Organisations, Culture & Food Safety

A rapid comparative overview of organisational culture frameworks in the food sector

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The author would like to thank Vanna Aldin for her painstaking support for continued dialogue and collaboration between the academic and policy worlds.

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BEIS – Department for Business, Energy and Industrial Strategy.

D-V-E-D-M – Dynamic-Value-Effort Decision-Making [model].

EHOs – Environmental Health Officers.

FBOs – Food Business Operators.

FCA – Financial Conduct Authority.

FHRS – Food Hygiene Rating Scheme.

FSA – the Food Standards Agency.

FSS – Food Standards Scotland.

GAP – Good Agricultural Practice.

GFSI – Global Food Safety Initiative.

GMP – Good Manufacturing Practice.

HACCP – Hazard Analysis and Critical Control Points.

HSE – Health and Safety Executive.

MCA – Maritime and Coastguard Agency.

NHS – National Health Service.

SMEs – Small and medium enterprises.

Executive summary

The Food Standards Agency (FSA) has a longstanding interest in organisational culture and its impact on the capability of a food business to provide food that is safe and what it says it is. However, while there has been some work carried out on assessing organisational culture in some regulatory areas, there has been limited progress in the development of a regulatory approach specifically for food safety culture.

In 2016, the FSA initiated a major change programme, 'Regulating our Future' (ROF),[1] to modernise the way food businesses are regulated. The objective is to create a system that is modern, risk-based, proportionate, robust, and resilient. In the context of increasing global and national interest in business culture and its relationship with regulation, a specific workstream considering food safety culture was set up in 2018.

The workstream aims to better understand the role of food safety culture in regulatory compliance and whether food safety culture tools can support local authorities and FSA inspectors in measuring and improving food businesses' compliance. As such, the workstream responds to the FSA's longstanding interest in organisational culture in the context of food safety and increasingly frequent notes that point to poor business culture contributing to food safety failures and major incidents. Additionally, the workstream matches efforts by other government departments/agencies/ bodies such as the Department for Business, Energy and Industrial Strategy (BEIS), the Health and Safety Executive (HSE), and the Financial Conduct Authority (FCA), which are actively looking at business culture in the regulatory context. Finally, the workstream is in line with the Regulatory Futures Review's (Cabinet Office 2017, 3) calls for 'light touch' regulation for businesses who 'do the right thing' and for bodies like the FSA to encourage 'more ethical business practices'.

[1] Available at: www.food.gov.uk/about-us/regulating-our-future.

A challenge is that food safety culture is complex and various food safety culture frameworks[2] have been developed by different actors in different contexts. So, this report asks the following question: *How can the FSA approach the implementation of food safety culture frameworks?* To answer this question, the report undertakes a rapid review of selected food safety culture frameworks.

Findings

At the most general level, the report provides the FSA with an insight into key considerations to include in a potential food safety culture initiative/programme/platform.

When considering all frameworks in the sample, food safety culture comes across as related to three different types of behavioural influences:

- ✓ **norms,** value-/belief-like considerations with an active ethical component (e.g., 'it is wrong not to wash my hands');
- ✓ **practices,** established behaviours that are not given much thought (e.g., 'I wash my hands automatically'); and,
- ✓ **standards,** codified systems of activities (e.g., 'the manual says I need to wash my hands').

Individually, however, the frameworks covered by this report focus on aspects of these three concepts.

Hence, the report considers that the FSA can see food safety culture as including *all* norms, practices, and standards. The comprehensive definition would ensure that the FSA's does not leave aspects of food safety culture outside its domain. Also, recognising the usage of more-focused definitions by external actors would enable dialogue and collaboration with them.

The report also finds differences in the intended function of the frameworks in the sample. Some frameworks seek to increase the capacity to *diagnose* the food safety

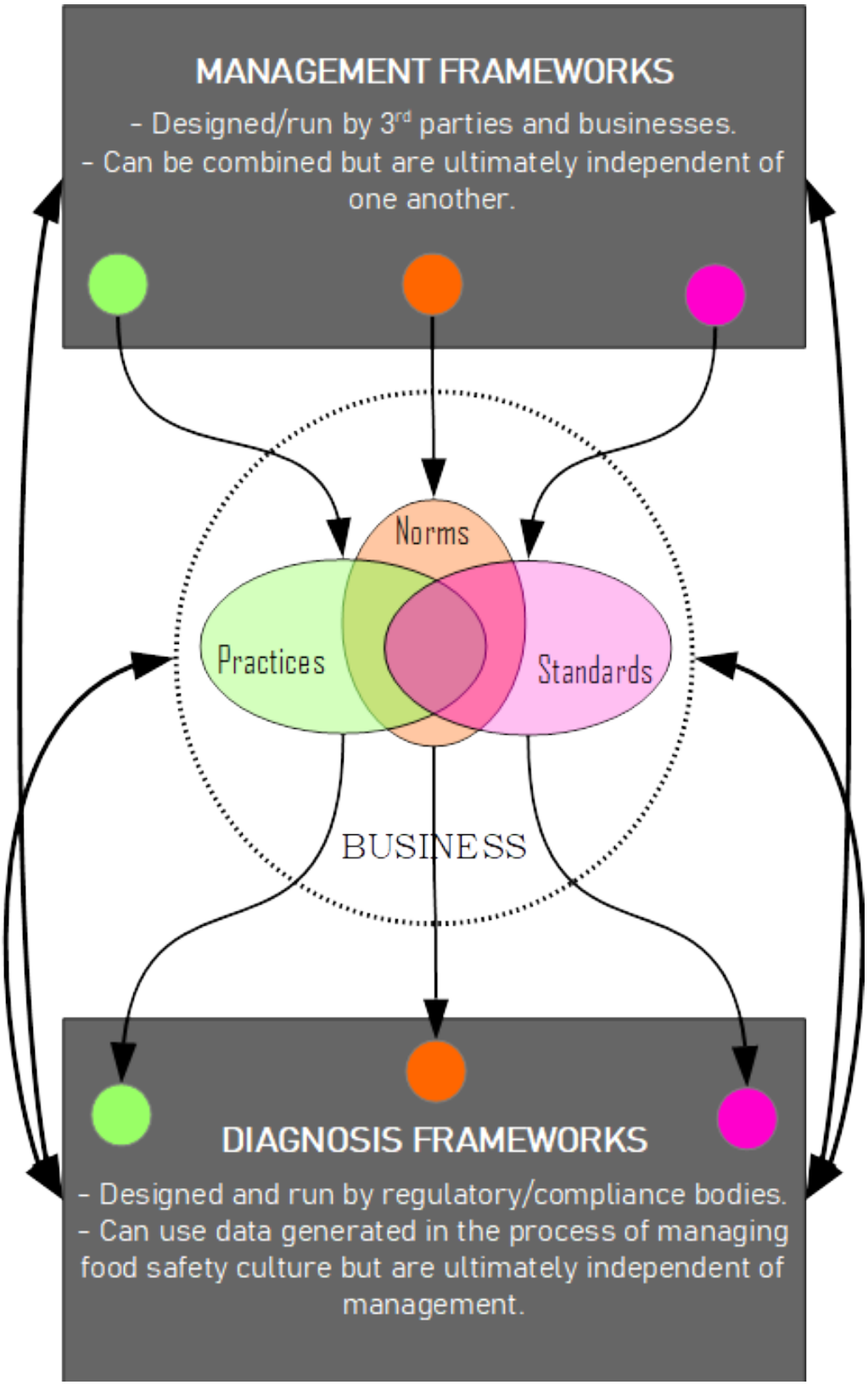
[2] A framework is a system of ideas (i.e., definitions/concepts) and replicable steps (i.e., tools/models).

culture of food business. Others aim to improve food businesses' ability to *manage* their food safety culture. However, it is hard to think of a single framework doing both diagnosis and management without becoming over-cumbersome or superficial.

As a result, the report considers that to avoid over-cumbersome or superficial frameworks, the FSA can think of the diagnosis and management of food safety culture as related but, ultimately, logically separate.

Figure A visualises findings.

Figure A: Food safety culture infographic.



It is worth noting that figure A acknowledges that businesses evaluate/assess their culture in the process of managing it and that a management framework can help this task (and, perhaps, even provide independent assessment). The words 'evaluation' and 'assessment' can be understood as a type of diagnosis, which can fuel a discussion about semantics. This project, however, is not about semantics. What matters here is that regulatory and compliance bodies benefit from the ability to identify (diagnose) the risk of a food business having a 'bad' food safety culture. Even if a regulatory/compliance body can build on assessments by others, there is still a need to determine the risk of such assessments being incorrect. So, the final diagnosis is independent of management (and by extension, feedback between all actors is vital).

Recommendations

To not leave aspects of the food safety culture phenomenon outside of the FSA's domain and be able to collaborate with external actors, the report recommends the FSA to consider:

R_1: adopting a general 'umbrella' definition covering the totality of food safety culture, namely, *the 'shared[3] norms, practices, and standards that influence behaviour in a food business organisation'*; and,

R_2: accepting third parties' usage of partial definitions (i.e., norms, *or* practices, *or* standards) as a valid way to specify interest in aspects of food safety culture.

Since a single framework doing both diagnosis and management of food safety culture seems out of reach, the report suggests that the FSA considers:

R_3: thinking *separately* of diagnosis and management; and, by extension,

R_4: developing proprietary diagnosis resources;

R_5: allowing the piloting of management frameworks; and, by extension (and assuming the performance of pilots is satisfactory);

R_6: engaging with food businesses to support the adoption of management frameworks.

[3] In an organisational setting, sharing can be partial (e.g., locations, teams, groups of staff).

Additionally, while noting that the rapid nature of the research equals a high risk of omissions, and while clarifying that none of the frameworks in the sample is ready to 'copy/paste' into the field, the report also notes that *from the frameworks in its sample*, the two frameworks that are closest to being ready for piloting are:

R_7: Wright, Leach, and Palmer (2012) for diagnosis; and,

R_8: GFSI's (2018) position paper for management.[4]

However, since the rapid nature of the research excludes existing efforts that already give some insight into food businesses' organisational culture (e.g., local authorities' enforcement officers' inspections), the report also recommends:

R_9: implementing R_7 and R_8 in a manner that complements existing efforts.

The report closes with recommendations for research to improve the FSA's understanding of food safety culture. One such recommendation, for example, relates to the fact that this report focuses on examining how to implement existing frameworks and, as such, is not an inquiry into the relationship between organisational culture and compliance. Such investigation remains necessary because the question of whether the link between organisational culture and compliance is strong enough for food safety culture efforts to perform as promised remains open. This question is difficult to answer without the type of pilots recommended, as there is currently little data on how food safety culture frameworks perform in the field. So, the type of pilots recommended here seem a necessary part the effort to understand the extent to which food safety culture can assist the FSA in its goals (and all pilots must naturally be examined critically before undertaking more comprehensive implementation). At the same time, however, the fact that the matter remains open equals a need for additional research at the foundations.

