



Critical factors, food quality management and organizational performance



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ABSTRACT

This paper proposes a model for measuring the effectiveness of quality (ISO 9001) and food safety (HACCP) systems, based on their stated objectives, when these systems are jointly implemented in a food company. In addition, it investigates the critical factors for effective implementation (CFEI) of the ISO 9001 and HACCP systems; and examines the degree to which the combined implementation of ISO 9001 and HACCP influences the overall performance of the certified firms. To achieve these objectives, primary field data was collected through an empirical survey that was conducted among 347 food companies in Greece, which were certified to ISO 9001, HACCP and/or ISO 22000 systems. Initially, Exploratory Factor Analysis (EFA) and then Confirmatory Factor Analysis (CFA) were applied. The connections among the non observed model factors were verified through Structural Equation Modeling (SEM) inspection. The findings suggest that “employee attributes”, “organizations’ attributes” and “internal business motives” make a significant contribution to the effective implementation of the ISO 9001 and HACCP systems. In addition, the effective implementation of the ISO 9001 and HACCP systems contribute to the business performance of companies in the Greek food industry. The evidence provided in this study helps managers to realize the importance of CFEI and the effective combined implementation of these systems in order to provide the necessary resources and support and develop the necessary policies, practices and procedures.

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1. Introduction

An increasing number of food companies all over the world have been implementing quality and Food Safety Systems (FSS) in order to improve the quality and safety of their products and to witness the related benefits. Nowadays, the main Quality Management Systems (QMS) that are implemented by food companies are those in the International Organization for Standardization (ISO) 9000 series, such as ISO 9001: 2008. The ISO 9000 series of quality management standards provides the framework for organizations to install a QMS following certain guidelines and leads to continually improved processes that satisfy customers’ requirements. However, the effectiveness of the ISO 9001 standard in enhancing a firm’s competitive performance is highly controversial (Yeung, Lee, & Chan, 2003) and studies evaluating the impact of ISO 9001

implementation on an organization’s performance show mixed results (Heras, 2011; Singh, 2008). In practice, the performance of the ISO 9001 QMS is often unsatisfactory due to its ineffective implementation. Indeed, the benefits and advantages of ISO 9001 are subject to a company’s conformance to a number of critical success factors (Augustyn & Pheby, 2000). Although there are many cases of successful adoption of the revised versions of the standard, there are still many problems regarding the achievement of sustainable implementation, indicating that the critical success factors require ongoing identification and exploration (Magd, 2008; Sampaio, Saraiva, & Rodrigues, 2009; Zeng, Tian, & Tam, 2007).

Similarly, Hazard Analysis of Critical Control Points (HACCP) is a system which was specifically developed in the food field to assist organizations throughout the food-chain to identify and properly prevent health risk sources in food manufacturing. HACCP is widespread within the food industry, since food product manufacturing is extremely sensitive to hygiene and safety issues at all stages. However, HACCP per se does not make food safe, although its correct and effective application can make a difference (Kafetzopoulos, Psomas, & Kafetzopoulos, 2013). The success and effectiveness of HACCP in preventing food borne diseases and

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reducing food safety risks to an acceptable level, depends on its correct implementation and application (Kafetzopoulos, Psomas, et al., 2013; Kök, 2009). When a food company adopts the HACCP, it has to assure its performance and assess whether the system is being implemented effectively (Domenech, Escriche, & Martorell, 2008). In order for this to be achieved, the barriers to implementing HACCP should be assessed and their impact evaluated. Taylor and Kane (2005) noted that there is a need to identify the specific hurdles that companies face at each step of the HACCP process and to develop successful intervention strategies. Until these barriers are resolved, the HACCP system will not be effectively implemented and it will not reach its full potential for the international trade of foodstuffs (Eves & Dervisi, 2005).

In 2005, the international standard ISO 22000 was published in order to fill the managerial gap in the HACCP FSS. According to the standard's requirements, an organization has to design and develop all necessary processes for safe food production, assuring the effectiveness of all prerequisite programs and HACCP implementation (ISO 22000, 2005). ISO 22000 (2005) provides a framework for a structured Food Safety Management System (FSMS) and incorporates this system into an organization's overall management activities. Also, ISO 22000 (2005) enables an organization to align its food safety system with other management systems such as QMSs or environmental management systems (Surak, 2007).

