

Evaluation of HACCP Implementation within Food Industry in China

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Abstract: This study assessed the implementation of HACCP system in Chinese food industry. The project aimed to evaluate the extent of HACCP implementation within food manufacturers in China and identify major barriers to this system. The results of this study indicate that most participants had implemented HACCP, while the others that did not implement this system had several characteristics, including small scale. Private Ownership Company and mainly focusing on the domestic market. The application of the system is hampered by several obstacles, such as the high cost of establishment and maintenance and the low recognition of HACCP system in China. Therefore, it is necessary to provide adequate support and propagate and train about food safety knowledge in order to promote the food safety consciousness of public.

Keywords: HACCP; Food Industry; Impact Factors; Food Safety Management Systems

1. Introduction

HACCP (Hazard Analysis and Critical Control Point) has become the global food hygiene quality control concept. In recent years, the United States, Canada, Australia, the United Kingdom, and the country have also promoted and adopted the HACCP standard, and issued corresponding regulations, respectively, and proposed the HACCP model for different types of food. Due to technical barriers of food export, China has promoted and applied HACCP system in seafood production companies since the 1990s, and then HACCP system has been developed in many fields in order to meet the requirement of exporting food. After systematically studying the HACCP, Chinese food industry gradually reached a consensus that HACCP system is not only a “knocking door” for food enterprises to enter international market, but also to improve Chinese food hygiene standards, reduce the difficulty of food supervision, and control food safety risks.

Although HACCP system has been implemented in China for more than ten years, there are still many barriers such as uneven development, lack of regulations, lack of professional employees, which restricts the further promotion and development of HACCP system in China. The researcher hopes to systematically analyze the implementation of HACCP system, and proposes the main problems and suggestions for improvement of HACCP system.

2. Method

2.1 Questionnaires based on survey design

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In this study, the electronic questionnaires was designed for Chinese food manufacturers. It takes about 3 minutes to complete the “the Condition of HACCP implementation in Chinese food industry”. The researcher used close-ended question, so it can decrease the time needed to complete. The questionnaire designed for Chinese food manufacturers is separated into two parts. The first section includes five questions to collect the basic characteristics of samples such the main products, main market and company scale. The second section has 11 questions, which was designed to evaluate their attitude towards the importance and benefits of HACCP implementation, the last question measured the main barrier when food manufacturers implement HACCP system.

2.2 Survey population

The sample population of this study includes Chinese food manufacturers, especially those employees who work in food hygiene and food safety departments. In addition, the consumers who live in China are another sample group of this project.

3. Results

The collection date is from June 3, 2020 to June 17, 2020, during this period, 322 questionnaires were sent and then 69 were returned back (66 answers were completed and 3 answers were not finished) in total. After removing those which are not completed, 66 usable respondents were obtained for an effective response rate of 18.6%. All respondents work in the safety management department of food companies now.

3.1 The characteristic of sample companies which have implemented HACCP

According to the Table 1, about 85% of food companies without a HACCP system were private companies. Comparing with the respondents which did not implement HACCP system, the sample companies with HACCP system had more employees and in these sample enterprises which implemented HACCP system, the number of sample enterprises employed more than 300 employees was 23 (43.39%). When sample companies were asked to indicate their main market, all 13 of sample companies which did not implement HACCP system indicated that they were focus on the domestic market, and there were currently no products exported to other countries. The sample companies that established HACCP system focused on sales in foreign markets. The respondent’s company location and key products were asked also. The results showed that companies’ mainly producing fruit and fruit products had the highest HACCP implementation rate, but the lowest HACCP implementation rate was also this kind of sample enterprises, which was useless. The result of sample enterprises location was same as the results of sample companies’ main products. This is because that the main product categories and location of the sample companies distributed uneven in this study.

