



Review

Determinants for conducting food safety culture research



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ABSTRACT

Background: Foodborne outbreaks continue to occur regardless of existing food safety measures indicating the shortcomings of these measures to assure food safety. This has led to the recognition of food safety culture as a key contributory factor to the food safety performance of food establishments.

Scope and approach: The aim of this paper is to identify determinants for conducting food safety culture research, using the systems approach as the underlying philosophy to guide the structured reconsideration of national, organisational and safety culture literature, in view of food safety.

Key findings and conclusions: Food safety culture is complex and many interlinking factors are at play. The analysis of 'culture' literature showed that food safety culture research should acknowledge the impact of national culture, specify hierarchical level(s) (strategic, tactical, and operational), establish underlying mechanisms, and consider the company's food risks and context characteristics. Major elements to be considered in food safety culture research include organisational and administrative characteristics (i.e. food safety vision, communication, commitment, leadership, training), technical facilities/resources (i.e. food hygiene/safety tools, equipment, & facilities), employee characteristics (i.e. attitudes, knowledge, perceptions and risk awareness), group characteristics, crucial FSMS characteristics, and actual food safety performance. Methodological requirements for food safety culture research include use of the systems approach, measurable indicators, classification systems for differentiated assessment, and use of multiple methods to enhance research validity. The identified food safety culture research determinants provide an underpinned and transparent starting point to the common understanding and research of food safety culture.

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1. Introduction

Existing measures to secure flawless production of safe food products have proven to be insufficient by recurring foodborne outbreaks. This has resulted in a unanimous global objective and initiative within the food industry (Consumer Goods Forum (CGF) (2011), to adopt Food Safety Management Systems (FSMS), which have been extensively and markedly acknowledged as measures to assure food safety. Although the food industry, third party auditors and regulators have placed substantial effort on implementing (EC, 2004; FDA, 2011; CFIA, 2012; Powell et al., 2013; Luning et al., 2015; Global Food Safety Initiative (GFSI) (2016) and improving FSMS, incidences of foodborne illnesses still continue to be reported

(Rapid Alert System for Food & Feed, 2014; Crim et al., 2015).

The continued occurrence of foodborne illnesses coupled with inconsistencies in food safety indicates the shortcomings of current FSMS, raising questions on the adequacy of these systems to fully guarantee food safety as evidenced by recent papers (e.g. Kirezieva, Jaxsens, Uyttendaele, Van Boekel, & Luning, 2013a; Onjong, Wangoh, & Njage, 2014). The shortcomings could be because FSMS are elaborated differently in practice (FAO, 2007; Kirezieva et al., 2015b) and are not always well adapted to cope with the risks inherent to the companies' context characteristics (Luning et al., 2011b; Kirezieva et al., 2013b). The shortcomings could also be attributed to neglecting the impact of different food safety enforcement philosophies and practices, which differently influence the implementation of and adherence to public and private standards and guidelines by the organisations (Pederson & Hernández, 2014; Kirezieva et al., 2015a). Moreover, due to globalisation, multiple national cultures often exist in organisations,

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which increases the complexity of the organisation's culture and could have a significant bearing on the effectiveness of FSMS (Pederson & Hernández, 2014).

Above observations led to the supposition that food safety culture (FS-culture) might be contributing to food safety performance (Yiannas, 2009; Griffith, Livesey, & Clayton, 2010b; Ungku Fatimah, Arendt, & Strohhahn, 2014a). Evidence presented from a number of industries (e.g. Pennington, 2009; Powell, Jacob, & Chapman, 2011) suggested that an organisation's FS-culture is an "emerging risk factor" (Griffith et al., 2010b; CGF, 2011) when inadequate, and that there is a link between food safety and the prevailing FS-culture (Powell et al., 2011; Ijabadeniyi, 2013; Ungku Fatimah, Strohhahn, & Arendt, 2014b). The most cited cases of John Tudor & Sons, Maple Leaf Foods Inc. and the Peanut Corporation of America, in which foodborne illness outbreaks were attributed to the existence of a poor FS-culture stress the importance of FS-culture (e.g. Powell et al., 2011; Ijabadeniyi, 2013). To achieve a good food safety performance organisations therefore need to have a well-elaborated FSMS and a positive FS-culture in place (Powell et al., 2011; De Boeck, Jaxsens, Bollaerts, & Vlerick, 2015). Food industries have thus taken a profound interest in the concept of FS-culture to reduce the potential for food safety failures (Yiannas, 2009; Griffith, Livesey, & Clayton, 2010a; CGF, 2011). However, the FS-culture concept is still built on limited conceptual foundations and has been far less investigated compared to organisational and safety culture (Griffith et al., 2010a; Ungku Fatimah et al., 2014a).