The contribution of the above mentioned systems has been thoroughly investigated in literature with both positive and negative reviews. Many researchers conclude that the systems' added value does not depend on the systems alone, but rather on the degree of their effective implementation (Kafetzopoulos, Psomas, et al., 2013; Psomas, Kafetzopoulos, & Fotopoulos, 2013). So far, the effectiveness of the QMS has been measured against the results achieved in an organization's performance (Feng, Terziowski, & Samson, 2008; Koc, 2007; Magd, 2008). However, much more conceptual and empirical work will be needed to examine the CFEI (Magd, 2008; Sampaio et al., 2009; Zeng et al., 2007). Furthermore, there is a gap in the literature concerning the assessment of the effectiveness of the quality and FSS as against their own goals and objectives (Kafetzopoulos, Psomas, et al., 2013; Psomas, Kafetzopoulos, et al., 2013) and the degree to which their effective implementation finally has an impact on the organization's performance (Psomas, Pantouvakis, & Kafetzopoulos, 2013; To, Lee, & Yu, 2011). Thus, many authors (Bas, Yoksel, & Havuoflu, 2007; Kafetzopoulos, Psomas, et al., 2013; Lin & Jang, 2008; Magd, 2008; Psomas, Kafetzopoulos, et al., 2013; Psomas, Pantouvakis, et al., 2013; Sampaio et al., 2009; Wallace, Holyoak, Powell, & Dykes, 2011) suggest future research that would evaluate the relationship between CFEI, ISO 9001 and HACCP effectiveness and a food company's overall performance.

Based on the above, the purpose and main contribution of this paper is; first, to measure the ISO 9001 and HACCP systems effectiveness, based on their stated objectives, when these systems are jointly implemented in a food company. Second, to investigate the CFEI of the ISO 9001 and HACCP systems; and third to examine the degree to which the combined effective implementation of ISO 9001 and HACCP influences the overall performance of the certified food companies. Therefore, we present a model that has been especially designed and tested in food industry enterprises. This empirical finding will help managers to provide the necessary resources and support and develop the necessary policies, practices and procedures.

In the next paragraph a relative literature review is presented followed by a presentation of the proposed model and the research methodology. Empirical results are discussed in the following section and the main conclusions of the study are summarized in the final section.

2. Theoretical background

Food companies implement quality and FSSs to avoid product failures, safety and health problems, customer complaints and failure costs (Van der Spiegel, Luning, Ziggers, & Jongen, 2005). An effective QMS enhances the competitiveness of a company and provides strategic advantages in the marketplace (Anderson, Rungtusanatham, & Schroeder, 1994). In order to assure, control and improve its operations and food quality, a food company has to select an appropriate QMS or a combination of systems that should be applied effectively (Oliver, 2009). That is why more and more food companies are implementing QMSs in order to assure the quality of their operations and thus the quality of their products. The most popular and widespread QMS is the ISO 9001 standard, which has gained widespread attention in both research and practice over the past two decades (Benner & Veloso, 2008). However, companies that establish a QMS according to the ISO 9001 standard should test its effectiveness (Al Nakeeb, Williams, Hibberd, & Gronow, 1998).

On the other hand, an FSMS is responsible not only for producing safe foods but also for demonstrating with transparency how food safety has been planned and implemented. HACCP is part of an FSMS (Al-Kandari & Jukes, 2011), which is widely acknowledged as the best method of assuring product safety while becoming internationally recognized as a tool for controlling food borne safety hazards (Khandke & Mayes, 1998; Wallace, Powell, & Holyoak, 2005). When a food company adopts an HACCP system, it has to assure its performance and assess whether the system is implemented effectively (Cormier, Mallet, Chiasson, Magnusson, & Valdimarsson, 2007; Domenech et al., 2008). In particular, Wallace et al. (2005) claim that it is necessary to establish ways of measuring HACCP effectiveness, that are not based solely on retrospective analysis of outbreak data. Furthermore, Kafetzopoulos, Psomas, et al. (2013) developed a measurement instrument for HACCP effectiveness based on the indicators of the HACCP objectives, in order to facilitate understanding of how the system operates. So, there is a need to establish criteria and assessment methods to identify the effectiveness of the HACCP FSS.

The implementation of quality and safety practises can help food companies to remain competitive in the market. With this aim, food companies have been implementing the ISO 9001: 2008 and the HACCP FSS combined. The requirements of a QMS like ISO 9001, coupled with the development of an FSS like HACCP, contribute considerably to the effective implementation of food business processes (Kafetzopoulos, Gotzamani, & Fotopoulos, 2013). Cao, Maurer, Scrimgeour, and Drake (2004) point out that by adopting a food quality and an FSS and then being able to signal it to the consumers, a company gains marketing advantages and consequently competitive advantages. An FSS can easily be integrated within a QMS. A quick and effective method for achieving this is by treating food safety specifications as an additional element of product and process quality (Chountalas, Tsarouchas, & Lagodimos, 2009).

2.1. CFEI of quality management and food safety systems

It is strongly and extensively supported in literature that despite their anticipated benefits, the implementation of quality and FSSs is not always successful. In fact, many authors have described a number of factors (implementation barriers, constraints, and motives) that may have a direct effect on their successful implementation. In this paper, these factors are called Critical Factors for Effective Implementation (CFEI). In order to detect the CFEI of quality and FSSs, one should identify: a) the usual barriers/difficulties/limitations faced in their implementation, as well as b) the

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