation and evaluation on the FRMQ system.

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Introduction

The world agriculture faces some of the biggest challenges from climate change, which is fundamentally reshaping the world food supply chain. For instance, China is shifting its position from agricultural exporter to agricultural importer, affecting the world agricultural prices and adding inflationary pressure. Food security has been one of the top priorities in China and Chinese government extends its partnership and cooperation with many countries around the world to maintain a sustainable food security. Korea on the other hand, is a net importer of agri-food products and agflation brought socio-economic pressures to Korean public which made them to have renewed perspectives on food security.

Globalization brought increased market access to Agri-food traders and exporters, and consumers are more exposed to products from foreign sources. This trend is expected to continue further as major trading countries are joining regional trade agreement to establish greater trading bloc and to expand export markets. Korea and China are major trading partners

of agri-food products and have initiated Korea-China FTA talk late 2012. Korea-China FTA is expected to integrate agri-food markets of the two countries. Increased trade liberalization and market opening lead to increased competition in the agri-food industry both in Korea and China, and consumers in both nations are exposed to potential risks of food safety in products both from domestic and foreign origin. Consumers in these countries are increasingly concerned about safety of food products both from domestic and foreign sources. Thus, sustainable food risk management in the global food supply chain is a critical task for both trading partners as it is a prerequisite for food security and furthermore sustainable economic welfare and growth. To enable sustainable and efficient food supply chain between the two countries, it is critical that both governments ensure development of food risk management (FRM) system which takes into consideration of major stakeholders in each country.

Therefore, it is important that both the public and the private sectors in agri-food industry in China and Korea recognize the difference between the two countries and derive a framework of FRMQ which

*Corresponding author.

Email: Kimrby@gmail.com, Kimrby@hangyang.ac.kr

can efficiently interconnect the food supply chain in China and Korea. This may be a fundamental groundwork which is necessary to initiate plausible open trade of agri-food products between the two countries. In particular, consumers' perception on the quality of food risk management which is run by the public and the private sectors may have significant impact on how consumers accept the current food supply system. What consumers think about FRM is important to consumers as a criterion for judging FRM (Houghton *et al.*, 2008).

The private sector of Agri-food industry increasingly implements private food risk management as part of marketing strategies. By examining how consumers differentiate the food risk management quality (FRMQ) of the public and the private sector, this paper attempts to address important guideline which may provide directions for future development of the private and the public FRMQ system in China and Korea. Findings suggest that consumers in the two countries show different expectation and evaluation on the FRMQ system.

Background

In order to evaluate consumers' perception of the Food Risk Management Quality (FRMQ), five dimensions are identified as significant determinants: the *Proactive consumer protection (PCP)*; the *Scepticism in risk assessment and communication practices (SCEP)*; the *Expertise of food risk managers (TRUSTE)*; the *Honesty of food risk managers (TRUSTH)*; the *Opaque and reactive risk management (ORR)* (Table 1). This study follows a previous study of FRMQ evaluation which was conducted in EU (van Kleef *et al.*, 2006, 2007; Hought *et al.*, 2006; Krystallis *et al.*, 2007) in twenty five EU member countries to determine consumers' psychological dimensions of FRMQ which were considered to be critical in developing effective food risk management policies in EU (Figure 1). A series of studies were conducted in different EU member states. Their research identified aforementioned five constructs to be important in consumers' evaluation of EU's FRMQ and developed a model based on these constructs with a survey study. This study takes the previously established model and applies to China and Korea separately in the public and the private sectors. By examining consumers' evaluation for FRMQ of the public and the private sectors in each country, a comprehensive overview of how consumers in each country perceive and evaluate the public and the private FRMQ can be derived.

According to the World Health Organization

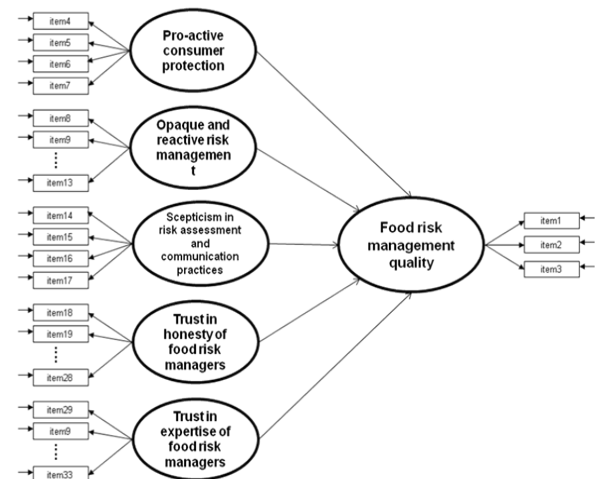


Figure 1. Structural model for food risk management quality (FRMQ) evaluation²

²This figure reports definition of the FRMQ Model in Van Kleef *et al.* (2007) and Kim (2012).