Table 1. The specific characteristics of implementing HACCP companies (n=431)

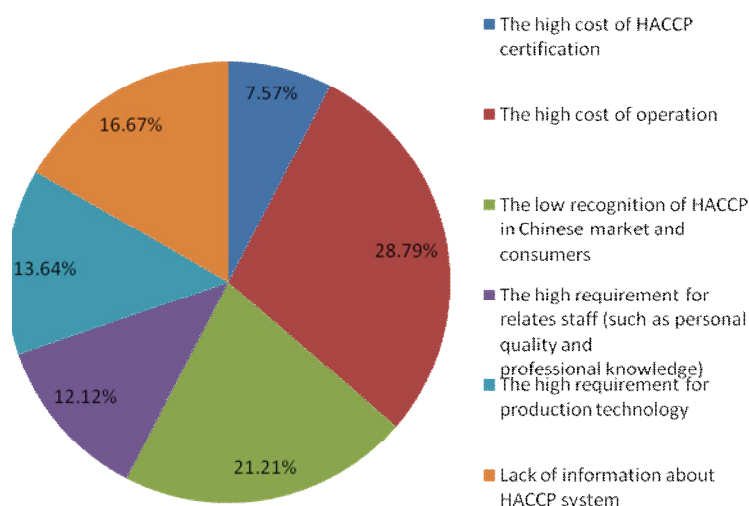
Characteristic		Frequency (valid %)	
		HACCP status	
		Yes	No
Main products	Dairy	8(15.09)	2 (15.38)
	Meat and meat products	9 (16.98)	2(15.38)
	Grain products	6 (11.32)	3 (23.09)
	Vegetable and vegetable products	9 (16.98)	2(15.38)
	Fruit and fruit products	12 (22.65)	4 (30.77)
	Beverages	8 (15.09)	0 (0)
	Others (food additions)	1 (1.89)	0 (0)
Type of companies	Private enterprises	37 (69.81)	11 (84.62)
	State-owned enterprises	6 (11.32)	0 (0)
	Sole investment foreign enterprises	5 (9.43)	0 (0)
	Joint-venture foreign enterprises	5 (9.43)	2 (15.38)
Number of employees	up to 20 employees	0 (0)	7 (53.85)
	between 20 and 300	30 (56.61)	4 (30.77)
	between 300 and 1000	18 (33.96)	2 (15.38)
	more than 1000	5 (9.43)	0 (0)
Location of sample companies	Fujian	31(58.49)	7 (53.85)
	Henan	9 (16.98)	3 (23.08)

	Guangzhou	1 (1.89)	0 (0)
	Beijing	2 (3.77)	0 (0)
	Hebei	1 (1.89)	1 (7.69)
	Jiangsu	4 (7.55)	1 (7.69)
	Zhejiang	2 (3.77)	1 (7.69)
	Hubei	3 (5.66)	0 (0)
Main market	Export market	9 (16.98)	0 (0)
	Domestic market	25 (47.17)	13 (100)
	Both of them	19 (35.85)	0 (0)

3.2 The main difficult point of HACCP implement in Chinese sample companies

According to Figur 1, 28.79% of participants regard the high cost of operation as the main difficulty when they implement HACCP system. 7.57% of participants think the high cost of HACCP certification is the main difficult point. 21.21% of participants consider that it is the main difficulty for their companies that the recognition of HACCP in Chinese market and consumers is too low. Moreover, 16.67% of participants think in their companies, lack of information about HACCP is the biggest problem when they implement HACCP system. The high requirement for relates staff (such as personal quality and professional knowledge) is another main difficulty in 12.12% of participants' opinion. Besides, 13.64% of participants think when they implement HACCP system, the most difficult problem is the high requirement for production technology.

Figur 1. The main difficult point of HACCP implement in Chinese sample companies. (n=66)



4. Discussion

4.1 Implementation of HACCP in food manufacturers

According to the results, more than 80% of sample companies have implemented HACCP system, the other sample enterprises that have not implemented HACCP are mainly private enterprises with small scale (fewer than 300 employees), and most of their products are sold in domestic market. In 2006, Shao, Zhou and others conducted a similar survey for 117 food enterprises in Zhejiang Province, China. The results show that only 55.26% of sample companies had implemented HACCP system, which indicates that HACCP system has developed rapidly between 2006 and 2019 in China.

