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Auditing Food Safety Management Systems: A Case Study of Hotels' Food Production Areas

Reda M. A. Gadelrab and **Mostafa M. M. Hussein**
Faculty of Tourism and Hotel Management, Helwan University
Faculty of Tourism and Hotels, Minia University

Abstract

The implementation of Food Safety Management Systems (FSMS) is frequently expanding for the time being, especially after the massive increase of foodborn disease incidence. Since providing highly safe foods represent a major element to achieve customer satisfaction, thus increasing food sales. The study was conducted to investigate and evaluate the efficacy of FSMS applied in the hotels approached within the food production area through a direct compliance audit. Data were collected from ten of five star hotels and eight of four star hotels at Greater Cairo in Egypt that were identified as the sample for this study to be audited personally using a food safety management system observation checklist. The findings revealed the five star hotels were implementing the FSMS (i.e. HACCP or ISO 22000) effectively better than the four star hotels. It was noticed also that there were statistically significant differences between five and four star hotels in the adoption of FSMS. Additionally, Internal and external audits contributed to effective implementation which contributed also to the improvement of food safety in four and five star hotels.

Keywords: Hotel Food Production; Food Safety; Food Safety Management System; ISO 22000; HACCP; Audit; Egypt.

Literature Review

Food Production in Hotels

Food production refers to the transformation of raw ingredients by food production staff into final dishes and meals (Hayes and Ninemeier, 2006). A complete kitchen in a large hotel involves a hot section (stock kettles, broilers, grills, steamers, fry kettles, and roasting ovens); the *garde-manger* (cold food) sections; the pantry (salad) area; the butcher shop; the pastry shop and sometimes a bake shop; the scullery (dish and pot washing) area; an employees' cafeteria; banquet kitchen(s); and room service kitchen (Dittmer and Griffin, 1997). Most kitchens involve two production areas: a central production area in which basic preparation of food is undertaken and satellite kitchens for the final preparation of foods in which foods are ready immediately before service (National Restaurant Association Educational Foundation, 2007, 2013). The food production area is headed by an executive chef or food production manager who carries out various duties (Powers and Barrows, 2003). Murray-Gibbons and Gibbons (2007) argued that the chef profession refers to the most stressful profession amongst hospitality industry careers. The head chef should not spend all his/her time cooking in the kitchen and s/he requires skills beyond technical skills to undertake administrative work, management, developing staff training, purchasing functions, stock control, staff selection, supervision through good communication and leadership, designing menus, and overall maintaining the quality and safety of the food leaving the kitchen. Thus, the main duties of the head chef are organizing, supervising and administering not just cooking (Pratten, 2003a; Pratten, 2003b; Stutts and Wortman, 2006).

Food Safety

Food safety is the assurance that food will not cause harm to consumers when it is handled, prepared, and eaten (Raspor and Jevšnik, 2008; FAO/WHO, 2009). From hospitality perspectives, food safety is an activity that specifically influences the visitor and the resident of a tourism destination through building ties of empathy between the visitor and the resident (Cohen &Aveli, 2004). They also confirmed that dealing with food, from its origin to its presentation, shows a high regard for the food safety and similarly conveying that image regarding the rest of the destination. This image of quality and safety of a destination should be visible to visitors, to stress a feeling of being welcomed and having a positive attitude towards their health and safety. As mentioned by Ghezzi and Ayoun (2013) that proper food safety practices not only ensure that employees practice personal hygienic measures, but that food production areas are free from contaminants.

According to National Restaurant Association Educational Foundation (2012) Food borne illness can be caused through five common mistakes which are:

1. Purchasing food from unsafe sources
2. Failing to cook food correctly
3. Holding food at incorrect temperatures
4. Using contaminated equipment
5. Practicing poor personal hygiene

Planning and realization of food safety with all relevant information required for conducting hazard analysis should be collected, maintained, updated and documented effectively (Sikora and Nowicki, 2007). They also stressed the

importance of applying hazard analysis by the food safety team to determine which hazards need to be controlled.

Food Safety Management System

The development and application of the Food Safety Management System (FSMS) is continuously increasing (Arvanitoyannis et al., 2016). However there is a lack of research in its use in the hospitality industry (Al Yousuf et al., 2015). The Food Safety Management System (FSMS) represents a group practices and procedures tented to prevent foodborne illness by actively controlling risks and hazards throughout the flow of food (National Restaurant Association Educational Foundation, 2014). There are many systems can be implemented to achieve managerial control of foodborn illness (Arvanitoyannis et al., 2016). Hazard Analysis Critical Control Point (HACCP) is one of these systems which is based on seven principles:

1. Conduct a hazard analysis.
2. Determine critical control points (CCPs).
3. Establish critical limits.
4. Establish monitoring procedures.
5. Identify corrective actions.
6. Verify that the system works.
7. Establish procedures for record keeping and documentation.