[4] Do note, however, that these two recommendations do not call for automatically deploying either frameworks as given. As a foundation, these two frameworks seem promising. However, implementation of either requires additional work. On the one hand, Wright, Leach, and Palmer (2012) is somewhat burdensome already, so simplification needs to happen. On the other hand, the GFSI's (2018) position paper sets out a view that requires specification in the field. So, once again, these two recommendations only say that the frameworks are, from the sample covered, the *closest* to being implementable – not that they are automatically implementable.

1. Introduction

The idea that organisational culture, broadly defined as the assumptions shared by many or all members of an organisational group (Schein 1990, 111), affects organisational performance, is not new. However, a related trend is attracting attention. Regulators and agencies in the United Kingdom (UK) are keen to explore if initiatives focused on the organisational culture of those under their jurisdiction can improve compliance. Organisational culture is too large an issue to speak generally. So, this report focuses on the Food Standards Agency (FSA), the non-ministerial department responsible for food safety and integrity in England, Wales and Northern Ireland, and *food safety culture*, the food sector's approach to organisational culture.

The FSA has a longstanding interest in organisational culture and its impact on the capability of a food business to provide food that is safe and what it says it is. Evidence of the longstanding interest is the fact that some of the earliest reports covered by this study were initiatives set in motion by the FSA in or around 2010.

Additionally, in 2016, the FSA initiated a major change programme, 'Regulating our Future' (ROF),[5] to modernise the way food businesses are regulated. The goal is a system that is modern, risk-based, proportionate, robust, and resilient. A workstream considering food safety culture was set up in 2018. The objective of the workstream is to better understand the role of food safety culture in regulatory compliance and whether food safety culture tools can support local authorities and FSA inspectors in measuring and improving food businesses' compliance. As such, as detailed later, the workstream responds to increasing global and national interest in business/organisational culture and its relationship with regulation and increasingly frequent notes about shortcomings related to organisational culture having contributed to food safety failures and major incidents.

[5] Available at: www.food.gov.uk/about-us/regulating-our-future.

Additionally, as also detailed later, the workstream also matches efforts by other government departments/agencies/bodies that are actively looking at business culture in the regulatory context. Furthermore, the workstream is also in line with the Regulatory Futures Review published by the Cabinet Office (2017, 3), which is clear about an interest to ensure that business who 'do the right thing' are subject to 'light touch' regulation and that, as part of this, bodies like the FSA should encourage 'more ethical business practices'.

However, food safety culture is complex, and various frameworks[6] have been developed over time by different actors in a variety of contexts. Alas, while work on assessing organisational culture in some regulatory areas has been carried out, there has been limited progress in the development of a regulatory model specifically for food safety culture. Accordingly, this report aims to address the following research question: *How can the FSA approach the implementation of food safety culture frameworks?*

The report is structured as follows. The following section details how interest in food safety culture has grown over the last years, and the way in which the literature about organisational culture can help to make sense of this phenomenon.[7] A third section presents the method, a rapid comparative review of eight food safety culture frameworks. Frameworks are discussed comparatively in the fourth section. Findings and recommendations follow.

[6] A system of ideas (i.e., concepts/definitions) *and* replicable steps (i.e., models/tools), the former needed for robustness, the latter for operationalisation.
[7] Here, robustness refers to the degree to which a system (in this case of thought) can tolerate a wide range of circumstances. From this perspective, a food safety culture foundation is only robust if it allows addressing a wide range of food safety culture challenges (ideally, all).

2. Theory (and background)

The FSA's interest in food safety culture dates to the 2009 Public Inquiry Report about South Wales' 2005 *E. Coli O157* outbreak, which explicitly mentioned food safety culture shortcomings as having contributed to the outbreak (Pennington 2009, 68):

> The food safety culture for a business serving high-risk food was completely inadequate and would not have controlled the risk of cross-contamination.

Since then, similar points can be found elsewhere in the work of the FSA. Most recently, for example, in the context of the 'Review of Meat Cutting Plants and Cold Stores', the FSA's and the Food Standards Scotland' (FSS) board "stressed the importance of food business management culture in successfully implementing… recommendations to secure improvements in food safety and food standards in the UK" (FSA and FSS 2018, 57). Likewise, the FSA's survey tracker for small and micro food business operators (FBOs) indicated that respondents from businesses with poor food hygiene ratings are more likely to have negative attitudes and beliefs about regulation (Wiseman and Parry 2019, 30). This finding suggests that the said attitudes and beliefs may be hindering compliance.

Additionally, in 2016, the FSA initiated a major change programme, 'Regulating our Future' (ROF),[8] to modernise the way food businesses are regulated. ROF's goal is a system that is modern, risk-based, proportionate, robust, and resilient. To this end, among other things, ROF looks to improve the analysis of factors affecting food hygiene such as those that "might indicate poor management culture which is linked to generally low levels of compliance with any regulation or legal requirement" (FSA 2017, 8). The inherent interest in the idea of food safety culture led to creating a workstream considering food safety culture, set up in 2018.

ROF and the FSA's interest in food safety is not isolated. To the contrary, the food safety culture workstream responds to increasing global and national interest in

[8] Available at: www.food.gov.uk/about-us/regulating-our-future.

organisational culture and its relationship with regulation. For example, the idea of looking into food safety culture aligns to the UK government's recent *Regulatory Futures Review*. This review calls for sharing good practices across regulators, including meta-regulatory frameworks "encouraging industry to put in place its own systems of internal control, which are then scrutinised by regulators" (Cabinet Office 2017, 22). In the context of food safety, this call falls within the remit of food safety culture, as all such frameworks create objectives that become shared by many or all members of a food business.

Despite the interest, the FSA is yet to pilot food safety culture initiatives. What challenges implementation/operationalisation is not a lack of options. As it will become apparent throughout this report, various actors have developed a diversity of frameworks and tools in a variety of contexts. Making sense of these alternatives, however, is exceptionally challenging because the literature about food safety culture remains fragmented, has no conceptual clarity, and lacks a systematic approach to implementation (Jespersen and Wallace 2017, 245; Nyarugwe et al. 2016, 84). So, there is no pre-established path that the FSA can follow when operationalising/implementing food safety culture.

As it will become evident, this report believes that the FSA can define a robust path to implementation/operationalisation of food safety culture by wrapping efforts against robust foundations available in the organisational culture literature. In this sense, despite seeing virtue in existing food safety culture efforts, the report is a little critical of the food safety culture literature, which nowadays acknowledges organisational culture (Griffith, Livesey, and Clayton 2010, 427–29; Nyarugwe et al. 2016, 81) but seems to disconnect from this literature upon practice.[9]

The literature about organisational culture is vast and cannot be summarised in full here. It stands out, however, that there are various relatively robust grounding points available that could help to avoid fragmentation, ambiguity, and chaos. Three

[9] Since this is a rapid review the report cannot guarantee that no exceptions exist.

authors that can help in this regard are Edgar Schein (1990; 1996; 2010), Sonja Sackmann (1991; 1992; 1997), and Karl Weick (1979; 1995; 2005).

Schein's view can be grounded on an explicit definition of culture itself (Schein 1990, 111):

> Culture can now be defined as (a) a pattern of basic assumptions, (b) invented, discovered, or developed by a given group, (c) as it learns to cope with its problems of external adaptation and internal integration, (d) that has worked well enough to be considered valid and, therefore (e) is to be taught to new members as the (f) correct way to perceive, think, and feel in relation to those problems.

From this perspective, organisational culture is the assumptions shared by many/all members of the group called an 'organisation', regardless of how the term 'organisation' is defined. Now, this perspective is too broad to enable frameworks specific to a field. However, as seen in the analysis, Schein's openness can serve as a grounding point that is robust yet, at the same time, flexible enough for practitioners to add the specifics needed to deliver safety in their specific field of human activity.

Sackmann saw the organisation as a complex web of "simultaneous existing multiple cultures that may contribute to a homogeneous, differentiated, and/or fragmented cultural context" (Sackmann 1997, 2). Sackmann emphasises how many cultural groupings, or subcultures, may co-exist in a single organisation (Sackmann 1992, 147–54). Sackmann (1991, 298) also depicts the visible aspects of an organisation's culture as the tip of a complex iceberg made of many underlying factors, such as tacit, shared, practised, and psychologically-anchored beliefs about priorities, processes, causes, and improvement options.

Finally, Weick's 'organisational sensemaking' is key to realising that there may be limits to the degree to which organisational culture can improve compliance. His work explains how members of organisations continuously interpret cues in the context, act upon them, and revise their meaning upon consequences (Weick 1995, 8). Sensemaking covers many aspects that may or may not be only about organisational culture, as cues can derive from elements "such as institutional constraints, organizational premises, plan, expectations, acceptable justifications,

and traditions inherited from predecessors" (Weick, Sutcliffe, and Obstfeld 2005, 409). The amplitude of Weick's view, however, subsumes organisational culture, as the culture of an organisation is, indeed, an influence to sensemaking (Harris 1994, 309–10). This is significant because it implies not only that organisational culture affects decision making on an ongoing basis but also, that even a healthy organisational culture can collapse amidst surprising or pressing situations (Weick 1993; cf. Maitlis and Christianson 2014, 58).

Together, these authors speak of three difficult challenges faced by any attempt to make sense of organisational culture in any field of human activity: the openness, the complexity, and the fragility of organisational culture. At the same time, however, the three authors above do not deny each other. While entering specifics about organisations, Sackmann does not deny that culture is a complex phenomenon with fuzzy boundaries. While speaking of the possibility of a collapse of sensemaking, Weick does not deny that robust organisational culture can go ways in preventing failures. Similarly, by being open-ended, Schein provides the space needed to make sense of such an extensive phenomenon and, yet, allow authors like Sackmann and Weick to enter specifics.

Not losing sight of the enormity of the organisational culture phenomenon while still being able to engage with specific challenges is critical to food safety culture phenomenon. The best explanation for this relates to the fact that, initially, the literature about organisational culture and the literature about safety culture developed separately.

In 1999, the Health and Safety Executive (HSE) published one of the first government-initiated overviews of 'safety climate tools' (Davies, Spencer, and Dooley 1999). Three years later, the HSE's Health and Safety Laboratory linked the idea of safety climate and safety culture and defined the latter term, broadly, as "a [organisation-based] proactive stance to safety" (Gadd and Collins 2002, 2). As years passed, safety culture efforts materialised, at the very least, at the Maritime and Coastguard Agency (MCA), the Financial Conduct Authority (FCA), the National Health Service (NHS), and at the FSA (Arthur D Little 2004; MCA 2014; FCA 2018;

Williams 2018; NHS 2017, 2019). However, while many now consider safety culture efforts part of the organisational culture literature (Nyarugwe et al. 2016, 82), the safety culture literature back focused primarily on results within specific fields. Indeed, the notion of safety culture arose from a goal-driven pursuit of safety fuelled by several high profile accidents (Pidgeon 1998, 202–3).

When authors struggled to come to terms with the differentiation between the idea of safety 'culture' and the more theory-driven field of safety 'climate',[10] writings about the former tightened their relation with organisational culture (Clarke 2000, 68). Up until then, however, safety culture was underlined mostly by a quest for results in the field.