The biggest incentive for food enterprises to implement and operate HACCP system is market-oriented, and most enterprises adopt HACCP implementation as a strategy to gain market competitive advantage (Bai, Ma and et al, 2007). In developed countries, the food industry is under a relatively strict food regulatory system (Henson, and Jaffee, 2007). If Chinese food enterprises plan to export their products to these countries, HACCP system will be needed to implement to meet these regulations. In addition, GB/T27341-2009 issued in 2009 clearly stipulates that the mandatory export of food enterprises installs the HACCP system, so enterprises that have not passed the HACCP certification have no qualification

for export and cannot enter international market.

For the main products of food enterprises, Wang points that among the sample companies that have implemented HACCP system; And their main products are concentrated almost entirely in soft drinks, meat, canned meat products, frozen fresh vegetables and fruits are the main products. These kinds of products are with comparative advantage in the international market, which shows that the motivation of Chinese food enterprises to implement HACCP is mainly related to entering the international market (Wang, 2011).

4.2 Major barrier to implementation HACCP

Although HACCP system can bring extensive benefits for manufacturers, implementing successfully has been limited. Table1 illustrated the main difficult point to implementation HACCP in Chinese food enterprises and it showed that most sample enterprises chose “high cost of HACCP operation” as the primary difficulty, which was same as the findings from Herath & Hansen (2010); Panisello&Quantick (2001); Siman et al. (2014).When enterprises implement HACCP considerable changes will be required in employees training, new equipment, and verifications, which needs need sufficient financial supports. However, in fact, FSMS will not be given priority to invest after obtaining funds because it is always considered adequate.

“The low recognition of HACCP in Chinese market and consumers” is another difficulty which was chosen by more than 20% of sample companies.Wang did a familiar survey about HACCP certification in 2006 and the results show that only 16.5% of sample consumers know what HACCP is (Wang, 2007). Besides, another research about Chinese consumer’ willingness to pay for HACCP was conducted by Yin in 2012. According to this research, the percentage of sample consumers who know HACCP system is 28.0% (Yin, 2013). Comparing with Yin’ results and Wang’ results, the percentage of Chinese consumers who know HACCP system is steadily low and the consumer recognition of HACCP have not been improved. For Chinese food industry, Liu, Tang & Xian (2008) pointed that government and food enterprises have limited publicity on HACCP and this is the main reason for the low recognition of HACCP in Chinese market and consumers.

4.3 Recommendation

4.3.1 Consider from an enterprise’s perspective

First of all, food enterprises which have implemented HACCP should focus on improving production technique and control the quality strictly in order to increase the reputation and recognition of HACCP system in Chinese market.

Secondly, while improving product quality, companies also need to pay attention to control production costs because consumers are not willing to accept excessive price increases. Therefore, enterprises should concentrate on technological innovation and strive to reduce costs so as to increase profits and enhance the competitiveness of enterprises. Finally, food enterprises can add the benefits of HACCP into their advertising.

4.3.2 Consider from the government’s perspective

The government should support and encourage food manufacturers to implement HACCP system. SMEs that voluntarily implement HACCP but lack funds should be given appropriate subsidies and preferential policies.

First, the government should regulate HACCP certification market and establish a scientific, independent, fair and authoritative third-party certification institution.

Secondly, it is necessary to raise consumers’ recognition of HACCP certification. After all, consumers’ understanding and recognition of HACCP certification is the direct driving force for food manufacturers to improve the preventive food safety control system and implement HACCP. In response to this, the government should introduce HACCP system and other food safety knowledge to consumers by various media advertisements such as television, internet, newspapers, etc.