(WHO), the main purpose of food risk management is to protect consumers' health as food safety is directly related with consumers' health in numerous ways, thus protection of consumers' health should be a fundamental principle of food risk management. Consumers' concerns and expectation for food safety increased rapidly, resulting in the importance of food risk communication among major stakeholders such as consumers, government and the private agri-food industry.

In 1995, WHO and FAO jointly developed 'risk analysis framework' which includes risk assessment, risk management and risk communication, and these three measures are used to determine overall food safety management for the public health. According to internationally accepted principles and definitions, risk assessment is defined as the process of evaluation, including the identification of the attendant uncertainties, of the likelihood and severity of an adverse effect(s)/event(s) occurring to humans, food producing animals or the environment. Risk management is defined as the process of weighing policy alternatives in the light of the result of a risk assessment(s) and other relevant evaluations. It could also include the selection and implementation of appropriate control options. Risk communication is defined as the interactive exchange of information and opinions throughout the risk analysis process (EU, 2002; FAO/WHO, 1995, 1997; Cope *et al.*, 2010).

There have been recent emphases within policy circles regarding the need to implement open and transparent communication with consumers about food safety policy procedures and decision-making practices (Byrne, 2002; FSA, 2000; Millstone and Van Zwanenberg, 2002). Consequently, it has become

Table 1. Definition of six constructs of FRMQ model¹

Variables	Definition	Previous Studies
Proactive consumer protection (PCP)	The management systems that consumers perceive to be functioning with respect to food safety -consumer's perceptions of whether there is an established system for controlling food risks -the rapidity of responses to food safety problems -efforts made to prevent food risks occurrence The efficient enforcement of food safety laws	Van Kleef <i>et al.</i> , Hans van Trijp, 2007
Opaque and reactive risk management (ORR)	Captures the concepts of responsiveness to food safety problems -negative measures taken or lack of management actions taken in food safety	J.R. Houghton, 2007
Skepticism in risk assessment and communication practices (SCEP)	Capture consumers' doubts about food safety assessment and the uncertainties surrounding this	A. Krystallis; Janneke de Jonge, 2007
Trust in honesty of food risk managers (TRUSTH)	The degree to which an audience perceives the assertion made by a communicator to be ones that the speaker considers valid	Hovland <i>et al.</i> , 1953
Trust in expertise of food risk managers (TRUSTE)	The extent to which a food risk manager is perceived to be capable of making correct assertions	Hovland <i>et al.</i> , 1953
Food Risk Management Quality (FRMQ)	Consumers' evaluation of the regulatory system to manage food hazards	Van Kleef <i>et al.</i> , Hans van Trijp, 2007

¹This table reports definition of constructs in Van Kleef *et al.* (2007) and Kim (2012).

increasingly important to ascertain the best ways to communicate with the public about how food risks are managed, as well as about food safety problem *per se* (Heleen van Dijk *et al.*, 2007). Communication about what is being done by food risk managers to protect consumers may be extremely relevant to societal responses to existing and emerging food risks, as well as generating trust among consumers in the process and practiced of risk analysis (H. van Dijk *et al.*, 2008).

Consumers determines food safety and quality of a product based on diverse measures instead of referring to scientific assessment or reports, thus it is challenging for the private firms and policy makers to transcend food safety information to consumers effectively. Consumers are inclined to be heavily influenced by the media publicity of food safety scares, which may be biased or inaccurate occasionally. This may be due to increased distrust of consumers toward policymakers in terms of how they communicate food risks with the public (Pidgeon *et al.*, 2003). Therefore, it is critical that food risk managers consolidate risk assessment institution and clarify the source of food risk information by establishing an efficient food risk communication system in order to restore consumers' confidence and trust. How policymakers and the private firms develop their risk assessment and risk communication mechanism may have significant impact on the FRMQ evaluation of consumers.

Nonetheless, FRMQ in the past tend to have responsive approach instead of proactive approach as policymakers and government tend to provide solution after food safety scarce occur. Many researchers argue that by shifting the focus from responsive to proactive in FRMQ, consumers' perception toward

FRMQ may improve significantly (Krystallis *et al.*, 2007). When the source of information on food safety is not clear, consumers tend to evaluate FRMQ based on their subjective view, and lack of trust may have negative impact on their evaluation process.

To enhance consumers' trust toward the FRMQ system, it is important to involve major stakeholders in the process of FRMQ and risk communication and to make communication process of food risk transparent. There has been a societal movement toward increased public engagement in decisions over issues related to science, production and technology. Increased participation is intended to introduce a new voice into the policy arena and to act as an antidote to perceived problems with the traditional 'deficit model approach to decision making, in which officials make policy and then simply communicate this to the public, expecting the public to understand, accept, believe and support that policy (Rowe *et al.*, 2005). The public participation is considered to inform politicians and decision-makers of citizen's attitudes towards a new technology or specific issue—a process may lead to greater legitimacy and public trust and to better decision-making (Houghton, 2008). Greater public engagement is presumed to have various advantages, such as increasing democracy, decreasing dispute, enhancing trust and improving decisions (Rowe and Frewer, 2004).

