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# Implementation of HACCP system in China: A survey of food enterprises involved

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**Abstract**

The paper reports the results of the study on *HACCP* implementation in China based on analyzing the findings of a survey on 27 food enterprises involved. The results indicate that large- and medium-sized food enterprises dominate over the implementation of *HACCP* system in China. The product types produced by food enterprises in China that implement *HACCP* system are those with a hold in international market. China's food enterprises take the implementation of *HACCP* system as a strategy to gain market competition advantage. The top incentives for China's food enterprises implementing *HACCP* system are that *HACCP* system can provide them more chances to access to new markets, improve product quality and increase market share, showing that the major incentives of *HACCP* implementation in China are market-oriented.


*Keywords:* *HACCP*; Food industry; Food safety

## 1. Introduction

With the concentration of urban population, development of public hygiene, change of consumers' food preparation methods, and increase of international food trade, Chinese show more and more interests in food safety than they did a few years ago. As an approved valid food safety management system for lowering microorganism, *Hazard Analysis Critical Point (HACCP)* system has been spread by FAO and WHO to help consumers obtain safer food (Ehiri, Morris, & McEwen, 1995). Even in developing countries, implementing and operating *HACCP* system in the whole food industry has become a kind of trend as well. By the end of April of 2004, about 4600 food enterprises has obtained third-party *HACCP* certification or validity check by Entry–exit Inspection and Quarantine Bureaus in all quarters of China (Certification and Accreditation Administration of the People's Republic of China, www.cctv.com/news/xwlb/20041114/100679). However, the *HACCP* certified or validity-checked enterprises still occupy a small proportion considering that there are more than 15,710 enterprises in China's food processing industry and food manufacturing industry (Yearbook of China's Food Industry, 2004).

Progressing, incentives and outcomes of *HACCP* implementation vary widely among food enterprises throughout the world since *HACCP* implementation requires a complex interrelation among governments, industry and consumers (Salay & Caswell, 1998). Some researchers have reported the results of study on progressing, incentives, barriers, costs and benefits of *HACCP* implementation in food industries of different countries based on analyzing the survey data of food enterprises involved. For example, Mayes and Mortimore (2001) drew on a wide range of practical experience, from large to small companies, manufacturers and regulators in developed and developing countries; and

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then in a wide-ranging and authoritative conclusion, they drew together the key lessons and issues for the future. Henson, Holt, and Northen (1999) reported the condition of *HACCP* implementation in British by taking dairy product industry as an example. Taylor (2001) acknowledged the importance of small enterprises across the food chain and analyzed barriers and benefits of *HACCP* implementation in small enterprises. Maldonado et al. (2005) reported the condition of *HACCP* implementation and operation, and the benefits that Mexican meat industry gained from *HACCP* operation. However, there still isn't an empirical study from China on how the *HACCP* implementation is progressing.

Studies in the fields of *HACCP* implementation and operation in China mainly focused on discussing the function of *HACCP* system and on how to operate *HACCP* system in certain food service industry like meat processing industry, fast food industry, canning industry, dairy processing industry, brewing industry, etc. Yu, Luo, Xiao, and Ye (2005) reported the processes of implementing *HACCP* in meat processing industry and identified *CCPs* of meat process enterprises. Song (2005) analyzed the status of *HACCP* implementation in brewing industry and interpreting the processes implementing *HACCP* system in brewery. Zeng, Wang, Zeng, and Lin (2005) analyzed the possible risks during the production process of canned shrimp and then identified the *CCPs* during the production process and settled down threshold values. Zhang, Wu, Wu, and Guo (2004) discussed the major difficulties implementing and operating *HACCP* system in China's food enterprises; they demonstrated five major difficulties when implementing HACCP: managers' incorrect concepts on quality control, enterprise size, product type, enterprise type and customers' request, and they also distinguished three major difficulties when operating HACCP system: cooperation among managers, spiriting and training staffs and lack of necessary facilities; however, their study was a kind of theoretical analysis rather than an empirical study, so these conclusions need further validating.

## 2. Materials and methods

Fieldwork was conducted by referring to the methodologies proposed by Maldonado et al. (2005), Bredahl and Holleran (1997), Martin, Bowland, Calingaert, and Dean (1993) with questionnaires adapted to China's food industry.