Early food safety culture efforts also arose from a pragmatic pursuit of safety. For example, the introduction of hazard analysis and critical control points (HACCP) was part of a global effort led by the World Health Organisation (WHO) intended to enhance food safety management (WHO 1997). HACCP and other similar frameworks like good manufacturing practice (GMP) and good agricultural practice (GAP) are "'codes of conduct'… [instrumental] in achieving a particular food safety or quality attribute" (Henson and Reardon 2005, 244).

Over time, however, food safety culture solidified by incorporating theoretical notes. Yiannas (2008, 77), for example, noted that "to effectively create or sustain a food safety culture, [it is important to] remember that it is critical to have a systems thinking mindset… [and] realize the interdependencies of each of the various efforts your organization (sic) chooses to put into practice and how the totality of those

[10] While not possible due to space, it would be interesting to explore links to other trends that also speak of culture as a type of shared knowledge that influences behaviour. In 2004, for instance, a paper by the Prime Minister's Strategy Unit sought to systematise approaches to behavioural change across the government included social capital theory (Bourdieu 1986) as a way to understand how the context around those in groups, organisations, and other types of communities can affect their behaviour (Halpern et al. 2004, 28–29). Another example is a report by the Cabinet Office that developed a cultural capital framework also supported by social capital theory (Knott, Muers, and Aldridge 2008, 39–40), which is acknowledged in a separate report by the Government Social Research (GSR) (Darnton 2008, 61–62). All these perspectives, and the argument here, speak of shared knowledge influencing behaviour at one or another level. So, rich linkages may exist.

efforts influences people's thoughts and behaviors". Other authors wrote, among other things, about managing food safety culture in multi-cultural social settings (J. Taylor 2011), the complementarity between food safety culture, audits, and inspections (Powell et al. 2013, 690), and the role of subcultures within food businesses (Manning 2017, 188). Likewise, as evidenced later in this project, the frameworks covered by this report acknowledge organisational culture and even ascribe to Schein's view of it.

In this manner, this project's interest in an approach that acknowledges, both, the general and the specific levels of food safety culture is a logical extension of the trend toward a unified view of organisational and safety culture. The point being, indeed, to provide robust recommendations (i.e., recommendations applicable across food sectors, types of business, size of business, etc.) that contribute to the FSA's ability to protect the safety of food in England, Wales, and Northern Ireland.

3. Method

This project follows a rapid review format. Rapid reviews are frequent in the UK (e.g., Wilson, Tyers, and Wadsworth 2010; S. J. C. Taylor et al. 2014; Wilson 2015; see also Collins et al. 2015) because they can improve the evidence available for making decisions. Rapid reviews are systematic but somewhat humbler in coverage than a comprehensive review (Langlois et al. 2017, 5; Schünemann and Moja 2015, 2). Accordingly, rapid reviews may not suffice when the objective is to gain a thorough understanding of an entire field. Rapid reviews, however, can be ideal when focusing on specific challenges or aspects of challenges (Hartling et al. 2015, 16–17).

A rapid review is applicable because this report examines the frameworks identified, upon informal conversations with staff at the FSA, as most likely to be considered relevant by the FSA;[11] the idea being that the analysis focuses on frameworks that the regulator has already regarded as noteworthy. At the time of writing, these were the frameworks proposed by or in:[12]

- ✓ Wilson, Tyers, and Wadsworth (2010) first 'Evidence Review on Regulation Culture and Behaviours';
- ✓ Define's (2011) 'Qualitative Research Exploring Regulation Cultures and Behaviours';
- ✓ Wright, Leach, and Palmer's (2012) 'Tool to Diagnose Culture in Food Business Operators';
- ✓ Wilson's (2015) second 'Evidence Review on Regulation Culture and Behaviours';
- ✓ Neal, Binkley and Henriod's (2012) 'Assessing Factors Contributing to Food Safety Culture in Retail Food Establishments';

[11] It is worth emphasising that, as a direct result, the sample contains frameworks commissioned by the FSA.

[12] These papers may or may not use the word 'framework'. As the analysis evidences, however, all conceptualise food safety culture and provide a set of replicable steps by which to approach it. Ergo, under the definition given earlier, all these papers offer a food safety culture 'framework'.

- ✓ Jespersen, Griffiths, and Wallace's (2017) 'Comparative Analysis of Existing Food Safety Culture Evaluation Systems';
- ✓ Osman's (2018) 'How can we make businesses more compliant? A comprehensive review of current literature'; and,
- ✓ the Global Food Safety Initiative's (GFSI) (2018) 'A Culture of Food Safety: A Position Paper from the Global Food Safety'.

The report compares these frameworks for conceptual coverage (i.e., concepts, or how the authors conceive food safety culture) and purpose (i.e., models, or how the authors operationalise food safety culture). Accordingly, the project speaks of 'frameworks' (i.e., a system of ideas *and* replicable steps; the former needed for robustness, the latter for operationalisation) rather than 'models' (i.e., a set replicable steps).

It is worth noting that comparisons exist in the field of food safety culture. For example, one of the frameworks covered by the report, Jespersen, Griffiths, and Wallace's (2017), is a comparison of previously existing food safety culture tools/systems. Generally, these focus on characteristics that describe the organisational culture of food businesses (Jespersen et al. 2016, 174–75). The main virtue of this approach is that it is pragmatic, as it allows identifying characteristics that can serve as proxies for a food business' food safety culture. However, the approach also creates a tension between a justifiable interest in focusing on the few characteristics that repeat across frameworks and an also-justifiable interest in considering all characteristics covered across frameworks. Additionally, there is ambiguity about the extent to which models covering similar characteristics are comparable. As the analysis shows, separating the comparison as described above allows insight into and a solution to these two challenges.

4. Discussion

As declared in the methods section, this discussion is split into two sections: coverage and purpose. The conceptual analysis in the first section shows that while there is agreement about the need to cover norm-like influences on behaviour such as values and beliefs, opinions about where to draw the boundaries of food safety culture vary. The 'clear-core fuzzy-boundaries' situation suggests the need for a layered understanding of food safety culture: an umbrella definition covering the totality of the phenomenon with more-focused definitions nested within for practical purposes. Afterwards, the second section considers the frameworks' divergence toward, either, diagnosis [by the regulator] or management [by food businesses], and why it is hard to imagine a single framework for both.[13]

It is worth noting already, that this report's recommendation for a definition different to salient definitions in the food sector may seem to stand at odds with attempts to reach consensus about the meaning of food safety culture and associated best practices. This is not necessarily the case. As it becomes apparent in the analysis, the report acknowledges the value of definitions and approaches by bodies external to the FSA and even suggests the FSA to consider leveraging their value. Ultimately, however, the report needs to operationalise food safety culture from the perspective of a regulatory/compliance body, which calls for a view that is sufficiently comprehensive as to not even accidentally exclude any aspect (however minimal) of food safety culture. Differences vis-à-vis external efforts, thus, are best read as a 'levels-of-analysis' situation.

4.1. Coverage

Table 4.1 presents a summary of the definitions related to food safety culture given by all frameworks in this report's sample. Figure 4.1 visualises table 4.1 in the form of a word cloud. The world cloud considers all definitions in table 4.1 as equally valid

[13] This section builds on a larger analysis of the frameworks in the project sample, available in appendix A.

because a general organisational culture framework applied to food businesses can theoretically deliver food safety and thus, be a food safety culture framework even if called otherwise.

Table 4.1: Summary of definitions related to food safety culture.

Definitions	
Wilson, Tyers, and Wadsworth (2010)	
Culture	A manifestation of the values and beliefs and attitudes within a workforce. Its formation is dependent upon the knowledge, standards, motivation and leadership of the person in charge, how they communicate with, and are trusted by, the staff.
Safety culture	'Good' organisational safety culture… [is] where there are 'shared, accurate perceptions of risks and everyone adopts the same positive attitudes to health and safety'.
Neal, Binkley, and Henroid (2012)	
Food safety culture	How and what the employees in a company or organization think about food safety. It's the food safety behaviors that they routinely practice and demonstrate.
Wright, Leach, and Palmer (2012)	
Safety culture	The safety culture of an organization is the product of the individual and group values, attitudes, competencies and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organization's health and safety programs.
Culture	Culture is the patterned ways of thought and behaviour that characterize a social group, which can be learned through socialization processes and persist through time.
Food safety practices	The collective food safety practices used within an organization… taking into account both food safety culture and food safety management... the aggregation of the prevailing relatively constant, learned, shared attitudes, values and beliefs contributing to the hygiene behaviours used in a particular food handling environment and one must—provide staff with a common sense of food safety purpose.
Food safety culture	How and what the employees in a company or organization think about food safety… [and] the food safety behaviours that they routinely practice and demonstrate
Wilson (2015)	
Culture	A manifestation of the values and beliefs and attitudes within a workforce. Its formation is dependent upon the knowledge, standards, motivation and leadership of the person in charge, how they communicate with, and are trusted by, the staff.
Safety culture	'Good' organisational safety culture… [is] where there are 'shared, accurate perceptions of risks and everyone adopts the same positive attitudes to health and safety'.
Jespersen, Griffiths, and Wallace (2017)	

Organisational culture	The culture of a group can now be defined as a pattern of shared basic assumptions that was learned by a group as it solved its problems of external adaptation and internal integration, that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems.
Food safety culture	The aggregation of the prevailing, relatively constant, learned, shared attitudes, values and beliefs contributing to the hygiene behaviours used in a particular food handling environment.
Osman (2018)	
Food safety culture	By food safety culture, what is meant is a set of behaviours that are learned and shared among people, and which are based on accepted assumptions, values, and beliefs, and which are dynamically impacted by an array of factors and situations.
GFSI (2018)	
Culture	Culture draws its power from the unspoken and intuitive, from simple observation, and from beliefs as fundamental as "This is the right thing to do" and "We would never do this." Rules state facts; culture lives through the human experience.
Food safety culture	Shared values, beliefs and norms that affect mindset and behaviour toward food safety in, across and throughout an organization.

Some clarifications are in order before examining the world cloud in figure 4.1. The word cloud is straightforward; words that repeat across definitions are larger those with unique appearances, and all words got the same weight. That said, the word cloud was generated using an online word cloud engine,[14] which required changing all definitions to British English and removing unnecessary words.[15] Appendix B lists all remaining words, along with their frequency. However, for clarity, figure 4.1 includes only words that repeat.

[14] Available at www.wordart.com.

[15] This included grouping similar usages of the same word (singular/plural/verb/adjective usages the same term), removing common words ('and', 'the', 'of', 'to', 'in', 'that', 'is', 'are', 'by', 'an', 'as', 'its', 'how', 'they', 'be', 'with', 'from', 'upon', 'good', 'where', 'there', 'can', 'or', 'about', 'it', 'this', 'do', 'into', 'both', 'one', 'on', 'now', 'was', 'how', 'well', 'new', 'way', 'ways', 'we', 'those', 'set', 'which', 'within', 'used', 'what', 'among', 'enough', 'food', 'defined', 'thing', 'worked', 'would, 'never', 'meant', 'must', 'sense', 'through', 'throughout', 'draws', 'relatively', 'same', 'therefore', and 'toward'.) and, to avoid circularity, removing the words 'food', 'safety', 'culture', 'behaviour', 'compliance', and 'health'.