Trust is very important element in effective risk communication and there have been several studies on trust issues regarding food risk communication (Van Kleef *et al.*, 2007). Many studies define trust in various ways (Renn and Levine, 1991; Johnson and Slovic, 1995; Frewer *et al.*, 1996; Johnson, 1999; Poortina and Pidgeon, 2003; Frewer *et al.*, 2003; Renn,

2006). A body of research has examined the extent to which the various agents involved in communicating information about risks trusted. These studies, however, facilitated understanding of trust concept, rather than provide public evaluation of current risk management practices (Houghton *et al.*, 2008). There has been limited research that has addressed public perception of FRM practices directly, in particular, regarding Asian countries. This study attempts to make contribution to current research on FRMQ by providing a comprehensive comparison of two major Asian countries, Korea and China by looking into their consumers' perspectives on the FRMQ of each country, separately in the public and the private sectors.

Method

To empirically derive consumers' evaluation on FRMQ of the public and the private sectors, survey study were conducted both in China and Korea in 2012. The target respondents in two markets were consumers who have interests in food safety issues and who are potential buyers of food products. In Korea, 350 surveys were collected and 322 data points were used in statistical estimation, while 350 surveys were distributed in China and 282 data points were used in empirical analysis. Structural Equation Modeling (SEM) was implemented to analyze the two sets of data and to elicit four models in total: two models of the private and the public sectors in Korea and two models of the private and the public sectors in China. AMOS 18.0 software was used to estimate a maximum likelihood function to derive these four models. The overall fit statistics suggest that four models had reasonable fit. For instance, the RMSEA values for the public and the private sectors in Korea were 0.058 and 0.055 (Table 3). For the two models in China (Table 2), the RMSEA values were 0.048 and 0.049, indicating a reasonable fit of the model to the data.

Results and Discussion

Structural equation modeling (SEM) on the Chinese and the Korean sample generates estimates of the consumers' perspectives on Food Risk Management Quality (FRMQ) of the private and the public sectors in these two countries. Results show that consumers in China and Korea had different perception toward the FRMQ of the public and the private sectors (Table 2 and 3). They appear to have different expectation toward public policy makers and private firms in agri-food industry. Chinese

consumers were found to consider the *Proactive consumer protection (PCP)* as the most important determinant affecting the level and quality of the FRMQ. Chinese consumers also consider the *Expertise of food risk managers (TRUSTE)* to be a critical factor determining the FRMQ of the public sector, while the *Honesty of food risk managers (TRUSTH)* is more important for risk managers in the private firms. Difference in their expectation toward risk managers in the private firms and the public policymakers may stem from the fact that the public policy makers set standards and guideline of overall FRMQ and professional level of knowledge and expertise may be critical in building an effective system. On the other hand, some of the FRMQ by the private firms are established on voluntary basis to enhance consumer trust and confidence in their brand and company reputation, thus Chinese consumer may think honesty and transparency is prerequisite in building a reputable FRMQ system.

Chinese consumers also showed that the *Opaque and reactive risk management (ORR)* is an important factor determining both FRMQ of the public policy makers and the private firms, although its impact was significantly less than the *Proactive consumer protection (PCP)*. The path coefficients of the *Scepticism in risk assessment and communication practices (SCEP)* were found to be insignificant both for the public and the private systems, implying that Chinese consumers were less dissatisfied regarding risk assessment and risk communication approach. Overall, Chinese consumers were more dependent on government in managing and regulating FRMQ than on the private firm's voluntary system, compared to Korean consumers.

For Korean assessment, the outcome was significantly different. At outset, it was clear that Korean consumers perceive the *Proactive consumer protection (PCP)* and the *Opaque and reactive risk management (ORR)* as important parts of government's responsibilities. Consumers in Korea expect the government to deal with prior and after the mass of food scarce incidents.

Korean consumers tend to point out the *Expertise of food risk managers (TRUSTE)* as the most critical aspect of FRMQ by the private firm. This suggests that Korean consumers demand their government to develop a proactive system of food risk management which can prevent and prepare for food scares or safety crises. They expect the policy makers to establish a constructive mechanism that sets a standard for overall national food risk management system and also provide guideline for the private firms to follow.