5. Conclusion

The study assessed the condition of HACCP implementation within Chinese food industry. The results of this study are consistent with the assumptions that most food companies in China have implemented HACCP system, but many small-scale private companies do not adopt the HACCP system and their productions mainly sale on domestic market instead of exporting to another countries. The obstacles to implementing HACCP system are: high cost of establishment, low recognition of HACCP in Chinese market and consumers and lack of professional information about HACCP

References

1. Guo Z, Bai L, Gong S. Government regulations and voluntary certifications in food safety in China. *Trends in Food Science & Technology* 2019.
2. Beina Y. Research about the influencing factors of consumers' willingness to pay for HACCP—Take consumers in Tianjin as an example. University of Tianjin 2013.
3. Jin S, Guo H, Mao F, et al. Willingness to pay for implementing HACCP systems in China's small and medium-sized food enterprises. *International Journal of Food and Agricultural Economics (IJFAEC)* 2013; 4: 25.
4. Brace I. Questionnaire design: How to plan, structure and write survey material for effective market research. Kogan Page Publishers 2018.
5. Xu J, Kang Q, Song Z, et al. Applications of mobile social media: WeChat among academic libraries in China. *The Journal of Academic Librarianship* 2015; 41(1): 21-30.
6. Yanna W. Consumers' willingness to pay for the HACCP certification: Based on an investigation of milk products in Beijing. *Journal of Chinese Institute of Food Science and Technology* 2007: 1.
7. National Bureau of Statistics of China. Methods for the statistical division of small, medium and large enterprises (2017)URL:http://www.stats.gov.cn/tjsj/tjbz/201801/t20180103_1569357.html.
8. Wallace, C.A., Sperber, W.H., Mortimore, S.E. Food safety for the 21st century: Managing HACCP and food safety throughout the global supply chain. John Wiley & Sons 2018.
9. Wu L, Xu L, Zhu D, et al. Factors affecting consumer willingness to pay for certified traceable food in Jiangsu Province of China. *Canadian Journal of Agricultural Economics/Revue Canadienne d'Agroeconomie* 2012; 60(3): 317-333.
10. Bai J, Zhang C, Jiang J. The role of certificate issuer on consumers' willingness - to - pay for milk traceability in China. *Agricultural Economics* 2013; 44(4-5): 537-544.
11. Jin S, Zhang Y, Xu Y. Amount of information and the willingness of consumers to pay for food traceability in China. *Food Control* 2017; 77: 163-170.
12. Bai L, Ma C, Yang Y, et al. Implementation of HACCP system in China: A survey of food enterprises involved. *Food Control* 2007; 18(9): 1108-1112.
13. Jin S, Zhou J, Ye J. Adoption of HACCP system in the Chinese food industry: A comparative analysis. *Food Control* 2008; 19(8): 823-828.
14. Guo Z, Bai L, Gong S. Government regulations and voluntary certifications in food safety in China: A review. *Trends in Food Science & Technology* 2019.
15. Bai L, Ma C, Yang Y, et al. Implementation of HACCP system in China: A survey of food enterprises involved. *Food Control* 2007; 18(9): 1108-1112.
16. Henson S, Jaffee S. Food safety standards and trade: Enhancing competitiveness and avoiding exclusion of developing countries. *The European Journal of Development Research* 2006; 18(4): 593-621.
17. Liu A, Shen L, Tan Y, et al. Food integrity in China: Insights from the national food spot check data in 2016. *Food Control* 2018; 84: 403-407.
18. Wang Z, Mao Y, Gale F. Chinese consumer demand for food safety attributes in milk products. *Food Policy* 2008; 33(1): 27-36.
19. Herath D, Henson S. Barriers to HACCP implementation: evidence from the food processing sector in Ontario, Canada. *Agribusiness* 2010; 26(2): 265-279.
20. Panisello, P.J., Quantick, P.C., Knowles, M.J. Towards the implementation of HACCP: results of a UK regional survey. *Food control* 1999; 10(2): 87-98.
21. Bas, M., Yüksel, M., Cavusoglu, T. Difficulties and barriers for the implementing of HACCP and food safety systems in food businesses in Turkey. *Food Control* 2007; 18(2): 124-130.