Generally, the principles break into three groups: (1) principles 1 and 2 help identifying and evaluating hazards; (2) principles 3, 4, and 5 help establishing ways for controlling those hazards; (3) principles 6 and 7 help maintaining the HACCP plan and system and verifying its effectiveness (National Restaurant Association Educational Foundation, 2014). Efficient and accurate record keeping in a way appropriate to the nature and size of the

business is crucial to the successful application of HACCP (OHIO State University, 2013; Al Yousuf et al., 2015). According to Vapneck and Spreij (2005) the International Standards Organization published the ISO 22000 in September, 2005 which outlines the requirements for implementing food safety management systems in all types of organizations along the food chain. The ISO 22000 creates a uniform and homogeneous platform of requirements, acceptable to all authorities worldwide (Arvanitoyannis and Varzakas, 2009). In terms of identifying the ISO 22000 family, it was demonstrated that it contains a number of standards in which each focusing on different aspects of food safety management (Escanciano and Santos-Vijande, 2014). According to the International Organization for Standardization (2014) these standards are displayed as follows:

1. ISO 22000:2005 contains the overall guidelines for food safety management.
2. ISO/TS 22004:2005 contains guidelines for applying ISO 22000
3. ISO 22005:2007 focuses on traceability in the feed and food chain
4. ISO/TS 22002-1:2009 contains specific prerequisites for food manufacturing
5. ISO/TS 22002-3:2011 contains specific prerequisites for farming
6. ISO/TS 22003:2007 provides guidelines for audit and certification bodies

According to Raspor and Ambrozic (2012) they emphasized that the effectiveness of the FSMS needs to be verified after implementation. Since food safety team should plan and implement the processes needed to validate control measures before their implementation to examine that they will work in practice.

Audit Overview

According to Oakland (2003) three types of audits have been identified: first party assessment, i.e. internal audit which is carried out to examine the QMS against a group of specified requirements, second party assessment, i.e. an external customer investigates the product against its standards and independent third party assessment, i.e. conducted by an independent company to make registration for the supplier. Since the external assessment is conducted by an outside consultant (Johns, 1996), and the internal one is carried out by the organization's personnel (Praxiom Research Group, 2005). Manning (2000) added more types for audits, e.g. a system audit (i.e. checking whether a QMS conforms to standards); a compliance audit (i.e. practices comply with QMS documentation); a follow-up audit (i.e. ensuring that corrective actions have been implemented effectively). The internal audits should be conducted at planned intervals to determine whether the food safety system conforms to planned arrangements and is effectively implemented and updated (Raspor and Ambrozic, 2012).

Methodology

As the main aim of this study is to investigate and evaluate the efficacy of the FSMS adopted in hotels' food production area through a direct compliance audit, 32 of the five star hotels and 16 of the four star hotels at Greater Cairo in Egypt (Egyptian Hotel Association, 2012) were approached personally or by telephone communication to ascertain whether they would be willing to participate in an audit visit. 22 out of 32 of the five star hotels and eight out of 16 of the four star hotels declined to be investigated. Reasons for this varied which included a lack of time and a reluctance to participate fearing that the information would be used for official purposes. As such ten of the five star hotels and eight of the four star hotels in were

identified as the sample for this study to be audited using a food safety management system observation checklist to evaluate the efficacy of the food safety management system adopted and to verify whether the given system is being adhered through a direct compliance audit. As the study approach is qualitative, the most commonly-used type of sampling is purposeful shambling (Hoepfl, 1997; Guest et al., 2006; Creswell and Clark, 2007), since researchers purposefully select specific respondents who have experience in a particular issue to be explored and studied (Creswell and Clark, 2007; Teddlie and Yu , 2007). The purposive sampling technique was done in selecting the samples of the four and five star hotels.