Figure 4.1: Word cloud of definitions related to food safety culture.

Three considerations stand out from the table and figure 4.1. The first consideration is that food safety culture is widely seen as something shared by some or all the members of a company, staff, workforce, or organisation. The agreement confirms this report's interest in using the organisational culture literature as a foundation.

The second consideration is that while the more normative elements like values, beliefs, or attitudes exist in almost all definitions, definitions differ elsewhere. The evidence reviews by Wilson, Tyers, and Wadsworth (2010) and Wilson (2015), as well as Wright, Leach, and Palmer (2012), are inclusive. These authors cover a mix of elements such as attitudes, beliefs, routines, practices, standards, and even safety programmes. However, other authors specify interest in only aspects of the above – for instance, Neal, Binkley, and Henroid (2012) centre mostly on practices, and Jespersen, Griffiths, and Wallace's (2017) and the GFSI (2018) veer toward a 'this-is-right-that-is-wrong' view that gives centrality to normative considerations.

The differences across definitions are unsurprising. As already noted, food safety culture is fragmented literature, which implies the existence of somewhat different perspectives. This report seeks to acknowledge reality. So, it will not deny that these differences exist.

The challenge, however, is that the definitional differences across may give the impression that one of the definitions is bound to be better than the others. This is not necessarily the case, though. The organisational culture approach taken by this project allows thinking of food safety culture as an extensive phenomenon composed of many specific aspects of relatively equal importance. Consider, for example, the following extract of Schein's (2010, 236) work:

> I am defining culture as the set of shared, taken-for-granted implicit assumptions that a group holds and that determines how it perceives, thinks about, and reacts to its various environments… Norms become a fairly visible manifestation of these assumptions, but it is important to remember that behind the norms lies this deeper taken-for-granted set of assumptions that most members of a culture never question or examine. The members of a culture are not even aware of their own culture until they encounter a different one.

Schein acknowledges in this extract that norms can be prominent parts of the phenomenon, and yet, he avoids defining the phenomenon upon them. Instead, rather than talking, per se, about a specific type of behavioural influence (like norms), he speaks, more generally, of a backdrop of *taken-for-granted implicit assumptions*. His view is, thus, comprehensive in the sense that it covers all behavioural influences that altogether make the culture of an organisation. At the same time, however, his view allows specificity by acknowledging that norms are one such influence.

It is possible to learn from Schein when defining food safety culture.

A comprehensive food safety culture definition would need to consider all types of influences that can affect food businesses' compliance. As per the definitions in table and figure 5.1, these are related to three different types of behavioural influences:[16]

- ✓ **norms,** value-/belief-like considerations with an active ethical component (e.g., 'it is wrong not to wash my hands');
- ✓ **practices,** established behaviours that are not given much thought (e.g., 'I wash my hands automatically'); and,

[16] See HSE (2005, 37) for a compatible argument from a different perspective.

- ✓ **standards,** codified systems of activities (e.g., 'the manual says I need to wash my hands').

As a result, only a very ample definition such as 'the fully or partially shared norms, practices, and standards that influence behaviour in an organisation' could speak for the entirety of food safety culture.

However, the trade-off of having a definition that covers the entirety of food safety culture is operability. A framework covering all norms, practices, and standards at a food business would likely cover most, if not all, of what happens at a food business. As the next section sees, this would likely lead to a framework that is over-cumbersome (or superficial, if the depth of analysis is sacrificed to avoid complication). As a result, it is reasonable for individual food safety culture frameworks to focus their definitions on aspects of food safety culture.

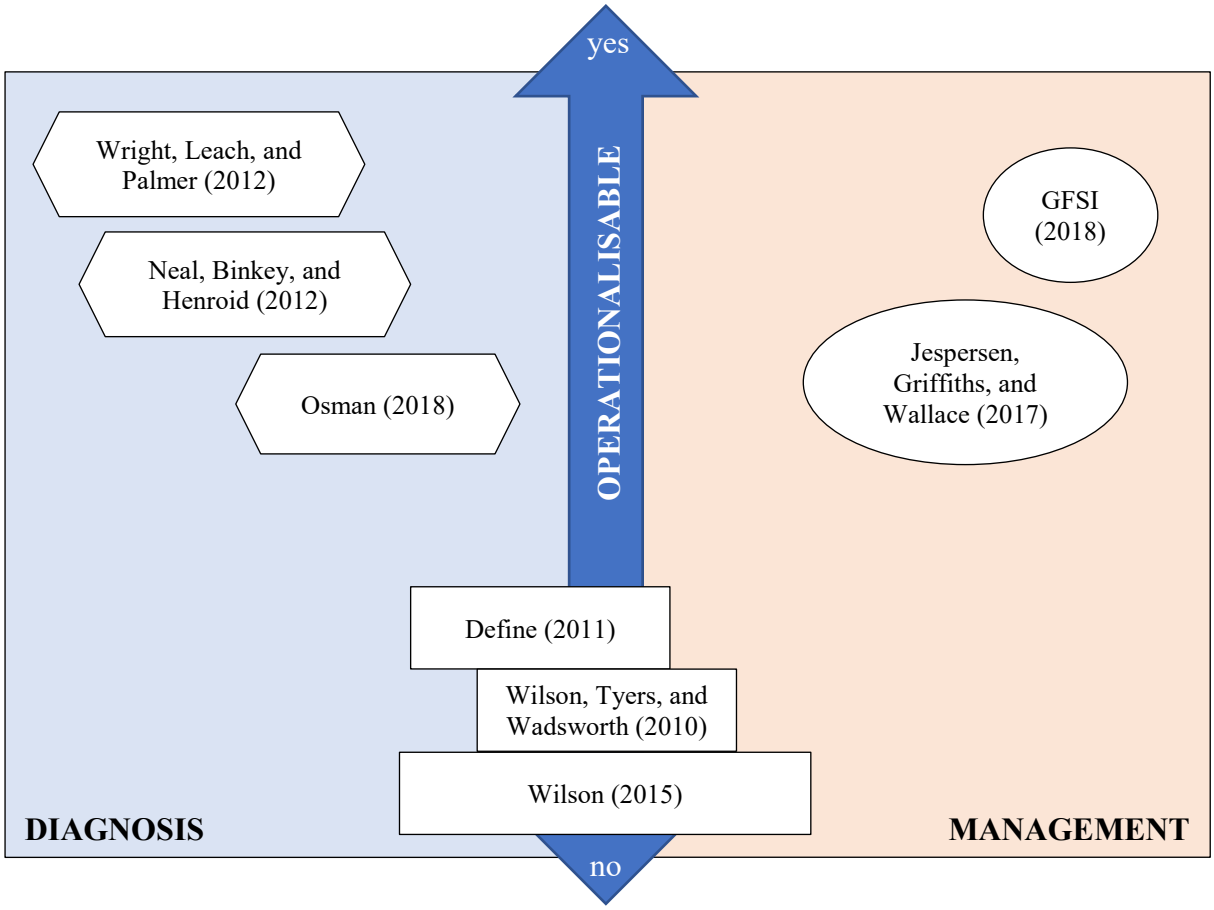
So, for example, even Wright, Leach and Palmer (2012, 8), who are inclusive at the general level, specify their last definition to routine practices. In contrast, the GFSI's (2018, 9) definition zooms into normative aspects. Neither of these approaches needs to be inherently wrong. Instead, it is possible to interpret the two efforts as complementary approaches that focus on different aspects of the general umbrella phenomenon that covers *all* norms, practices, and techniques.

4.2. Purpose

Figure 4.2 visualises two considerations. How each of the frameworks covered by the report operationalises their interest in food safety culture. And the extent to which each framework seems ready for operationalisation by the FSA (from the author's perspective).

In a nutshell, the figure shows that frameworks with a decided interest in *either* diagnosing food businesses' food safety culture *or* assisting businesses in their management of food safety culture seem closer to being operationalisable than frameworks ambiguous about their purpose. The following pages discuss why the divergence emerged and the reasons why it is tough to think of a single framework for both diagnosis and management.

Figure 4.2: Summary of frameworks' purpose and comparative operationalisability.



4.2.1. Diagnosing organisational culture

> … when I see my colleagues inventing questionnaires to "measure" culture, I feel that they are simply not seeing what is there, and this is particularly dangerous when one is dealing with a social force that is invisible yet very powerful. We are in grave danger of not seeing our own culture, our assumptions about methods, about theory, about what is important to study or not study, and, in that process, pay too much attention only to what suits our needs.
>
> Edgar Schein (1996, 239).

Studies about organisational culture have debated the challenge of diagnosing the culture of an organisation. Sackmann (1997, 2), in particular, saw the organisation as a complex web of "simultaneous existing multiple cultures that may contribute to a

homogeneous, differentiated, and/or fragmented cultural context". As a result, her work seeks to avoid the temptation of basing diagnosis on simplistic assumptions. As evidenced by the extract that opens this subsection, Schein agrees.

To be clear, all models covered by this report have some diagnostical value. For example, the consistency dimension of Jespersen, Griffith, and Wallace (2017) and the GFSI (2018) pays attention to accountability, performance measurement, and documentation (Jespersen, Griffiths, and Wallace 2017, 376; GFSI 2018, 21–24). All these metrics are necessary for food businesses to be aware of their food safety culture, which is an essential step into improvement. If organisations share the data with the regulator, the information can aid diagnosis.

Regardless, the evolution of the frameworks covered indicates a move toward decided interest on either diagnosis or management, but not both. Wilson, Tyers, and Wadsworth (2010), Define (2011), and Wilson (2015), for which design majorly took place in 2010 with the first report in the series, vacillate between diagnosis and management, but subsequent efforts by Wright, Leach, and Palmer (2012) and Neal, Blinkley, and Henroid (2012) focus decidedly on diagnosis. Similarly, while agnostic at the foundation, Osman's (2018) framework specified recommendations to diagnosis.

Osman's framework needs to be treated separately as the virtue of the agnostic foundation is that it could, in theory, provide a pathway for bridging across diagnosis and management. So, for the moment, the report will focus on Wright, Leach, and Palmer (2012) and Neal, Blinkley, and Henroid (2012).

There are two primary differences between these two frameworks. One difference refers to granularity. Wright, Leach, and Palmer (2012) focus on the *general* risk attitudes of the individuals making decisions. Neal, Blinkley, and Henroid (2012) present *specific* proxies that likely correlate with compliance. This difference is not hugely problematic, as the actual content of both final models is compatible. For example, where the former trio speaks, generally, of the leadership provided on food safety and hygiene, the latter speaks, more specifically, of management that shows

leadership by keeping employees focused on food safety. So, while looking at the challenge from a slightly different level, the models do not contradict each other.

