

Factors Affecting HACCP Practices in the Food Sectors : A Review of Literature 1994 ~ 2007

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Abstract

Almost every country around the world has been focusing on food safety in intense and multifaceted ways. The use of Hazard Analysis Critical Control Points (HACCP) is widely accepted as a food safety management system. This paper investigates the success factors of HACCP practices with reference to the domains of food production, processing and delivery. A literature review of food safety and management articles was conducted. Using the key-words search, the online Emerald Database was used and a total of 102 journal articles were identified between 1994 and 2007. The study examined a list of 20 success factors. Results show that 'food regulations,' 'role of the industry,' 'government policies and interventions,' 'training on food safety and hygiene,' and 'food contamination and/or poisoning' share the spotlight as being the most critical factors for HACCP practices in organisations. Future research could investigate a holistic paradigm that incorporates the success factors and aligns HACCP measures for attaining safety performance goals.

Key Words: HACCP, Food Safety, Factors, Implementation

1. Introduction

According to the World Health Organisation (WHO), disease can either be food, air or water borne. As such, food borne disease is any disease of an infectious or toxic nature caused by, or thought to be caused by the consumption of food or water. It can either be of a microbiological, chemical or physical nature (Griffith, 2006a). Food safety, synonymous with food hygiene, embraces anything in processing, preparation or handling of food to en-

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sure that it is safe to eat (Griffith, 2006b). The responsibility of food safety encompasses various food sectors of people, including producers and processors of food, governments and the consumers themselves (Griffith, 2000).

It is in an effort to satisfy the responsibility that food safety standard such as Hazard Analysis Critical Control Points (HACCP) has been developed. Nowadays, HACCP has been developed as a food safety management system, which concentrates prevention strategies on known hazards and the risk of them occurring at specific points in the food chain. HACCP is an umbrella term used to describe various activities that affect food safety. Food safety authorities in the United States, Canada and European Union (EU) promote the use of HACCP. Consequently, there is a growing need to promote appreciation for and understanding of HACCP by governments and the food industry, particularly in developing countries.

Identification of success factors for HACCP implementation has begun in recent years, and these factors are being applied by some organisations, but more research is needed to define and make them universal. This paper investigates the success factors of HACCP practices in organisations with reference to the domains of food production, processing and delivery. A literature review of food safety and management (FSM) articles was conducted to explore the need of adopting HACCP practices and identify the factors affecting the implementation of HACCP to achieving safety performance goals in organisations. The paper describes the methodology used and presents the findings of the study.

2. Need of Adopting HACCP Practices

Adopting HACCP assists companies to comply with legislation, supports due diligence and fulfills customer requirements for a food and safety management system. The introduction of a common food hygiene approach across the European Community through directive 93/43/EEC was achieved within the UK in 1995, by the Food Safety (General Food Hygiene) regulations, which legally requires the HACCP approach. Industry guides to good hygiene practices are voluntary guides providing more detailed advice on complying with the regulations as they relate to specific sectors.

The objective of the HACCP system is to guarantee food safety by implementation of a quality system, which covers the complete food production chain, from the primary sector up to the final consuming of the product. Food manufacturers are not only responsible for the Good Manufacturing Practices within their respective organisations, but must also address the possible hazards (Arnjadi and Hussain, 2005). For example, if there is a possibility that the raw materials are exposed to certain hazards, a manufacturer is responsible to check if and how the supplier of the raw materials controls this hazard. Also, the manufacturer must sup-

ply the consumer with sufficient information about handling of the product to avoid hazards, which can occur during cooking and/or storage of the product.

The application of HACCP is not limited to food manufactured and processed by medium to large-scale operations but may also be applicable to smaller operations where safety of foods is of critical importance. HACCP is the system of choice in the management of food safety, and is compatible with that of quality management systems, such as ISO 9000 series (Manning *et al.*, 2006; Nguyen *et al.*, 2004). Many food manufacturers and processors have already applied the HACCP system to their operations. The level of safety assurance offered by the HACCP system is fast becoming the standard for the food industry in industrialised countries.