Table 2. Standardized estimates of path coefficients of the FRMQ model for the public and the private sectors in China

Construct	The Private Sector		The Public Sector	
	Standardized Estimates	t-value	Standardized estimates	t-value
Proactive consumer protection (PCP)	0.32	3.52**	0.67	4.34***
Opaque and reactive risk Management (ORR)	0.31	1.97*	0.34	1.72
Skepticism in risk assessment & Communication practices (SCEP)	0.01	0.06	0.24	1.31
Honesty of food risk managers (TRUSTH)	-0.24	-1.67	-0.11	-0.57
Expertise of food risk managers (TRUSTE)	0.21	1.03	-0.44	-2.04*
Goodness of Fit	x ² =415.020, df=246 RMR=.084, GFI=.895 NFI=.866, CFI=.940 RMSEA=.049		x ² =314.212, df=190 RMR=.086, GFI=.910 NFI=.882, CFI=.949 RMSEA=.048	

***p<0.01, **<0.05, *<0.10

Table 3. Standardized estimates of path coefficients of the FRMQ model for the public and the private sectors in Korea

Construct	The Private Sector		The Public Sector	
	Standardized Estimates	t-value	Standardized estimates	t-value
Proactive consumer protection (PCP)	0.25	3.73**	0.51	5.68***
Opaque and reactive risk Management (ORR)	0.18	1.30	-0.43	-3.10**
Skepticism in risk assessment & Communication practices (SCEP)	-0.26	-4.05***	-0.14	-2.61*
Honesty of food risk managers (TRUSTH)	-0.57	-3.29**	0.18	1.41
Expertise of food risk managers (TRUSTE)	0.39	4.47***	0.12	2.23*
Goodness of Fit	x ² =702.008, df=354 RMR=.060, GFI=.871 NFI=.886, CFI=.948 RMSEA=.055		x ² =623.353, df=299 RMR=.046, GFI=.874 NFI=.906, CFI=.948 RMSEA=.058	

***p<0.01, **<0.05, *<0.10

Recently, there have been frequent cases of food safety scares which have been ineffectively communicated, leading to increased distrust of Korean consumers. Public responses to uncertain food risk information may depend on past experience with how scientific uncertainty has been communicated by risk managers in the past (van Dijk *et al.*, 2008). In response to this, Korea Food Drug Administration (KFDA) initiated a comprehensive reform in its food safety regulatory measures, by introducing excellence accreditation system which encourages and facilitates the private firms' voluntary food risk management in 2012. This system endows excellence accreditation

to a private firm which applies for accreditation evaluation and passes the standards. The standards for food risk assessment were established according to international standards and comply with IOS 17025. The firms with the accreditation can release and promote its risk assessment system and receives various government financial supports.

Under this new system, it is inevitable for the private firms in Korea to implement its voluntary food risk assessment system, thus encouraging competition for food safety among the private firms in agri-food industry. In addition, Korean government intends to lay out infrastructure of private food risk management

system (FRMQ) to enhance competitiveness of Korean agri-food firms in international expansion. One of the downsides of Korean public FRMQ is structural issues.

On the other hand, Korean consumers seem to emphasize the *Expertise of food risk managers (TRUSTE)* in their operation, which was contrary to Chinese consumers. Difference may arise from the fundamental difference in industrial structure and the extent of government regulation in the industry. Korea has relatively more privatized industrial structure in which majority of the agri-food firms privately owned and operated, while China has several major agri-food firms which are publically owned or incorporated, otherwise heavily regulated by the government system. Therefore, Korean consumers expect the private firms to have professional level of knowledge and expertise in their voluntary management system while Chinese consumers perceive this to be largely important for the public policy makers.

Korean consumers tend to have relatively high level of the *Scepticism in risk assessment and communication practices (SCEP)* toward the private firms. This may be due to the fact that there have been several food scare incidents in the past in which the private firms attempted to hide their faults. These negative experiences in the past lead Korean consumers to be more skeptical regarding the way the private firms manage their food risk assessment and risk communication. It was evident that Korean consumers are concerned about the integrity of the private firms in their FRMQ system.

Implications

Both Chinese and Korean consumers emphasized the importance of proactive consumer protection in operating the FRMQ. Government policy makers should invest sufficient resources in building framework and measures for proactive risk management system. It is even more important that details of the development of such system be effectively communicated with consumers and the public. The policy makers should relentlessly communicate specific measures and mechanism which are prepared to protect and prevent the public from potential food risks. It should be noted that reactive management approach in dealing with food scarce incidents may be ineffective and inefficient in recovering consumer confidence. Korean private firms may need to emphasize the advancement in their FRMQ and promote the expertise of the FRM team by opening the food risk assessment methods and communicating actively with consumers. Chinese

consumers appear to rely more on the public policy makers regarding the FRMQ than on the private firm's voluntary system, and due to the inherent structural characteristics of Chinese agri-food industry, it may be more plausible for the public policy makers to enlarge its leading role in the process of advancing FRMQ in China.

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