Since China Quality Certification Center (CQC)[1] is China's biggest, earliest-established and most authoritative organization providing various third-party certifications including *HACCP* certification, the target population of the paper were 45 food enterprises with fully operational *HACCP* system certified by CQC in three provinces of Fujian, Hebei and Liaoning, which locate in three regions of China, Fujian in Southwest, Hebei in Center and Liaoning in Northeast. The questionnaires were sent by faxes, emails and letters on target population demands in June of 2005, and 39 questionnaires were returned by the end of August, among which 27 were fully answered and could be used as data source for further analysis.

## 3. Results and discussion

### 3.1. Business structure of survey respondents

According to Chinese criteria, 18.5% of the respondents were large-sized (over 2000 employees, over RMB 300 million Yuan of sales and over RMB 400 million Yuan of total assets), 63.0% were medium-sized (300–2000 employees, RMB 30 million–300 million Yuan of sales and RMB 40 million–400 million Yuan of total assets) and 18.5% were small-sized (less than 300 employees, less than RMB 30 million Yuan of sales and less than RMB 40 million Yuan of total assets).[2] The results showed that large- and medium-sized food enterprises dominated over the implementation of *HACCP* system in China.

### 3.2. Ownership structure of respondents

Sino-foreign contractual joint venture (37.0%) and privately owned and operated business (29.6%) dominated over the implementation of *HACCP* system in China, followed by exclusively foreign-owned enterprise (22.2%) and Government facility (11.1%). And among the 27 respondents, five are national agriculture industrialization key dragonhead enterprise designated by the State Council and six are provincial agriculture industrialization key dragonhead enterprise at provincial level.

### 3.3. Product types of respondents

Fig. 1 detailed the product types of respondents surveyed. The products most widely produced by respondents were meat products (24.2%), which were followed by can products and frozen fruit & vegetable products. All of the three kinds of products are China's traditionally predominant export products, indicating that accessing overseas markets is one of the most important reasons for China's food enterprise operating *HACCP* system.

And among the 27 respondents, 21 enterprises produce only one kind of product, whilst six enterprises produce more than two kinds of products. However, all the respondents produced more than one series of products.

[1] CQC, including 45 branches in the domestic and abroad, is a third-party certification body authorized by Chinese government and takes responsibility for certification only. As a member of International Certification Network (IQNet), CQC conducts *HACCP* certification from 2001. CQC has also signed Mutual Recognition Agreements with many overseas certification bodies, which brings great reputation to it.

[2] The data of *employee number*, *annual sales* and *total assets* of respondents are those at the year-end of 2003.

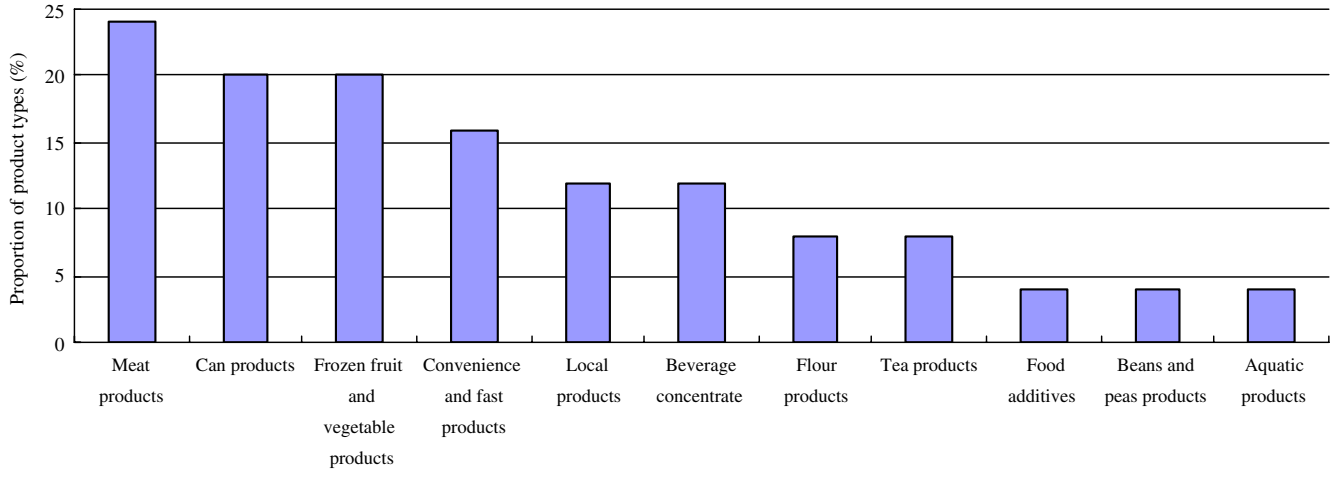


Fig. 1. Product types of surveyed respondents.