A non-participant observation was conducted to achieve the aim of this study. It is a qualitative method where the researcher is not part in the observation and stands away to collect primary data and observe what is happening in the investigated area (Bouma , 2000). The observation investigated what has been actually done in hotel food production operations, since it helps to determine issues that encounter the effective application of the food safety management system (FSMS). The observational checklist was developed based on reviewing and integrating between the ISO 22000 standards and the HACCP plan. This checklist consisted of four main categories with 21 dimensions: food safety system requirements (with two dimensions); food safety management requirements (with seven dimensions); required resources for food safety (with three dimensions); food safety realization requirements (with nine dimensions). Each dimension has relevant many items to be observed, recorded, analyzed and discussed. The checklist was validated through discussion with some of recognized lead-auditors specialized in the ISO 22000 standards who worked for a food safety auditing company based at Cairo in Egypt. Some items

observed needed documentations in place to be provided as an evidence of implementation. The average length of the observations was between three and four hours.

As the topic must be investigated in its real-life context to reveal the key issues related to managing food safety in food production areas within hotel sector, the case study approach is commonly used for a deeper understanding of the topic (Yin, 2003). This approach is highly recommended to be used in the food-related studies (Lyons, 2005). Data analysis was conducted through using the Statistical Package for Social Sciences (SPSS) version 22. Appropriate statistical analyses such as frequencies, T-Test, stepwise regression, and Cronbach's Alpha were used to ensure the aim of the study.

Findings and Discussion

Based on the literature reviewed and focused on ISO 22000 and HACCP plan, 34 dimensions represent food safety management system were audited using an observational checklist within the five and the four star hotels' food production areas (ten and eight cases respectively). This exploratory and qualitative study was designed to evaluate the efficacy of the food safety management system implemented and to verify whether the given system is being adhered in the hotels investigated through a compliance audit.

In terms of defining reliability, Bryman and Bell (2007:40) stated that *"reliability is concerned with the question whether the results of the study are repeatable"*. If the Cronbach's Alpha is above 0.7, the sample will be reliable (Pallant, 2005). As shown in Table 1, the Cronbach's Alpha coefficient is 0.95 that is above 0.7. This indicates that the reliability has been achieved and the study has been recognized reliable with the sample.

Table 1: Reliability Statistics for 18 Non-Participant Observations

Research Tools	Cronbach's Alpha
Non- Participant Observation	0.93

1. *Food Safety System Requirement*

In terms of establishing Food Safety Management System (FSMS), there is only one of the five star hotels out of ten hotels investigated (10%) has established the ISO 22000 for implementation which certified by an external food safety company. However, all the ten of the five star hotels (100%) have established the HACCP for implementation and only four of them (40%) have certified HACCP by an external food safety company. Considering the four star hotels investigated (eight hotels), none of them have established the ISO 22000 for implementation. However, there are only six (75%) have established the HACCP for implementation, but none of them have been certified for the HACCP by any eternal food safety company (third party). Two of the four star hotels (25%) do not implement the HACCP, since they believe that HACCP application is more difficult to be implemented in hotels and its cost represents a big dilemma.

With regard to the documentation to support the FSMS, it was found that there are eight of the five star hotels (80%) and six of the four star hotels (75%) have documentations in place to support the FSMS. All eight of the five star hotels were being controlling for such documentations, whereas none of the six of the four star hotels were found doing such controlling. Whereas two of the five star hotels (20%) and two of the four star hotels (25%) stated that there is no food safety documentations in place, since they do not have forms to record, e.g. Temperatures in freezers; refrigerators; cooking; hot and cold holding; food displayed on buffets.

2. *Food Safety Management Requirement*

In relation to food safety policy, there were eight of the five star hotels (80%) and only one of the four star hotels (12.5%) have a food safety policy. There were also three out of that eight of the five star hotels post the food safety policy for all employees, but the four star hotel did not. The food safety policy have been implemented throughout the hotel by all eight that of the five star hotels and the one that of the four star hotels. Regarding hotel's FSMS planning, nine out of ten of the five star hotels (90%) and six out of eight of the four star hotels (75%) were involving top management in development, implementation, and evaluation of FSMS. Considering Clarification of FSMS responsibilities, there were nine of the five star hotels (90%) and six of the four star hotels (75%) defining the responsibilities of FSMS. The same hotels respectively were giving the authority to designated personnel to solve FSMS problems and train personnel to perform FSMS responsibilities and authorities.

Recognizing, food safety team, it was noticed that all the ten of the five star hotels (100%) and six of the four star hotels (75%) were appointing food safety team leaders, giving them the authority to make changes to the FSMS. There were only seven of the five star hotels (70%) and four of the four star hotels (50%) establishing a HACCP team. There were also six of the five star hotels (60%) and only one of the four star hotel (12.5%) defining responsibilities for the HACCP team. There were also six of the five star hotels (60%) and two of the four star hotels (25%) reporting that they involve a member of the management in the HACCP team. Additionally, there were also eight of the five star hotels (80%) and two of the four star hotels (25%) mentioning that their HACCP team is met monthly at the minimum. Documentations of such HACCP team meeting was implemented

by seven of the five star hotels (70%), but none of the four star hotels had documentations.