3. Methodology

3.1 Literature Search Method

There is extensive literature on food safety and management (FSM). In order to identify the determinants of HACCP practices in industries, an attempt to search the related literature was made. The initiative covered the period of January 1997 to December 2007. The search was limited to publicly available journal articles in food safety and related areas. Online databases, mainly the Emerald Database (www.emeraldinsight.com), were hired and a set of relevant search keywords, such as food safety, HACCP, implementation and success factors,

Table 1. Searched Journals in FSM and Related Areas, 1994~2007

No.	Name of Journals	No. of Articles
1.	British Food Journal	54
2.	Nutrition and Food Science	20
4.	Supply Chain Management: An International Journal	5
3.	International Journal of Contemporary Hospitality Management	5
5.	International Journal of Quality and Reliability Management	4
6.	International Journal of Retail and Distribution Management	2
7-	Other Journals with an article:	12
18	Benchmarking for Quality Management and Technology; Economic Determinants of Food Safety Control; European Journal of Innovation Management; Industrial Management and Data Systems; International Food and Agribusiness Management Review; International Journal of Health Care Quality Assurance; International Journal of Physical Distribution and Logistics Management; International Journal of Social Economics; Journal of Knowledge Management; Managerial Auditing Journal; Managing Service Quality; and The TQM Magazine)	
Total:		102

was used. The search yielded over a thousand articles, and each of them was examined to ensure that the content was relevant to food safety, production and delivery. Many articles had a holistic and/or pragmatic approach to HACCP while others focused on few specific aspects of HACCP such as processes, policy and performance issues. Tools and techniques were also included if they were written in the HACCP context. Eventually, a total of 102 articles were selected from 18 journals.

Table 1 depicts a list of 18 searched journals in FSM and related areas. It showed that articles published in *British Food Journal* accounted for some 52.9% of searched articles (i.e. 54 papers) throughout the period. The second popular journal for publishing FSM articles was *Nutrition and Food Science*, of which 20 papers were found (i.e. 19.6%). Besides, a sum of 16 FSM articles (i.e. 15.7%) was published in four journals (i.e. no.3~6) and each of which published 2~5 articles. The rest of 12 articles were published in other non-main steam journals (i.e. no.7~18). Scholarship on FSM being published in 18 journals reveals that FSM is multi-disciplinary in nature.

3.2 Investigation of HACCP factors

Analysis of articles focused on the investigation of factors that affect the adoption and implementation of HACCP. This was done to classify the extracted HACCP factors from the literature. In total, a list of 20 factors was initially identified using factor analysis. These factors include:

1. Analysis of hazards (AH)
2. Awareness of food borne disease (AD)
3. Changing patterns in food consumption (CP)
4. Communication of food safety (CFS)
5. Consumers' roles and responsibilities (CR)
6. Corrective actions (CA)
7. Critical control points (CCP)
8. Food contamination and/or poisoning (FC)
9. Food handling (FH)
10. Food regulations (FR)
11. Good manufacturing practices (GMP)
12. Government policies and intervention (GI)
13. Preventive measures (PM)
14. Record and documentation (RD)
15. Role of industry (RI)
16. Safety procedures (SP)
17. Safety assurance and/or auditing (SA)
18. Trade barrier (TB)

19. Training on food safety and hygiene (TR)
20. Worldwide competition (WC)

Each of 102 articles was reviewed to determine whether respective factors were covered. The review examined the abstracts, the literature review section and conclusions of articles. A list of 20 HACCP factors was excerpted from selected studies during the period of 1994~2007. It showed the authors in the first column with HACCP factors identified as headers for each column. An 'X' is placed under the respective factor(s) identified in each article, correlating to the authors in the first column. The total amount of X's accumulated shows the most important issues related to the HACCP practices.

Table 2. List of HACCP Factors in Selected Studies, 1994~2007

HACCP Factors:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Authors:																				
1. Adams (1995)		x	x							x		x			x					x
2. Adams (2001)	x					x	x						x	x		x				
3. Adams and Morrell (1999)								x		x	x				x		x			x
4. Adelaja <i>et al.</i> (1999)												x			x					x
5. Amjadi and Hussain (2005)		x	x		x			x			x	x			x					x
6. Avermaete <i>et al.</i> (2003)			x							x		x								x
7. Baines (2004)	x	x	x	x	x			x		x										x
8. Barnes (1996)				x			x	x		x		x								x
9. Becker (2000)		x		x				x	x	x	x									
10. Beuchat (2006)	x	x		x			x	x						x						
11. Botonaki <i>et al.</i> (2006)		x	x						x		x									
12. Clayton <i>et al.</i> (2003)		x			x		x	x												
13. Elsasser (1999)				x				x			x									x
14. Emmett (1999)	x						x				x					x				x
15. Fallows (1994)	x			x	x					x	x									x
16. Fearn <i>et al.</i> (2001)		x	x	x	x					x	x	x		x	x					
17. Fraser and Sumar (1998)					x				x		x			x	x					
18. Gibson (2000)				x				x								x				x
19. Griffith (2005)		x	x	x				x	x	x		x			x					
20. Griffith (2006a)	x						x	x		x		x			x		x			
21. Griffith (2006b)		x		x	x				x					x			x	x		x
22. Griffith <i>et al.</i> (1994)		x	x					x			x							x		
23. Griffith <i>et al.</i> (1995)		x		x				x		x		x								x
24. Grigg (1998)	x					x	x			x		x	x	x	x	x				x