%

All the respondents surveyed dealt not only in domestic market but also in international market, although different respondents indicated different export proportion ranged from 0.4% to 100%. Fig. 2 showed the respondents' export markets. The major export market is Japan since 74.1% of respondents indicated that Japan is one of their most important export markets, followed by Europe Union, Hong Kong, Macao, Taiwan, and Southeast Asia.

### 3.5. HACCP status of respondents

CQC has verified *HACCP* system in all the respondents; furthermore, 100% of respondents claimed that they had fully operation of *HACCP* system in place. Results also showed that 55.6% of respondents had a fully operational *HACCP* system for more than 18 months, and 100% had a fully operational system for at least 6 months.

Among the 27 respondents, 44.4% had adopted *ISO-9000: 2000* quality standards, which was introduced in 1987 by the International Organization for Standardization (*ISO*) (International Organization for Standardization, 1999), for at least 6 months before implementing *HACCP* system; 40.7% implemented *HACCP* and *ISO9000* systems almost at the same time[3]; only 3.7% had adopted *HACCP* for at least 6 months after implementing *HACCP* system; and still 11.1% has not implemented *ISO9000* system. Most enterprises responded that they had first adopted *ISO9000* system and then moved to *HACCP* system because implementing *ISO9000* system helped prepare for implementing *HACCP* system and made the full operation of *HACCP* system easier.

Respondents were asked to indicate how long it took from their starting to implement *HACCP* system to fully operating *HACCP* system. 77.8% of respondents indicated that the whole process took 6–12 months; however, 14.8% less than 6 months.

### 3.6. Incentives of implementing HACCP system of respondents

Respondents were required to rank the incentives of implementing *HACCP* system in order of importance. Results showed that the top incentives for respondents' implementing *HACCP* system were that *HACCP* system would provide them more chances to *access to new market*, *improve product quality* and *increase market share* (Table 1), which showed that the major incentives of *HACCP* implementation in China's food industry were market-oriented. Further investigation showed that meeting the *HACCP* certification requirement of certain major export markets, such as America, Japan and Europe Union, was one of the most important reasons for respondents implementing *HACCP* system. Results suggested that China's food enterprises take *HACCP* system as a strategy to gain market competition, not only just to gain marketing/competitive advantage in domestic markets but also to improve competitive ability in global market.

## 4. Conclusion and suggestion

### 4.1. Conclusion

The study introduced the implementation of *HACCP* system in China by analyzing the results of a survey on 27 enterprises.

Large- and medium-sized food enterprises dominate over the implementation of *HACCP* system in China, among which Sino-foreign contractual joint venture and privately owned and operated enterprises occupy a larger proportion which not only shows that foreign-funded enterprises are stricter in product quality control but also indicates a development trend of ownership structure in China's food industry. Small-sized food enterprises in China has little incentives to implement *HACCP* system by now, as

[3] *Same time* here means that the span between the time pass *HACCP* certification and the time passing *ISO* certification is less than 6 months.