In terms of establishing communications, there were nine of the five star hotels (90%) and six of the four star hotels (75%) establishing external communication procedures to handle food safety issues and concerns. The verification and validation of external communication procedures were implemented by that entire nine of the five star hotels and five of the four star hotels (62.5%). The internal communication procedures are established among managements who are responsible for food safety by all ten of the five star hotels (100%) and six of the four star hotels (75%). The internal communication procedures are verified and validated by all ten of the five star hotels (100 %) and five of the four star hotels (62.5%). These findings conformed to what has been found by Wilcock et al. (2011) regarding to five star hotels, that food safety managers/coordinators considered communication as a vital issue to the success of FSMS implementation through food production areas.

Relating to development of emergency response procedures, it was found that eight of the five star hotels (80%) and three of the four star hotels (37.5%) were establishing the recall program, defining responsibilities and authorities and verifying the recall program. The emergency response program is established by the entire ten of the five star hotels (100%) and six of the four star hotels (75%). The emergency response program has also been verified by nine of the five star hotels (90%) and six of the four star hotels (75%). In terms of carrying out FSMS' management reviews, it was reported that the management of the entire ten of the five star hotels (100%) and six of the four star hotels (75%) reviewed the FSMS and its objectives.

Records were kept for all management reviews in nine of the five star hotels (90%) and five of the four star hotels (62.5%).

3. *Required Resources for Food Safety*

In relation to providing adequate FSMS resources, there were eight of the five star hotels (80%) and five of the four star hotels (62.5%) providing proper resources to establish and implement the FSMS. Such proper resources were provided to monitor and validate the FSMS by eight of the five star hotels (80%) and three of the four star hotels (37.5%). These results agree with Luning et al. (2012) particularly for the four star hotels, that lowest FSMS performance and limited organizational support have been noticed.

In terms of providing adequate training**,** there were eight of the five star hotels (80%) conducting annual HACCP training; critical control points training, but none for the four star hotels. Training is evaluated based on effectiveness by seven of the five star hotels (70%) and only one of the four star hotel (12.5 %). It was also noticed that the entire ten of the five star hotels (100 %) and six of the four star hotels (75%) were keeping training records and reviewing training needs on a regular basis. The documented plan to provide consistent food safety training was implemented by seven of the five star hotels (70 %), but four star hotels were not. These results agree with Wilcock et al. (2011) that there is a need for well-trained personnel to be responsible for the FSMS program to monitor the daily productions and complete the necessary documentations. These results also agree with Garayoa et al. (2011) particularly for four star hotels that they have a lack in HACCP training, evaluation, record keeping, reviewing, and documented plan for such training.

In relation to providing adequate infrastructure, there were seven of the five star hotels (70%) and four of the four star hotels (50%) providing adequate infrastructure to establish and maintain FSMS. Some notices were highlighted. For example, in five star hotels, it was noticed that kitchen ceilings and walls should be renewed in four hotels (40%); floors should be changed in kitchen and dry store in three hotels (30%); walls and ceilings of the dry food store should be renewed in one hotel (10%); electric wires should be covered in kitchen ceilings in one hotel (10%). Whereas in the four star hotels investigated, it was noticed that kitchen ceilings, walls and floors should be renewed in four hotels (50%); the floor of refrigerators should be renewed in two hotels (25%).

4. Food Safety Realization Requirements

In terms of waste disposal programs, the entire ten of the five star hotels (100%) and six of the four star hotels (75%) were training employees for waste disposal programs. The verification procedures for effective waste disposal are implemented by nine of the five star hotels (90%) and six of the four star hotels (62.5%). The documentation of corrective actions is implemented by eight of the five star hotels (80 %), but not for the four star hotels.

Regarding personal hygiene, it was indicated that that the entire ten of the five star hotels (100%) and six of the four star hotels (75%) train employees for a proper personal hygiene. The verification procedures for effective personal hygiene and corrective actions documentation are implemented by eight and seven of the five star hotels respectively, but not for the four star hotels.

In terms of the preparation for hazards analysis, it was noticed that the entire ten of the five star hotels (100%) and four of the four star hotels (50%) train their HACCP team members for the HACCP application. There were also six of the five star hotels (60%) assessing all hazards associated with food products; describing food products and the end use of them; creating and controlling a flow chart of the food production processes. None of these steps are implemented by the four star hotels.