Table 2. (continued)

HACCP Factors:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Authors:																				
25. Grigg and McAlinden (2001)					x	x				x	x	x			x					x
26. Grigg and Walls (1999)							x			x				x			x			
27. Haysom and Sharp (2005)					x			x	x		x		x			x				
28. Henchion and McIntyre (2000)			x							x		x			x	x		x		
29. Henchion and McIntyre (2005)					x					x		x			x				x	x
30. Hepner <i>et al.</i> (2004)					x					x		x			x		x			
31. Hilton (2002)	x	x					x	x	x		x		x			x				
32. Holt and Henson (2000)								x	x	x	x	x								
33. Hornibrook <i>et al.</i> (2005)		x	x					x				x			x					
34. Hughes and Merton (1996)		x	x		x					x	x				x	x				x
35. Jackson (2006)		x		x						x		x		x						
36. Jensen (1999)		x	x			x	x						x	x	x	x				
37. Juliata and Diaz (2000)	x		x										x			x			x	
38. Kerr (1999)			x	x	x					x					x				x	
39. Khandaker and Alauddin (2005)						x	x	x		x			x	x		x				x
40. Khatri and Collins (2007)	x	x		x		x	x		x	x	x	x	x	x	x	x				x
41. Kierstan (2000)	x									x	x									x
42. Kivela <i>et al.</i> (2002)								x	x		x	x			x		x			x
43. Knowles (2001)				x						x		x			x				x	
44. Lues and Lategan (2006)			x			x				x	x	x			x	x				
45. Maher (2001)							x			x				x			x			x
46. Mann <i>et al.</i> (1998)				x						x		x								x
47. Manning and Baines (2004a)		x	x	x							x	x			x			x	x	
48. Manning and Baines (200b)								x		x		x		x						x
49. Manning <i>et al.</i> (2005)	x					x	x			x	x		x				x	x	x	
50. Manning <i>et al.</i> (2006)	x			x				x		x		x				x				
51. McAdam and Henderson (2004)				x										x				x		x
52. McIlveen(1994)	x				x					x					x			x		
53. Mead (1994)	x	x				x	x	x					x	x		x				
54. Miles <i>et al.</i> (1999)	x	x	x	x	x			x												x
55. Morrison <i>et al.</i> (1998)								x	x	x	x	x			x					x
56. Nguyen <i>et al.</i> (2004)			x	x	x		x				x	x		x	x					
57. North (1994)				x				x		x		x			x					x
58. North <i>et al.</i> (1996)	x	x	x			x	x	x					x			x				
59. Nwogugu (2004)			x					x		x		x			x		x			x
60. Ogden and Grigg (2003)	x									x					x		x			x

Table 2. (continued)