The second difference, which *is* problematic, relates to the type of insight enabled by each approach. Wright, Leach, and Palmer (2012) try to establish if decision-makers are more/less likely to decide in favour of compliance. Their approach is, thus, input-oriented.[17] Neal, Blinkley, and Henroid (2012) try to establish if a given number of visible behaviours already exist at an organisation. Their approach is, thus, output-driven.[18]

There may be two ways out of the input/output problem. The first is to run the frameworks in parallel because, if only one is running at a given time, it becomes challenging to identify failures timely. For example, if leadership changes, the preferences determining decisions will change. An input-oriented framework would capture this immediately, because the change in leadership is, in effect, a change of input. However, an output-driven framework would only capture the change as new behaviours begin to emerge. It is possible also to imagine the inverse situation. Incremental changes in behaviour can occur. An input-oriented framework might miss such changes, given that the leader remains the same. However, an output-driven framework could identify changes in behaviour even if there is no change in who the leader is. Parallel utilisation of input and output diagnostical tools can reduce the risk of not identifying meaningful changes until it is too late to act. A parallel approach of the sort would involve redundancies at ordinary times but may allow spotting inconsistencies more easily (much like flying on a plane with redundant indicators).

The second way out of the input/output problem is to understand, thoroughly, how the decision-maker processes inputs and produces outputs. Regulators who understand the decision-maker will likely make more out of a framework than those

[17] Input-oriented approaches focus on the ingredients that go into a process, such as, in this case, the proclivities of managers.
[18] Output-oriented approaches focus on studying what goes out of a process, such as, in this case, the behaviours that have emerged from previous decisions.

that do not understand the decision-maker. The problem, however, is that understanding the decision-maker in the context of food safety culture requires bridging the type of organisational-level understanding put forth in this report with a theory of individual action, which is challenging. Of the frameworks covered here, only Osman (2018) tries to do such a thing. Osman shows that a general model can be of use in the food sector. It may be possible to learn from or build upon her work to solidify the understanding of decision making in other frameworks.

4.2.2. Managing organisational culture

> One can think of some aspects of culture as being for the group what defense mechanisms are for the individual…
>
> Edgar Schein (1990, 111).

As noted earlier, the idea that food safety culture management may not be as simple as having a relatively 'good' culture in place can be associated with the work of Weick (1979; 1995). One of the virtues of his work is that it highlights novel, unexpected, or confusing events involving ambiguity or uncertainty (Maitlis and Christianson 2014, 58) can challenge organisational culture. Indeed, as Weick (1993) argued himself, even highly trained staff can struggle under pressure. What this means is that, to act as a successful defence mechanism, organisational culture needs to be sufficiently robust as to cope with stress and surprise.

All frameworks covered by this report share a desire to make food businesses' culture sufficiently robust as to cope with pressure – even a diagnosis framework can help to this end when used as a source of advice. Regardless, while the guidance from a diagnosis framework has managerial value, a diagnosis framework's ability to contribute to management is indirect at best. In contrast, Jespersen, Griffiths, and Wallace (2017) and the GFSI (2018) both directly aim to create resources to assist businesses in managing their food safety culture. Equally, both include considerations to avoid compliance from faltering when staff is under pressure. As such, it is possible to describe these two frameworks as shields against noncompliance.

The interest in improving food businesses' organisational culture allows the frameworks by Jespersen, Griffiths, and Wallace (2017) and the GFSI (2018) to bypass the input/output problem that affects diagnosis frameworks. Their primary objective is to roll out actions that control the content of a food business' organisational culture. They are, therefore, inputs in and of themselves.

The problem, however, is that the very same virtue makes it hard to think of these frameworks as a sound foundation for diagnosis (again, by the regulator; self-diagnosis by businesses is needed for all type of management, but this is obvious). The information created in the process of implementing these frameworks can help diagnosis. However, if a management framework is used for diagnosis, the diagnosis would focus mostly (or completely, even) on its own inputs. The first section of this analysis showed that individual frameworks specify interest in only aspects of food safety culture, which means that much would be missed in a diagnosis based on a specific framework.

The way to avoid over-specificity is, naturally, to expand a framework's diagnosis capacities until it covers all aspects of a business' food safety culture. Such expansion, however, would detach the management and diagnosis aspects of a framework. Additionally, expansion would likely lead to an over-burdensome framework of little use for the managers of a food business or to the need to only superficially cover many aspects of the food business' culture.

It follows, thus, that if the objective is to avoid impossibly cumbersome frameworks, food safety culture likely requires food business' managers combining resources. So, for example, using the GFSI framework alongside standards by other prominent bodies such as the British Retail Consortium and modifying practices upon advice by expert consultants.

Now, the challenge implied in the above paragraph is that there is a need to think of how different frameworks combine (or not combine). A way to visualise this situation is to briefly discuss GFSI's framework's section about hazards/risks (GFSI 2018, 28–30). As noted earlier, the GFSI take a normative approach to food safety culture. Accordingly, the hazards/risk section calls for an underlying system of values that

would lead to taking risks and hazards seriously. However, the hazards/risk section does NOT prescribe specific standards to manage hazards/risks. For this purpose, a business would need to implement frameworks such as HACCP.

In practice, therefore, the full picture speaks about food safety culture frameworks being like pieces of modular equipment: they are designed to fit together but are still separate resources. As is the case of modular equipment, making sure that parts fit together is key to the result. In the context of food safety culture, this challenge calls for a thorough understanding of human decision making in food businesses.

Of the two models geared to management, the one that comes closest to offering a theory of action is GFSI's position paper (2018). This paper links individual- and organisational-level realities by noting that, "in a work environment, we are affected by the group we identify with, including our department, coworkers, our role and position, job security, formal and informal authority, and our own habits and consciousness around the job at hand" (2018, 10).

That said, while the link is acknowledged, the bulk of the attention in the paper goes to the specific "areas that an organization should examine if it wants to better understand its current food safety culture and make improvements to strengthen it" (GFSI 2018, 7). Given that the purpose of the GFSI paper is, indeed, to deploy practical solutions, the lack of additional discussion is justifiable. However, the absence of such discussion forbids assessment here. Therefore, at this point, there is a need to call for further research about the links between the food safety culture frameworks here and individual decision-making processes within food businesses.

5. Conclusions

The conclusions below present findings and recommendations. This section considers internal discussions at the FSA that highlighted a desire for defining food safety culture in a way that allows action and while acknowledging that food safety culture is an intangible, diverse, and comprehensive phenomenon.

It is important to recall that as noted extensively in the analysis, the frameworks covered here focus on aspects of food safety culture. Such focus is, as also noted in the analysis, virtually mandatory. Talking of a food business' organisational culture is akin to talking about almost everything (or everything) that happens in a food business. A single framework covering all would easily become unmanageable. It therefore makes sense to see convergence toward a modular approach to the management of food safety culture.

A regulatory/compliance body like the FSA can also approach diagnosis modularly. So, for example, the FSA can diagnose the values and beliefs of food businesses separately to how it diagnoses their usage of technical standards. However, for full diagnosis to happen, the FSA needs to consider all aspects at some point or another. The implication is that the FSA needs a definition that explicitly covers all aspects of food safety culture while being, also, sufficiently flexible enough as to allow others to focus on aspects of food safety culture.

Findings

The report's first finding is that in the aggregate, frameworks conceptualise food safety culture as related to three different types of behavioural influences:

- ✓ **norms,** value-/belief-like considerations with an active ethical component (e.g., 'it is wrong not to wash my hands');
- ✓ **practices,** established behaviours that are not given much thought (e.g., 'I wash my hands automatically'); and,
- ✓ **standards,** codified systems of activities (e.g., 'the manual says I need to wash my hands').

Individually, however, the analysis shows that the frameworks included in this report tend to specify interest on aspects of the above.

To have a robust foundation while being supportive of the diversity of frameworks needed for a modular approach to be possible, the FSA can define food safety culture in two steps. The first step would involve a broad view of food safety culture at the general level, via a definition that includes norms, *and* practices, *and* standards. The second step would involve accepting that external parties may focus their definitions on specific aspects of food safety culture. This two-step understanding of food safety culture would enable the FSA to:

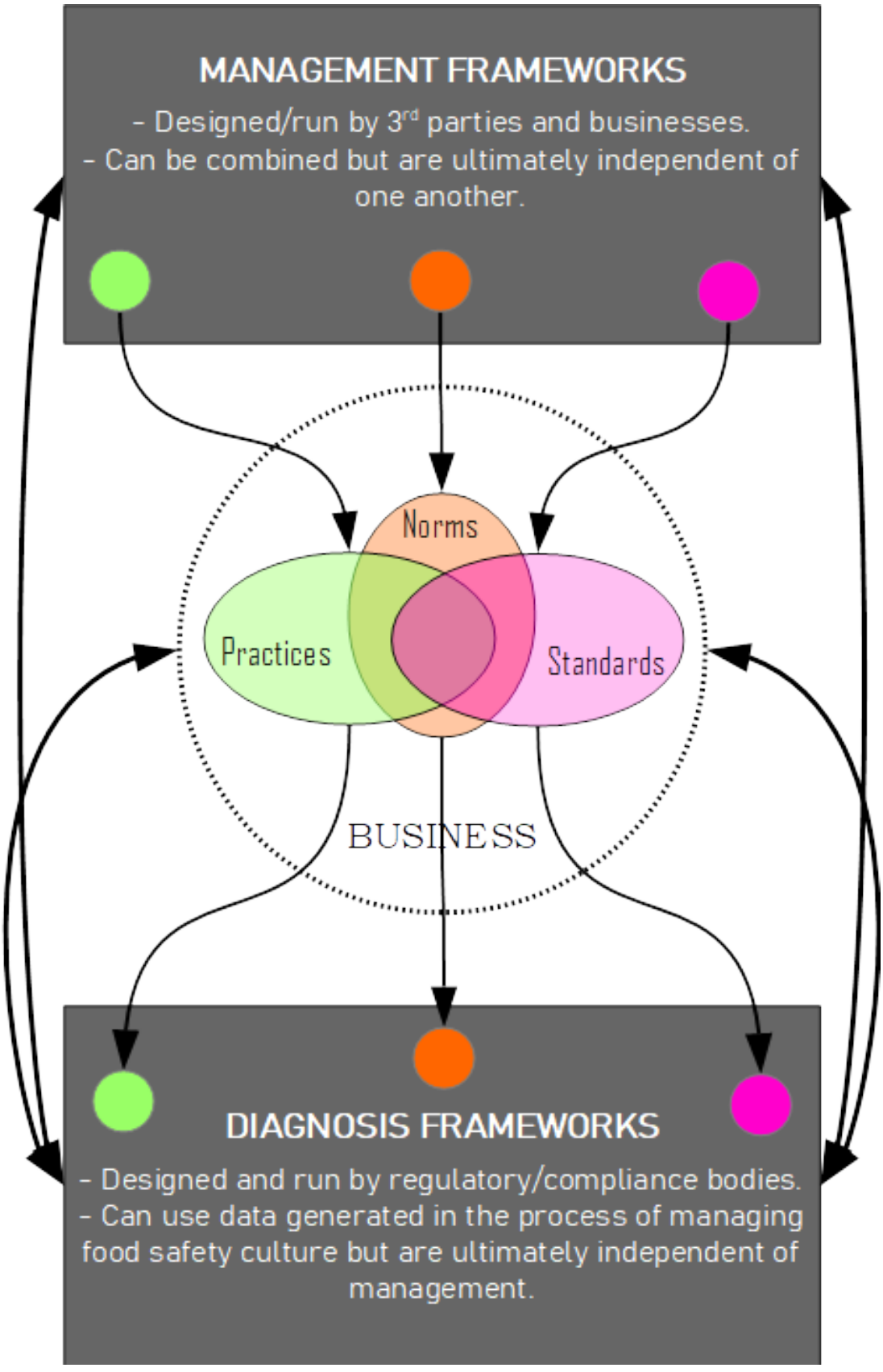
1) consider all aspects of a food business' culture as vital for food safety;
2) accept frameworks focused on specific factors as valid; and,
3) collaborate with other actors regardless of how specific/general their approach is.