With regard to performance for hazard analysis, it was revealed that six of the five star hotels (60%) identified all potential chemical, biological, and physical hazards; performed hazard analysis by HACCP team; described the hazard assessment methodology. They were also performing hazard analysis for raw materials; including all processes in the hazard analysis. It was revealed that seven of the five star hotels (70%) established preventive measures for the identified hazards to reduce them to an acceptable level, since they ascertained that these measures have been verified and validated. But none of the four star hotels were found conducting this process as mentioned by Eves and Dervisi (2005) performing hazard analysis represents a barrier of HACCP application in the four star hotels.

In terms of establishing the HACCP plan and particularly for the statement that critical control points are established based on potential hazards, it was found that six of the five star hotels (60%) and two of the four star hotels (25%) conformed to this process. There were eight of the five star hotels (80%) and four of the four star hotels (50%) determining the critical limits. Monitoring procedures were established by seven of the five star hotels (70%) and three of the four star hotels (37.5%). The corrective actions were

predetermined for critical deviations by eight of the five star hotels (80%) and only one of the four star hotels (12.5%). Records keeping was established and verified by six of the five star hotels (60%), but not for the four star hotels.

Considering requirements for ensuring and improving food safety, it was indicated that there were six of the five star hotels (60%) and only one of the four star hotel (12.5%) had procedures for verifying FSMS effective implementation. In terms of validating food safety control measures, there were nine of the five star hotels (90%) and four of the four star hotels validating food safety control measures before implementing them in the processes. The control measures were validated through the application of the HACCP plan by eight of the five star hotels (80%) and four of the four star hotels (50%). There were also seven of the five star hotels (70%) and only one of the four star hotel (12.5%) validating the effectiveness of food safety control measures. It was also found that seven of the five star hotels (70%) and two of the four star hotels (25%) confirmed by validation that the control measures are capable for eliminating the food safety hazards.

In relation to verifying the FSMS, it was found that the entire ten of the five star hotels (100%) and five of the four star hotels (62.5%) were establishing an internal food safety audit program. This audit program was conducted effectively by nine of the five star hotels (90%) and two of the four star hotels (25%). The HACCP team reviewed all the FSMS components annually by six of the five star hotels (60%), but did not for the four star hotels. Additionally, there were nine of the five star hotels (90%) and six of the four star hotels (75%) establishing and conducting external food safety audit programs. All verification steps are documented by seven of the five

star hotels (70%) and only one of the four star hotel (12.5%). The results indicated to the four star hotels conform to Luning et al. (2012) that improper implementation for the HACCP system was reported in the four star hotels.

In terms of improving the FSMS, there were six of the five star hotels (60%) analyzing FSMS for improvement annually, but not for the four star hotels. Internal food safety audits, corrective actions, and management reviews were used to improve FSMS by the entire ten of the five star hotels (100%) and four of the four star hotels (50%).

Differences between five and four star hotels in terms of FSMS Implementation Dimensions

The findings shown in Table 2 reveals that there is statistically significant difference between five and four star hotels in planning, establishing, implementing, auditing, and improvement dimensions of HACCP or ISO 22000. The T values for these dimensions are 2.44, 4.07, 2.77, 3.21, and 3.33 at the 0.026, 0.001, 0.013, 0.005, and 0.004 significance levels respectively. These dimensions were descriptively analyzed earlier in the observation checklist. It was noticed that the means scores in five star hotels were higher than in the four star hotels. Thus, FSMS dimensions were effectively implemented better in five star hotels than the four star hotels.

Significance of conducting external and internal audits

There was statistically significant contribution for internal and external audit on HACCP or ISO 22000 in predicting the effective implementation of them in four and five star hotels as seen in Table3. In the five star hotels, the multiple correlation (R) between internal and external audit and planning dimensions is 0.83 at 0.002 significance levels. Adjusted R^2 is 0.66.