HACCP Factors:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Authors:																				
61. Pawsey and Howard (2001)	x	x					x	x		x										x
62. Phillips and Roscoe (1996)		x		x			x	x					x			x				
63. Redmond and Griffith (2005a)		x	x	x	x				x		x					x				
64. Redmond and Griffith (2005b)		x		x	x			x	x		x									
65. Reid <i>et al.</i> (1998)		x		x	x							x								
66. Reijnders (2004)		x			x							x				x				
67. Richardson and Brady (1997)	x	x	x	x												x				
68. Roberts and Deery (2004)				x					x	x	x					x		x		x
69. Rodgers (2005a)										x		x				x				x
70. Rodgers (2005b)		x	x					x	x	x	x									
71. Semos and Kontogeorgos (2007)	x			x		x			x					x	x	x	x			x
72. Shears <i>et al.</i> (2001)					x				x	x	x								x	x
73. Shears <i>et al.</i> (2004)				x								x								x
74. Singleton and Hillers (2006)		x		x	x												x	x		x
75. Smith (1994)					x					x		x				x				x
76. Smith (2006)	x						x				x		x			x	x			
77. Sohal and Perry (2006)										x		x				x				x
78. Soliman (2000)						x	x		x		x		x	x		x				
79. Taylor (2004)		x								x	x	x						x		x
80. Taylor and Taylor (2004)		x		x										x		x				
81. van der Spiegel <i>et al.</i> (2005)	x						x			x			x				x			
82. van Dorp (2003)	x					x				x							x			x
83. Walker and Jones (2002)	x				x				x	x	x			x	x					x
84. Wallace <i>et al.</i> (2005a)	x				x	x	x	x	x		x	x	x	x	x	x			x	x
85. Wallace <i>et al.</i> (2005b)				x	x	x	x		x		x		x				x	x		x
86. Watson (1994)	x	x	x					x		x										
87. Wheelock (1994)	x			x	x			x		x	x	x				x				x
88. Wilson and Clarke (1998)				x												x				x
89. Wilson <i>et al.</i> (1997)	x						x	x		x										x
90. Worsfold (1995)	x	x			x			x			x					x		x		x
91. Worsfold (1997)		x		x				x	x		x							x		x
92. Worsfold (2003)				x						x	x	x				x				
93. Worsfold (2005a)	x	x	x		x			x	x	x						x	x			
94. Worsfold (2005b)									x	x		x								x
95. Worsfold (2006a)	x					x	x		x	x	x						x	x		x
96. Worsfold (2006b)				x	x		x			x		x		x	x	x	x			x
97. Worsfold and Griffith (2003)	x				x				x	x	x					x				x

Table 2. (continued)

HACCP Factors:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Authors:																				
98. Worsford <i>et al.</i> (2004)	x	x			x					x					x					x
99. Yabanci and Sanlier (2007)	x	x			x		x	x	x							x				x
100. Yapp and Fairman (2005)				x						x		x			x		x			
101. Yee and Yeung (2002)				x	x			x							x					x
102. Zylbersztajn <i>et al.</i> (2003)		x	x		x							x			x				x	x
Total Counts:	35	40	26	40	36	16	28	41	28	57	39	44	18	20	52	29	23	9	44	17
Percentage:	34	39	25	39	35	16	27	40	27	56	38	43	18	19	51	28	22	9	43	17
Ranking:	10	6=	14	6=	9	19	12=	5	12=	1	8	3=	17	16	2	11	15	20	3=	18

Keys: 1. Analysis of hazards (AH); 2. Awareness of food borne disease (AD); 3. Changing patterns in food consumption (CP); 4. Communication of food safety (CFS); 5. Consumers' roles and responsibilities (CR); 6. Corrective actions (CA); 7. Critical control points (CCP); 8. Food contamination and/or poisoning (FC); 9. Food handling (FH); 10. Food regulations (FR); 11. Good manufacturing practices (GMP); 12. Government policy and intervention (GP); 13. Preventive measures (PM); 14. Record and documentation (RD); 15. Role of industry (RI); 16. Safety procedures (SP); 17. Safety assurance and/or auditing (SA); 18. Trade barrier (TB); 19. Training on food safety and hygiene (TR); and 20. Worldwide competition (WC).

4. Analysis of HACCP Factors

4.1 The Top Range factors (Ranks 1~5)

Of the 102 searched articles, the five factors received the greatest coverage were 'food regulations' (i.e. rank 1; 57 counts), 'role of the industry' (i.e. rank 2; 52 counts), 'government policies and interventions' (i.e. rank 3; 44 counts), 'training on food safety and hygiene' (i.e. rank 3; 44 counts), and 'food contamination and/or poisoning' (i.e. rank 5; 40 counts).

There has been a major shift in thinking on food safety legislation (Shears *et al.*, 2004; Yapp and Fairman, 2005). The onus is now on the individual food business to take positive action to ensure that the food produced is safe and wholesome. There are two key elements; (1) risk assessment coupled with hazard analysis and (2) training in food hygiene is critical particularly for supervisors and managers (Wheelock, 1994). Management must, consistently enforce hygienic regulations established by local, state and national bodies. These regulations are usually outlined in public health codes. Proper food hygiene, however do not just happen because a government agency has established appropriate standards (Worsfold, 2006b). They are made to happen by concerned and committed personnel of a food service establishment. Proper food hygiene results in healthful, clean, wholesome food, an orderly envi-

ronment, and pleasant working conditions (Semos and Kontogeorgos, 2007; Smith, 2006).