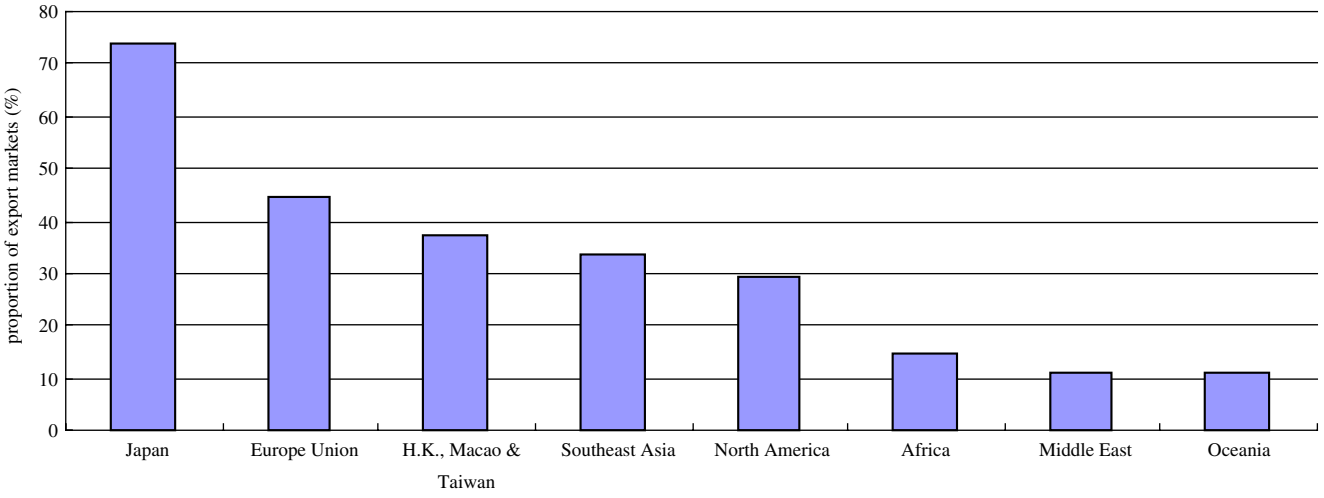


Fig. 2. Export markets of surveyed respondents.

Table 1
Rank sores of incentives implementing *HACCP*

| Incentives | Mean scores[a] |
|---|---|
| Comply with regulatory requirement | 1.92 |
| Comply with customer requirement | 1.17 |
| Increase product quality | 3.54[b] |
| Reduce production cost | 2.06 |
| Increase market share | 2.58 |
| Access to new market | 3.67[b] |

[a] 7 = very important and 1 = unimportant.
[b] Items are not significantly different to each other at 5% level based on Wilcoxon signed rank test.

acknowledged by Taylor (2001), small companies may face more difficulties to implement *HACCP*, such as time cost and documentation required by *HACCP*. Therefore it is necessary for Chinese regulation organizations to make effective policies and plans to incentive small enterprises to implement *HACCP* since small-sized enterprises occupy a more considerable proportion in China's food industry.

The top incentives for enterprises implementing and operating *HACCP* system are market-oriented, and enterprises take *HACCP* implementation as a strategy to gain market competition advantage. It's reasonable that all the surveyed respondents are exporting enterprises considering that product quality control systems of most developed countries are stricter than those of China. However, this kind of dualistic structure should not last over a long period of time since the health of domestic consumers is same as that of foreigners.

The types of products in the enterprises operating *HACCP* system are China's traditionally predominant export products, which show, from another angle, accessing overseas markets is one of the most important reasons for China's food enterprise operating *HACCP* system.

Most food enterprises take 6–12 months to implement *HACCP* system in China; *ISO* system prepares for implementing *HACCP* system and makes the full operation of *HACCP* system easier.

### 4.2. Suggestion

(a) Since food chain is only as strong as its weakest link, policy maker should take measures to motivate small-sized food enterprises. Firstly, since food enterprises' motivation of implementing *HACCP* system determines on their prior expectations of the costs and benefits involved, policy makers should make more researches on the quantitative value of costs and benefits of implementing and operating *HACCP* system, and take due regard of these costs and benefits when making regulation policies and offering directions to food enterprises. Secondly, *HACCP* implementation in small enterprises requires intimate cooperation among regulation departments, trade societies, and educational and training service organizations. Considering the higher cost of *HACCP* implementation in small enterprises, it is improper for regulation departments to force them implement *HACCP* because mandatory measures may hinder the development of food industry in China. Therefore, *HACCP* implementation in small enterprises requires intimate cooperation among the above-mentioned three organizations. And then on the basis of making experiments and training, different reference models can be framed and provided to different food industries.

(b) All the surveyed respondents are exporting enterprises, which shows not only that non-exporting enterprises have weaker motivation to implement *HACCP* but also that food producers show more concern for the quality of products sold in developed countries than that sold in domestic markets. A major reason is the stricter quality control measures and higher penalty in those countries. Compared with these, lower regulation efficiency and immature mechanism making unqualified enterprises difficult to quit market in China. And part of consumers, especially consumers in rural areas, still show no preference for

qualified safe food with higher price. Therefore, based on implementing quality safety admittance system (QS system) across China, the nature of the risks inherent in unsafe food must be communicated more effectively to consumers and help foster consumers' preference for safe food so as to impose pressures on small food enterprises since most of their customers are the end-users.

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