Table 2: T-Test: Differences between five and four star hotels in terms of FSMS Implementation dimensions

FSM Implementation Dimensions	Five star hotels (N=10 hotels)		Four star hotels (N=8 hotels)		T (df= 16)	Sig.
	Mean	Std. Deviation	Mean	Std. Deviation		
Planning dimensions	60.80	7.68	50.37	10.43	2.44	0.026*
Establishing dimensions	87	12.76	63.75	10.99	4.07	0.001*
Implementing dimensions	23.20	6.35	16.50	2.67	2.77	0.013*
Auditing dimensions	26.40	5.08	19.37	3.92	3.21	0.005*
Improvement dimensions	11	1.49	8.50	1.69	3.33	0.004*

* Significance level is 0.05

It represents the pure contribution of internal and external audit in predicting planning dimensions as a part of effective implementation of HACCP or ISO 22000. The multiple correlation (R) between internal and external audit and establishing dimensions is 0.93 at 0.000 significance level. Adjusted R^2 is 0.86. It represents the pure contribution of internal and external audit in predicting establishing dimensions as a part of effective implementation of HACCP or ISO 22000. Additionally, the multiple correlation (R) between internal and external audit and implementation dimensions is 0.90 at 0.000 significance level. Adjusted R^2 is 0.79. It represents the pure contribution of internal and external audit in predicting implementation dimensions as a part of effective implementation of HACCP or ISO 22000.

In the four star hotels, the multiple correlation (R) between internal and external audit and planning dimensions is 0.84 at 0.009 significance levels. Adjusted R^2 is 0.65. It represents the pure contribution of internal and external audit in predicting planning dimensions as a part of effective implementation of HACCP or ISO 22000.

Table 3: Stepwise Regression and Multiple Correlation of the Effect of Internal and External Audit on Planning, Establishing, and Implementing Dimensions of HACCP or ISO 22000

Five star hotels (N= 10)										
Independent dimensions	**Internal and external audit of food safety management system**									
Dependent dimensions	**R**	**R^2**	**Adjusted R^2**	**F**	**Sig.**	**T**	**Sig.**	**Beta**	**Unstandardized coefficients**	
									B	**Std. Error**
Planning dimensions	0.83	0.70	0.66	18.97	0.002	4.35	0.002	0.83	27.31	7.81
Establishing dimensions	0.93	0.88	0.86	59.47	0.000	7.71	0.000	0.93	24.74	8.20
Implementation dimensions	0.90	0.81	0.79	34.91	0.000	5.90	0.000	0.90	-6.58-	5.12
Four star hotels (N= 10)										
Independent dimensions	**Internal and external audit of food safety management system**									
Dependent dimensions	**R**	**R^2**	**Adjusted R^2**	**F**	**Sig.**	**T**	**Sig.**	**Beta**	**Unstandardized coefficients**	
									B	**Std. Error**
Planning dimensions	0.84	0.70	0.65	14.40	0.009	3.79	0.009	0.84	7.11	11.60
Establishing dimensions	0.82	0.67	0.62	12.65	0.012	3.55	0.012	0.82	19.07	12.78
Implementation dimensions	0.91	0.84	0.81	32.64	0.001	5.71	0.001	0.91	4.37	2.16

The multiple correlation (R) between internal and external audit and establishing dimensions is 0.82 at 0.012 significance level. Adjusted R^2 is 0.62. It represents the pure contribution of internal and external audit in predicting establishing dimensions as a part of effective implementation of HACCP or ISO 22000. Additionally, the multiple correlation (R) between internal and external audit and implementation dimensions is 0.91 at 0.001 significance level. Adjusted R^2 is 0.81. It represents the pure contribution of internal and external audit in predicting implementation dimensions as a part of effective implementation of HACCP or ISO 22000. Therefore, Internal and external audit for food safety management system (HACCP or ISO 22000) contribute to effective implementation of HACCP or ISO 22000 in four and five star hotels.

Conclusion and Implications

Hotel food production is a critical area in which food is prepared to be ready for sale. Ensuring consistent food safety represents one of the main duties of the head chef. The aim of this study is to investigate the effective application and implementation of HACCP or ISO 22000 as a Food Safety Management System (FSMS) through auditing 21 dimensions related to FSMS in ten of the five star hotels and eight of the four star hotels food production areas. The results can be summarized as follows: (1) the five star hotels implemented effectively the FSMS much better than the four star hotels that were investigated; (2) There were statistically significant differences between five and four star hotels in planning, establishing, implementing, auditing, and improvement dimensions of FSMS; (3) Internal and external audits contribute to effective implementation of HACCP or ISO 22000; (4) Effective implementation and auditing of HACCP or ISO 22000 contribute to the improvement of the food safety. The findings of this study

could be useful for food companies' auditors to be more careful when checking whether the corresponding aforementioned dimensions of the FSMS are met and satisfied. This study could also encourage the preparation of similar reviews that examine the results of audits in food production dealing with other categories than hotels that implement the FSMS.

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