Any company linked to an outbreak of food poisoning invariably loses customers and, in some cases, goes out of business (North *et al.*, 1996). It is the responsibility of the manufacturers of convenience products to recognise the importance of providing the consumer with specific handling instructions designed to ensure the safety of the product (Worsfold, 1995). Most studies advocate that it is not only the responsibility of the government in enforcing the practices, but also the role of the industries and consumers to be aware of the food available and their preparation in order to avoid outbreaks of food poisoning.

'Training on food safety and hygiene' and issues related to 'food contamination and/or poisoning' were discussed by some 44 articles. Food hygiene education and the active promotion of food safety for businesses and the public are vital to reduce the incidence of food poisoning (Rodgers, 2005a; Worsfold, 2005a; Worsfold *et al.*, 2004). Food hygiene in a food service operation is the responsibility of everyone working in that establishment. The HACCP system is set up to maximise food safety (Kierstan, 1995). The proper allocation of hygienic duties ensures that safe food is produced. It has been established that a single action of deliberate food contamination in one location can have significant impact on regional, national and even international basis (Manning *et al.*, 2005). The objectives of training on food safety and hygiene are to protect food from contaminating substances and to minimise the effects of any contamination that does occur (Singleton and Hillers, 2006).

4.2 The Middle Range Factors (Ranks 6-16)

Some food preparation operations are more frequently implicated in outbreaks of food poisoning than others. Therefore, food safety is a critical aspect of food manufacturing and is synonymous with food hygiene. 'Awareness of food borne disease' is another factor embraced by some 40 articles (i.e. rank 6) and is directly related to the issue of food handling and preparation. Similarly, 'communication of food safety' also ranked same sixth place among these HACCP factors (Redmond *et al.*, 2005a, 2005b). Both factors encompass a wide area of knowledge and include potential safety issues deriving from pathogenic microorganisms (Beuchat, 2006) and physical and chemical contaminants to handling of food (Hornibrook *et al.*, 2005; Khandaker and Alauddin, 2005).

The HACCP system combines three elements, namely principles of food microbiology, quality control and risk assessment. It also emphasises a movement away from the inspection of facilities to one that centers on the process of preparing and serving safe food (Kierstan, 1995). The next three factors identified were 'good manufacturing practices' (i.e. rank 8; 39 counts), 'consumer roles and responsibilities' (i.e. rank 9, 36 counts) and 'analysis of hazards' (i.e. rank 10, 35 counts). Results show that there is a direct correlation ensuring knowledge and practices of food manufacturing.

The number of food poisoning outbreaks and food-related scares has led to calls for better

hygiene and quality practices. Safety procedures (SP), food handling (FH), defining critical control points (CCP), safety assurance and auditing (SA), and record and documentation (RD) are all linked factors of 20 counts or more (i.e. ranks 11-16). These factors are integral parts of HACCP and are important in the industry environment (Wallace *et al.*, 2005a, 2005b).

It has been determined that safety procedures and food handling techniques necessary to prevent outbreaks of food-borne disease are unknown, misunderstood and not followed in the home and in industries. The first step in designing an operational HACCP system is to identify the critical control points in the product handling process where controls can be applied and food safety hazard can be prevented, eliminated or reduced to acceptable levels. These are controllable points, steps, or procedures in production within which; if an error happens the quality of the final product can be negatively influenced (Amjadi and Hussain, 2005; Yabanci and Sanlier, 2007).

The emerging effort to provide higher food quality and food safety has led to stricter safety specifications and a considerably grown number of quality assurance schemes internationally (Botonaki *et al.*, 2006; Grigg and McAlinden, 2001; Hepner *et al.*, 2004). Quality/safety assurance schemes are becoming increasingly important in integrated food supply chains, from primary production to the consumer. There is the need to focus on the food preparation, food safety and good manufacturing practices in the manufacture and processing of food.

Accurate and complete HACCP records can be very helpful for 1) documentation of the establishment's compliance with its HACCP plan; 2) tracing the history of an ingredient, in-process operations, or a finished product, when problem arises; 3) identifying trends in a particular operation that could result in a deviation if not corrected; 4) identifying and narrowing a product recall. The record of a HACCP system should include records for critical control points, establishments of limits, corrective actions, results of verification activities, and the HACCP plan including hazard analysis.