The report also finds differences in the intended function of the frameworks. Frameworks diverge into, either, resources to increase a regulator's capacity to diagnose food safety culture *or* resources meant to improve a food business' ability to manage its food safety culture. Additionally, the analysis suggests that it would be tough for a single framework to perform both tasks, as such task could easily lead to an over-cumbersome or superficial (upon an attempt to balance) framework. Ergo, there is a need to think of the diagnosis and management of food safety culture as, interrelated but, ultimately, separate.

Figure 5.1 visualises findings. The figure acknowledges that businesses evaluate/assess their culture in the process of managing it and that a management framework can help this task (and, perhaps, even offer an independent assessment). The words 'evaluation' and 'assessment' can be understood as a type of diagnosis, which can fuel a discussion about semantics. This project, however, is not about semantics. What matters here is that regulatory and compliance bodies benefit from being able to identify/recognise (diagnose) the risk of a food business having a 'bad' food safety culture. Ergo, even if a regulatory/compliance body can build on evaluations/assessments by others, it is still necessary to determine the risk of such

evaluations/assessments being incorrect. In other words, the final diagnosis is independent of management (and by extension, feedback between all actors is vital).

Figure 5.1: Food safety culture infographic.



Recommendations

To not leave aspects of the food safety culture phenomenon outside of the FSA's domain and be able to collaborate with external actors, the report recommends the FSA to consider:

R_1: adopting a general 'umbrella' definition covering the totality of food safety culture, namely, *the 'shared*[19] *norms, practices, and standards that influence behaviour in a food business organisation'*; and,

R_2: accepting third parties' usage of partial definitions (i.e., norms, *or* practices, *or* standards) as a valid way to specify interest in aspects of food safety culture.

Since the analysis suggests that a given framework is unlikely to double as a diagnosis and management resource, the report also suggests that the FSA considers:

R_3: thinking *separately* of diagnosis and management; and, by extension,

R_4: developing proprietary diagnosis resources;

R_5: allowing the piloting of management frameworks; and, by extension (and assuming the performance of pilots is satisfactory);

R_6: engaging with food businesses to support the adoption of management frameworks.

Additionally, while it is necessary to recall that the rapid nature of the research equals a high risk of omissions, the report also notes that *from the frameworks in its sample*, the two frameworks that are closest to being ready for piloting are:

R_7: Wright, Leach, and Palmer (2012) for diagnosis; and,

R_8: GFSI's (2018) position paper for management.

Do note, however, that these two recommendations do not call for automatically deploying either Wright, Leach, and Palmer (2012) or the Wright, Leach, and Palmer (2012) exactly as given. As a foundation, these two frameworks seem promising. However, implementation of either requires additional work. On the one hand, the

[19] In an organisational setting, sharing can be partial (e.g., locations, teams, groups of staff).

Wright, Leach, and Palmer's (2012) diagnostical toolkit is somewhat burdensome already, so simplification needs to happen. On the other hand, the GFSI's (2018) position paper sets out a view that requires specification in the field. So, once again, these two recommendations only say that these two frameworks are, from the sample covered by the report, the closest to being implementable. It does *not* say that they are automatically implementable.

Likewise, it is also essential to recall that the rapid nature of the research forced the exclusion of many other initiatives that already give the FSA some insight into aspects of food businesses' organisational culture (e.g., local authorities' enforcement officers' inspections). Accordingly, the report also suggests:

R_9: implementing R_7 and R_8 in a manner that complements existing efforts.

Food safety culture is, currently, one of the most complex challenges faced by actors in the food sector. Therefore, a single report, particularly a rapid review, cannot elucidate all there is to know about food safety culture. In this sense, it is essential to note that in addition to the recommendation above, the report identified areas where undertaking additional research could benefit the FSA. The remainder of this conclusion provides a snapshot of these areas.

(**R_{10}**) This report assumes that the trend toward the use of organisational culture in the context of regulation is sufficiently robust as to justify a causal relationship between food safety culture and compliance. As the introduction and theory section showed, some work on this causal link already exists. However, to this author's knowledge, there is no such thing as final and definitive proof of a direct or a (realistically) manageable relationship between good business culture and compliance. So, it is essential to continue research about it. Such type of research is not antithetical to the recommendations here. This report aims, in a nutshell, to maximise the value of what exists, but it does not presume that such maximised value will suffice for food safety. As such, the report is careful to recommend piloting initiatives as pre-requisite to implementing them at a larger scale. That said, since there is currently little data about how food safety frameworks perform in real life, piloting seems a necessary part of the quest to answer the question of performance.

Not to say that the issue of performance can be resolved with piloting alone – much more is necessary. For example, it would be ideal to compare frameworks specifically designed for the food sector and general frameworks that may, nonetheless, apply to the food sector. However, this report's rapid nature forbade looking at such type of general frameworks. Additionally, research about similarities between the food and other sectors' approach to organisational culture and compliance could help to determine if/how the FSA can learn from or inspire other regulators.

(**R_{11}**) Another area that may be worth additional research relates to the idea that diversity is not the same as chaos. This report advices thinking about food safety culture as characterised by diversity, but it does not imply that efforts should disregard each other. Disregard is particularly un-advisable when it comes to the implementation of food safety culture frameworks. It would risk irreconcilable mismatches between how food safety culture is diagnosed and its management, which is a contradiction in the context of regulation, where the final objective is to avoid noncompliance. So, it seems wise to continue research intended to enhance communication between frameworks. Something that might help is that several of the frameworks covered by this report view of the individual as the epicentre of compliance. Therefore, it is valid to think that even significantly different food safety culture frameworks could communicate via specifying their understanding of individual decision-making. It may be worthwhile to pursue research contributing to this challenge.

(**R_{12}**) Finally, as this rapid review could not cover all organisational culture frameworks with the potential to increase food safety, there is a need for additional work on other frameworks. This includes food safety culture frameworks not covered here, maturity models,[20] third-party assurance schemes,[21] and/or cost/resource/management sharing business models.

[20] The question of whether these are best conceptualised as complementary or parenthetical to a given food safety culture framework falls out of scope here and, thus, deserves additional research.
[21] For a non-comprehensive list of examples see Wright et al. (2013, xiii-ix.).

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Appendix A: Extended analysis

This appendix offers a more complete overview of the frameworks in the sample. The appendix arranges frameworks chronologically under the assumption that, since they were salient food safety culture solutions at their time, the sequence provides a window into the evolution of best practices.

In line with the approach set out in the methods, each subsection splits the analysis into two, a first subsection dealing with the coverage of each framework, and a second with their actionable recommendations, i.e., purpose.

There is variation in content across subsections. It is impossible to include definitions not covered by a framework, so some conceptual subsections cover more definitions than others. Additionally, the recommendations associated with each framework, their clarity, and their specificity also varies. It is worth maintaining these divergences in plain sight, as they emphasise how diverse food safety culture is.

Wilson, Tyers, and Wadsworth (2010)

The first '*Evidence Review on Regulation Culture and Behaviours*', conducted for the FSA by the Institute for Employment Studies and Cardiff Work Environment Research Centre, aimed "to understand 'what works' to secure regulatory compliance particularly, though not exclusively, in relation to food safety" (Wilson, Tyers, and Wadsworth 2010, 2). The researchers aimed to answer several research questions:

- ✓ who does/does not comply and why;
- ✓ what approaches/communications are more/less effective in securing regulatory compliance;
- ✓ what encourages sustained compliance; what deterrents and incentives have been shown to achieve and maintain compliant behaviour; and,
- ✓ what more can business bodies and enforcement agencies do to increase compliance?

To include evidence from fields other than just food regulation, the authors identified seven non-field specific areas against which they organised research: enforcement, compliance, communication, support, behaviour, and culture (Wilson, Tyers, and Wadsworth 2010, 5). Additionally, the authors considered suggestions by experts in the field (Wilson, Tyers, and Wadsworth 2010, 7), to lower the risk of omitting key sources.

Coverage

At the general level, the authors take an organisational view with food businesses as the central unit of analysis. They offer a chapter about organisational characteristics and behaviours, a chapter about organisational culture, and a chapter about the characteristics of regulators *and* their interactions with businesses. Similarly, the analysis makes many notes about managers' role have to the dissemination of practices influencing compliance. Finally, the study argues that the most effective way to change food safety culture is to interact directly with food businesses. In sum, the authors see food safety culture as decidedly part of the organisational culture umbrella.

The authors define culture and safety culture explicitly. The former, by attaching to the definition in the Pennington Review (Pennington 2009, 85; Wilson, Tyers, and Wadsworth 2010, 27):

> A manifestation of the values and beliefs and attitudes within a workforce. Its formation is dependent upon the knowledge, standards, motivation and leadership of the person in charge, how they communicate with, and are trusted by, the staff.

The latter, upon work by the HSE (1999; Wilson, Tyers, and Wadsworth 2010, 27):

> 'Good' organisational safety culture… [is] where there are 'shared, accurate perceptions of risks and everyone adopts the same positive attitudes to health and safety'.

That said, the review does not join these definitions into a single explicit depiction of food safety culture. To the contrary, the authors note that they prefer to focus on establishing links between culture and compliance as opposed to discussing concepts in detail.

Purpose

The review divides findings and recommendations into three main areas:

1) organisational characteristics, where aspects like the size and nature of the business link, directly or indirectly, with willingness or ability to comply;
2) organisational culture, where the argument is that the likelihood of compliance is higher if organisations have an effective culture; and,
3) regulators and interactions, where the authors note that while there is limited evidence assessing the impact of culture and behaviour of enforcing bodies, the evidence available suggests a connection.

The authors also make general recommendations applicable across the three areas above:

- ✓ identify areas where lessons can be applied;
- ✓ gain further understanding of workplace cultures;
- ✓ examine first-hand the experience of enforcers;
- ✓ consider other sources of data;
- ✓ ensure that studies include compliance as an outcome measure;
- ✓ design interventions with impact assessment in mind;
- ✓ develop targeted prescriptive guidance;
- ✓ provide specialised support for environmental health practitioners on communications;
- ✓ ensure the dissemination of pertinent research findings; and,
- ✓ consider models from other countries.

These recommendations are somewhat general, but they signpost room for further research. Additionally, the authors go on to provide much more specific considerations.