Recent studies developed tools to measure FS-culture (e.g. Wright, Leach, & Palmer, 2012; Ungku Fatimah et al., 2014a; De Boeck et al., 2015), maturity models (Jespersen, Griffiths, Maclaurin, Chapman, & Wallace, 2016) and FS-culture concepts (Taylor, 2011). However, the studies used differing approaches and

concepts from various disciplines (e.g. Griffith et al., 2010b; Taylor, 2011; Jespersen et al., 2016). The aim of this study is therefore to identify the determinants for conducting food safety culture research, using the systems approach as the underlying philosophy to guide the structured reconsideration of national, organisational and safety culture literature as presented in Fig. 1 and sections 3–7. National culture literature is discussed first to set the context and elaborate its role in organisational, safety and FS-culture. Organisational culture literature is discussed to provide a deeper understanding of culture concepts. Safety culture literature is examined to provide insight in typical safety related issues in high risk fields. FSMS principles are described since they are crucial to the existence of a positive FS-culture (Powell et al., 2011). An evaluation of current FS-culture concepts provides an overview of the current understanding of FS-culture and its role in food safety performance. The paper concludes with research recommendations.

2. Approach and literature search strategy

2.1. Approach

The systems approach was used to position food safety culture (Fig. 1) and to guide the literature reconsideration in the different 'culture' research fields with the intention to identify the "determinants" (Table 4) for conducting FS-culture research. The systems approach is a structured way to study the interdependence and relationships of system components (Arnold & Wade, 2015), and recognises the synergy of elements in systems and the hierarchy of systems where subsystems participate in a bigger hierarchy of systems (Skyttner, 2005). The approach transcends and links numerous disciplines (Arnold & Wade, 2015). Fig. 1 presents the

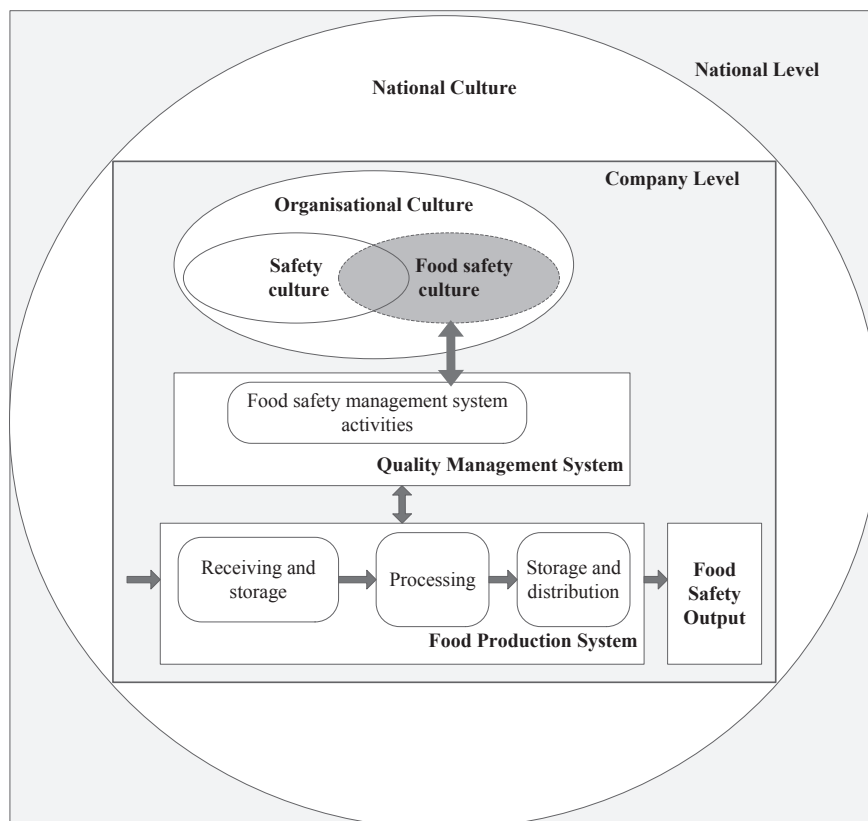


Fig. 1. Proposed positioning of food safety culture from a systems perspective (adapted from Luning & Marcellis, 2007). The arrows in the figure show the direction of influence. The figure shows that national culture is the overarching culture and that FS-culture can be analysed at both the company and national level.

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