Moreover, some 26 articles advocated that changing patterns in food consumption (i.e. rank 14) signify the increasing need of proper HACCP practices. HACCP principles can be applied throughout the food chain from the primary producer to the final consumer. The application of HACCP systems can aid inspection by regulatory authorities and promote international trade by increasing confidence in food safety. The food supply chain has seen an increasing trend in globalisation of food sourcing (Baines, 2004) and thus increasingly complex supply chains (Manning *et al.*, 2005; Sohal and Perry, 2006). Food supply chains increasingly work on short lead times so that the impact on the general public on such an incident would be immediate, especially if measures are not in place to switch to an alternative source of supply. Indeed, where there is no alternative source a national strategy should be developed, which ensures an integrated, rapid response to incidents in order to

minimise the human, animal welfare and economic impact of such an action (Manning *et al.*, 2005).

4.3 The Lower Range Factors (Ranks 17~20)

Nowadays, intensifying worldwide competition (i.e. rank 18) together with trade barriers (i.e. rank 20) has been putting pressures on companies to adopt food safety initiatives and strategies (Baines, 2004). The findings are consistent with the global trends indicating that it is imperative to have HACCP systems implemented in food industries. This will ultimately reduce the number of incidences worldwide of illnesses and death due to contamination or food borne illness due to microbiological, chemical or physical nature (Griffith, 2006; Reijnders, 2004).

Besides, the benefits of preventive measures (i.e. rank 17) in an operational HACCP system cannot be denied, especially in the manufacture of high-risk foods such as cooked meats, sandwiches and dairy products (Manning and Baines, 2004). Lastly, 'corrective actions' (i.e. rank 19) is a part of a HACCP system. It describes the processing of nonconforming products and the nonconformities and the correction of the situation. In order to establish record-keeping procedures for the HACCP system, managers would develop forms to fully record corrective actions taken when deviations occur; and identify employees responsible for entering monitoring data into the records and ensure that they understand their roles and responsibilities (Manning *et al.*, 2006).

5. Conclusion

This paper examined the success factors of HACCP practices by analysing 102 journal articles published between the period 1994 and 2007. The review of FMS literature recognised 20 factors as vital to achieving HACCP success in organisations. The top five factors were 'food regulations,' 'role of the industry,' 'government policies and interventions,' 'training on food safety and hygiene,' and 'food contamination and/or poisoning.' 'Food regulations' defines HACCP's primary function or role as a standard for food industries. This basically shows that the literature assigns an important role to regulations in the implementation of this food safety standard. The inputs of the industry and the role of the authoritative force or regulatory body of the government are indisputable in promoting and reinforcing the adoption of HACCP practices. 'Training on food safety and hygiene' and issues related to 'food contamination and/or poisoning' were discussed. Their importance is directly related to food safety in industry environments.

Business and operational situations vary in organisations and industry sectors. There are 11 factors (such as AD, CFS, GMP, CR, AH, SP, CCP, FH, CP, SA and RD) fallen into

mid-range categories, and each of them embraced by some 20–40 articles, respectively. This indicated their relative importance varied with respect to different application domain in industries. On the other hand, results show that ‘preventive measures,’ ‘corrective actions,’ ‘trade barriers’ and ‘worldwide competition’ are of lesser impact as compared to other HACCP factors identified in this study.

The findings provide a basis for exploring the factors that affect HACCP practices. This can be useful to organisations attempting to assess their strengths and weaknesses and safeguard and improve food safety performance. Managers can examine the relationships and interdependencies among success factors, and monitor the food safety improvements in their respective organisations. This study concludes that HACCP practices would only succeed if they are implemented as a long-term organisational paradigm shift matching their corporate mission and strategies, and taking into account the success factors.

Nevertheless, there are several limitations attributed to this study. These are, firstly, only English publications in the selected journal database were searched. This has resulted in the omission of some relevant articles published in journals not included in this study. Secondly, of the 102 searched articles, some discussed one or more success factors in detail, and other just mentioned their importance to HACCP practices in a general manner. Therefore, the method used to determine the important success factors was subject to possible biases. The sum of article counts might not solely reflect the scope or significance of HACCP factors coverage in articles. Future research could investigate a holistic paradigm that incorporates the success factors into HACCP practices for attaining food safety goals. Comparative evaluations of HACCP implementation could also be conducted in order to reveal sector-specific characteristics.

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