The review distributes specific considerations across the three main areas described above, organisational characteristics, organisational culture, and interactions between regulators and food businesses. These considerations, summarised in table AA.1, can act as a guide for focusing attention on aspects of the challenge that seem most critical. In this much, although perhaps not as focused as the recommendations

by some of the frameworks that are yet to be covered, the considerations constitute actionable recommendations, i.e., a model.

Table AA.1: Wilson, Tyers, and Wadsworth model.

Characteristics (1)	**Culture (2)**	**Interactions (3)**
Size is a key determinant of many aspects of organisational culture but not the only factor influencing compliance. Hazards and challenges change across sectors. Resource constraints can limit training and monitoring. Compliance costs are proportionately higher among SMEs than in larger businesses. Larger businesses tend to have access to better information. SMEs may lack technical expertise, particularly if recruiting inexperienced staff. Compliant worker behaviour appears best reinforced via multiple feedback channels (incl. management communication and performance feedback).	Effective performance management improves compliance (chef pivotal). Safety culture is important for effective safety management. SMEs can lack the management needed to drive compliance. Peer support, supervision, and threats of sanctions encourage best practices among staff. Staff is more likely to cooperate if they agree with regulations and are involved in decisions. Attitudes and perceptions (incl. understanding) of regulators and regulations affect safety culture. Risk perceptions are often driven by knowledge of specific risks. Self-regulation can be difficult for food businesses lacking understanding of the legislation. Compliance is more likely when the regime is perceived as fair, trusted and co-operative. Training must be ongoing and via multiple channels. Motivations are complex and can be case-specific. Targeted information is welcome.	UK regulators are preventative and conciliatory, but diversity can help. Sanctions and name-shaming can have an impact. Rigid enforcement offers limited results. Informal approaches should be clear and consistent. Local authorities' local knowledge and proximity to stakeholders helps, but concerns about consistency, knowledge, and interference exist. Resources can affect local authorities' record-keeping and inspection quality. Inspections can help to share and disseminate information, but the educator/enforcer duality implies tensions. Food businesses interact with many regulators; multiple inspections can be a burden. Food businesses respond to personal contact, which works best when reinforced by other methods. Written communications need to be clear and user-friendly. Enforcers have a key role in training provision. Some studies indicate that the food hygiene ratings schemes aid compliance.

Much as the considerations in table AA.1 could act as a guide for action, they are still on the 'fuzzy' side of things. It is unclear if some of the considerations in this table would be most adept at assisting the FSA in diagnosing the food safety culture of food businesses than at helping food businesses in managing their food safety culture. In fact, some recommendations could support both, and others seem too superficial or ambiguous to assist in either; examples follow.

Some items in table AA.1 are most fit to the challenge of diagnosing the food safety culture of food businesses. Consider, for example, the first item, the existence of a link between the size of food businesses, their food safety culture, and their compliance. A regulator can estimate the size of a business with some ease, so the item is directly applicable to diagnosis. However, in and of itself, the item says nothing about what a food business of 'X' size can do to improve its food safety culture.

In contrast, other items are best read as management recommendations. Consider, for example, the item highlighting that the knowledge of specific risks often drives risk perceptions. It is next to impossible for a regulator to comprehensively account for the knowledge available at all the organisations that it regulates. It is feasible, however, for regulators to help their regulated organisations to roll informational campaigns designed to enhance the knowledge of risks. So, this particular item is readily applicable to the challenge of assisting food businesses to manage their food safety culture.

Additionally, other items are unclear or ambiguous. Consider the need for ongoing and multi-channelled training. This note implicitly calls for determining if the said type of training exists at a food business, which is a diagnostical effort, and for promoting the said training amongst them, which is a management effort. However, training is not as straightforwardly measurable as the size of a business, and the item says little how to measure it. Similarly, the item says nothing about how to promote the said kind of training amongst food businesses. So, the item is midway between diagnosis and management, but it is not clear enough for operationalisation.

Define (2011)

In 2011, Define Research and Insight undertook a 'Qualitative Research Exploring Regulation Cultures and Behaviours' that gauges the response to Wilson, Tyers and Wadsworth's Evidence Review (2010). Define used in-depth interviews, which it argued leads to a thorough understanding of the opinions of actors (Define Research & Insight Ltd 2011, 17):

> This approach allowed respondents the opportunity to discuss compliance issues from their own perspective as well as allow for the opportunity for discussion around the findings of the Evidence Review. Respondents were informed that any opinions not arising from or referencing the pre-information document were welcomed. In-depth interviews were also chosen as the method, as opposed to group discussions, as respondents were from different backgrounds and experiences and one to one sessions allowed the conversation to focus on their individual views as well as ensure confidentiality and respondent comfort within the discussion. Further, many of the respondents were in senior positions and one to one sessions enabled the timing of the interviews to fit better into their schedules.

In this much, Define's report seems thorough. However, the approach to sampling limits generalisability, which the authors acknowledge (Define Research & Insight Ltd 2011, 21).

Coverage

Define (2011, 15) also takes an organisation-centred approach. The report even specifically ascribes the idea of food safety culture to that of organisational culture:

> One project… concerns food safety cultures. The intention of this project is to understand "food safety organisational culture" and "what works" in achieving compliance with food safety requirements.

As such, this framework also remains within the greater organisational culture umbrella.

Define argues that since 'culture' has various definitions, it would have been undue of them to impose a given definition unto interviewees. However, despite transferring the responsibility for defining culture to interviewees, the study does not explicitly address the meanings that interviewees attached to it. As a result, the report mostly lacks definitions, with an exception.

The study asked for interviewees' opinion about the meaning of the term 'compliance' (Define Research & Insight Ltd 2011, 168):

> How would you define compliance from a regulator's perspective? What is your definition of compliance based on? [e.g. body of evidence/ practical experience/ policy guidance etc]

The answers to this question highlighted a separation of the idea of regulatory compliance and what interviewees termed 'effective compliance'. The former type of compliance matches the standard idea of "meeting legislative and auditing requirements, including paperwork-level compliance", while the latter term referred to "effective governance of food safety and the production of safe food for consumption" (Define Research & Insight Ltd 2011, 27). Some respondents even indicated that, sometimes, regulatory compliance could challenge effective compliance (Define Research & Insight Ltd 2011, 28).

Purpose

In general terms, the study found that interviewees agreed with the findings in Wilson, Tyers and Wadsworth's (2010). So, rather than suggesting a new way of thinking, Define supports Wilson, Tyers, and Wadsworth in principle, and recommendations focus on suggesting aspects of Wilson, Tyers, and Wadsworth's work that need revisiting or allow improvement.

Recommendations divide into three sections: aspects in which the Wilson, Tyers, and Wadsworth model needs additions, elements of the model that are necessary conditions, and other elements that deserve prominence. That said, table AA.2, which is an addendum to the Wilson, Tyers, and Wadsworth model, splits the findings into four:

- ✓ elements of the Wilson, Tyers, and Wadsworth model that are *necessary* conditions;
- ✓ aspects in which the model is *problematic*;
- ✓ elements that are *additional* to the model; and,
- ✓ elements of the model that should receive *priority*.

Table AA.2: Define's addendum to the Wilson, Tyers, and Wadsworth model.

Necessary
Wanting to comply and believing in compliance. Understanding how to comply. Being able to comply. Having effective organisational cultures and management structures to filter compliance goals and knowledge through the organisation on an on-going basis.

Problematic	**Additional**	**Priorities**
The influence of size may not be straightforward. Dutyholders do not perceive UK regulators as mainly preventive and conciliatory. Fear of tensions in the educator/enforcer dual role may be exaggerated.	Food business' definition of compliance can affect their behaviour. Profit margins may impact food businesses' ability and willingness to comply. Large food businesses may face considerable challenges in terms of the dissemination of information, training and procedures throughout an organisation	Leadership affects compliance. Customer expectations and concerns about brand or reputation are a major motivation for compliance. Consistent and multi-channel communication about compliance is key to achieve sustained compliance.

As exemplified below, Define's addendum has a slightly more diagnostical purpose than Wilson, Tyers, and Wadsworth's model. However, since the goal was to reinforce Wilson, Tyers, and Wadsworth model, Define remains ambiguous in some respects.

Consider, for instance, the item about the effect that profit margins may have to food safety. This item can serve as a call for using profit margins as diagnostical. The item, however, says little about how to improve profit margins or how to take actions to ensure safety despite financial struggle. Thus, as given, the item applies to diagnosis but not to management. Similarly, most of the items flagged as necessary conditions point to red flags indicating when food businesses lack aspects critical to a 'good' food safety culture. Therefore, these items are straightforwardly diagnostical. A final example is the item about large food businesses not agreeing with the idea of their compliance costs being proportionally lower than those of small

businesses. This item can be used to argue against falsely diagnosing food safety culture based on overly simplistic proxies. Much more research would be needed, however, to piece out a management strategy from it.

The move toward diagnosis is not complete, however. Some items remain ambiguous or unclear. Consider, for example, the item referring to leadership being important. To a degree, leadership is intuitive. An inspector could intuitively gauge the leadership at an organisation, and the item suffices for food business to pay attention to leadership. So, some diagnosis and some management are possible upon this item. That said, more specific recommendations could help. Another example is the item about the management of communication, training, and the syncing of processes in large food businesses. This item is, inherently, a call for better management. However, the authors do not develop a robust rationale by which the said management can happen.

In sum, then, Define achieves improvements if seen as a diagnostical resource, but remains slightly spread across diagnosis and management, and is unclear in some respects.

Neal, Binkley, and Henroid (2012)

The empirical study conducted by Neal, Binkley and Henriod (2012) was an exploratory attempt to investigate the views of those working in food businesses. They presented 103 food service workers who were students training in hotel and restaurant management with a total of 38 items designed to establish which factors are core to food safety culture. Respondents, in turn, indicated their agreements with the statements on a five-point scale.

Coverage

This study grounds itself on the organisational culture literature. It declares the said grounding and, also, explains how the authors conceive of the link between organisational culture and compliance in the food sector (Neal, Binkley, and Henroid 2012, 469):

> Managers need to change the food handling behaviors of their employees so that these behaviors become a permanent fixture in the organization and not something that is the "topic of the month".

Additionally, while acknowledging the lack of agreement about the meaning of food safety culture, Neal, Binkley and Henriod (2012, 469) defer to Yiannas (2008) for a definition of food safety culture:

> How and what the employees in a company or organization think about food safety. It's the food safety behaviors that they routinely practice and demonstrate.

The deferral is interesting because Yiannas' definition emphasises practices and routines rather than considerations such as norms, values and beliefs. It is possible, of course, to say that norms can influence practices, but the same is true of the effect that practices can have on norms. Since both claims are possible, thus, it becomes impossible to say that either is inherently better than the other. As such, rather than arguing for one or the other type of definition, this report considers both norm- and practice-based definitions acceptable. In other words, the report believes that to overcome fragmentation the field of food safety culture needs to acknowledge that frameworks can conceptualise food safety culture somewhat differently to one another without a given framework being necessarily wrong about it.

Purpose

Neal, Binkley and Henriod (2012) build on Ball, Wilcock, and Colwell's (2010) 'Tool for Measuring Food Safety Climate'. This tool consists of 65 items derived from a qualitative study of personnel at meat plants, categorised initially as 1) work unit commitment, 2) management commitment, 3) personal understanding, 4) infrastructure, 5) food safety training, 6) behaviour. The authors narrow down the 65 items in the tool into 38 items directly applicable to their respondents. At this point, the authors begin reclassifying.

Initially, the six categories are brought down to five: (1) management commitment to food safety (including leadership and resource allocation); (2) work unit commitment to food safety (including supervisor, co-worker and personal commitment); (3) food safety training; (4) infrastructure for food safety (including food safety management system, food safety personnel and production practices); and (5) worker food safety

behaviour. Ultimately, however, the authors find it helpful to reclassify into three categories: management, employees, and self. The result is a view that can offer different perspectives into a given challenge. For instance, the idea of following rules features under all categories but in a slightly different manner: “even if no one was looking… management would follow all the food safety rules… [,] employees encourage each other to follow food safety rules… [, and] it is important for me to follow all the food safety rules, not just the most important ones” (Neal, Binkley, and Henroid 2012, 471).

The authors find that the two factors that contribute the most to food safety are management commitment and workers’ food safety behaviour. In line with this finding, Neal, Binkley and Henriod (2012, 472) finalise with a table that groups items into two categories: indicators of management commitment, and important considerations about workers’ behaviour.

The findings are reproduced below in table AA.3. For clarity, the table presents items in decreasing order of importance, as per the original results.

It stands out from table AA.3 that Neal, Binkley and Henriod’s model has some managerial value, as items generally call attention to actions that likely improve food safety culture. In a way, a good manager could prioritise action accordingly. That said, this manager would still have little guidance to go by, so the model is not a management framework in and of itself.

Therefore, it is best to understand the model as a framework for diagnosing food safety culture. Consider, for example, the item that notes that compliance is improved if management believes that food safety is very important. A regulator can operationalise this item in various manners, such as through surveys, or by asking inspectors to gauge if management believes that food safety is important. It is difficult to see how management actions that lead to the managers believing such a thing could happen upon this item alone. So, the item is more straightforwardly deployable for diagnosis than it is for management.

Table AA.3: Neal, Binkley and Henriod model

Management			
Management stresses food safety, even when the restaurant is busy. Management shows leadership by keeping employees focused on food safety. Management often checks to see that all employees are following food safety rules. Management ensures that employees follow food safety rules all the time. Management provides adequate tools for training and education for food safety.	Management follows all food safety rules. Management visibly shows support for food safety ("walks the talk"). Management encourages employees to report all food safety problems. The organisation learns and makes changes when mistakes are found. Management believes that food safety is very important. Management ensures that employees have the equipment/tools needed to follow food safety rules.	Management asks help from employees to improve food safety. Employees will tell a manager when a food safety problem happens. Even if no one is looking, employees follow all food safety rules. Management praises employees who pay special attention to food safety. Employees take responsibility for proper food handling in their work areas.	New employees receive all the training they need to perform their jobs according to food safety rules Equipment is designed to allow proper cleaning. Employees are committed to the food safety program. Even if no one is looking, management would follow all the food safety rules. The pest control program is effective, so there is no sign of rodents or insects.
Workers'			
I know why I should wash my hands to protect the food from contamination.	I know why I should change my gloves to protect food from contamination. I know when I should wash my hands to protect food from contamination.	I know when I should change my gloves to protect food from contamination. I completely support our food safety program.	I believe that how well I do my job can affect the safety of the food. When the restaurant is busy, I still wash my hands as much as I should.

Wright, Leach, and Palmer (2012)

In a report for the FSA, Wright, Leach and Palmer (2012) present 'A Tool to Diagnose Culture in Food Business Operators'. The report includes a review of several safety culture diagnostic tools in the context of micro, small and medium Enterprises. From this work, the authors give a tool for local authorities to evaluate the food safety behaviour of food businesses.

The report is comprehensive. It starts with 169 existing questionnaires and tools, which are narrowed down to 15. So, the draft toolkit is distilled of 15 previous questionnaires/tools. The kit was then presented to food businesses and Environmental Health Officers (EHOs) for discussion and evaluation, after which the authors proposed a final assessment tool.

Coverage

The authors underline the importance of having a robust foundation by highlighting a note from Yiannas (2008) that criticises that the field of food safety had not incorporated lessons available in the organisational literature (Wright, Leach, and Palmer 2012, 2). This note is less applicable nowadays. Regardless, the note highlights that Wright, Leach, and Palmer saw the organisational culture not only as a precursor but, indeed, as an essential foundation.

For the most, the authors refer to others for their definitions of safety culture, culture, and food safety practices. The definition of safety practices builds upon an HSE's (1993) definition from the early-1990s (Wright, Leach, and Palmer 2012, 8):

> The safety culture of an organization is the product of the individual and group values, attitudes, competencies and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organization's health and safety programs.

The definition of culture comes from the public health sector (Wright, Leach, and Palmer 2012, 8; Coreil 2010, 30):

> Culture is the patterned ways of thought and behaviour that characterize a social group, which can be learned through socialization processes and persist through time.

Finally, the authors attribute the definition of food safety practices to Professor Chris Griffith (Wright, Leach, and Palmer 2012, 8; Pillay 2011):

> The collective food safety practices used within an organization… taking into account both food safety culture and food safety management... the aggregation of the prevailing relatively constant, learned, shared attitudes, values and beliefs contributing to the hygiene behaviours used in a particular food handling environment and one must—provide staff with a common sense of food safety purpose.

Upon these definitions, the authors build their understanding of food safety culture as the union between "how and what the employees in a company or organization think about food safety… [and] the food safety behaviours that they routinely practice and demonstrate" (Wright, Leach, and Palmer 2012, 8).

Purpose

Wright, Leach and Palmer's motivation was, specifically, to develop a toolkit for use by food hygiene inspectors to categorise businesses in their attitude and approach to food safety management. Accordingly, the authors identified five categories that rank attitudes/behaviour towards food safety culture from least to most interested in food safety culture.

Amoral calculators, a category based on earlier work by Hawkins (1984) and Kagan and Scholtz (1984), intentionally breach regulations for the sake of financial gain, disputing or disregarding risk to people. An amoral calculator is unlikely to be compliant. The next category is doubters, who are sceptical of the relevance and importance of food hygiene regulations. Doubters typically have limited interest in compliance. The next along is dependents, food businesses that do not tend to act on their own initiative but, rather, wait for instruction and advice from inspectors or the regulator. Dependents' willingness to comply often comes with a deferment of responsibility to other parties involved in food safety management, regulation and enforcement. The fourth category is proactive compliers, which will show good practice but likely just good enough. These food businesses understand the value of food hygiene and the risks that follow from poor practices. Likewise, proactive compliers will be reasonably good at demonstrating compliance. Finally, the fifth category is leaders, the 'example' type of food business. Leaders are keen to

prioritise food hygiene training, and they believe that this, along with other factors, is critical to reputation. Furthermore, leaders strive to develop new and efficient food safety practices.

Wright, Leach and Palmer's (2012) report provides eight elements on which to measure food businesses alongside the five categories above. The eight elements are:

1) business priorities and attitudes towards food hygiene;
2) perception and knowledge of food safety hazards;
3) confidence in food hygiene requirements;
4) ownership of food safety and hygiene;
5) competence, learning and training in food safety and hygiene systems;
6) leadership on food safety and hygiene;
7) employee engagement in review & development of food hygiene practices; and,
8) communications and trust to engage in food safety and hygiene and report issues.

Table AA.4 summarises the resulting toolkit.

Table AA.4: Wright, Leach, and Palmer model.

Element	Category				
	Calculative noncompliers	**Doubting compliers**	**Dependent compliers**	**Proactive compliers**	**Leaders**
Business' priorities and attitudes towards food hygiene					
Business' perception and knowledge of food safety hazards					
Business' confidence in food hygiene requirements					
Business' ownership of food safety and hygiene					
Competence learning and training in food safety and hygiene systems					
The leadership provided on food safety and hygiene					
Employee engagement in review & development of food hygiene practices					
Communications & trust to engage in food safety and hygiene &report issues					

There is not much question about what the primary objective was. The report is, explicitly, an effort to improve the FSA's diagnostical capacities (Wright, Leach, and Palmer 2012, vii):

> This work developed a tool for use in identifying aspects of good/poorer safety cultures in food businesses, particularly aimed towards micro and small and medium sized (SMEs) businesses.

So, Wright, Leach and Palmer's (2012) is the first of the frameworks here developed with the primary objective of improving a regulator's ability to diagnose food safety culture.

That said, it is also true that management requires awareness of the baseline situation, so, in a way, proper management requires proper diagnosis. So, while the toolkit in table AA.4 is diagnostical, the authors attempt to provide advice about how diagnosis using their kit could translate into management, via a brief section with 'supporting guidance on enabling food safety culture improvement' (Wright, Leach, and Palmer 2012, 48–50). Additionally, the authors undertook a workshop with EHOs and food businesses to assess the toolkit.

The workshop revealed that actors recognised the value of such a toolkit, but it also showed concern about the level of training needed to implement it. So, in a way, the workshop showed that the tool was too complicated. Additionally, however, another detail that arose was a call for "providing guidance on how to improve safety culture for each combination of category and element" (Wright, Leach, and Palmer 2012, 58). So, the feedback also showed that the toolkit was not enough. Together, these two pieces of feedback point to the fact that if either diagnosing or managing food safety culture is already likely to be challenging, both diagnosing and managing food safety culture through the same framework is unlikely less complicated.

The authors, however, did not interpret the feedback as pointing to a fundamental divide between diagnosis and management. In response, they developed the toolkit further by expanding managerial advice (Wright, Leach, and Palmer 2012, 58–61). Separate attempts to simplify the resulting framework did not happen.

Wilson (2015)

The second '*Evidence Review on Regulation Culture and Behaviours*', conducted for the FSA by the Institute for Employment Studies, aimed "to update the findings presented in the 2010 review by examining relevant evidence that has accumulated over [time]" (Wilson 2015, 2). As is the case of its predecessor, this effort departs from the Pennington Review's note about poor safety culture contributing to compliance failures (Wilson 2015, 1). Likewise, the research questions are the same as in the first instance, namely:

- ✓ who does or does not comply and why;
- ✓ what approaches and communications are more/less effective in securing regulatory compliance; what encourages sustained compliance;
- ✓ what deterrents and incentives have been shown to achieve and maintain compliant behaviour; and,
- ✓ what more can business bodies and enforcement agencies do to increase compliance (Wilson 2015, 3).

However, this second review does not focus on reviewing the literature. Instead, it pools evidence from within the FSA (Wilson 2015, 2).

Coverage

While the first 'Evidence Review' by Wilson, Tyers and Wadsworth (2010) addressed interactions between regulators and food businesses, this second 'Evidence Review' by Wilson (2015, 3) declares the interest in both food businesses' *and* the regulator's organisational culture in a more precise manner:

> In line with the main aims of the review the research questions are addressed principally in terms of the behaviours and cultures which drive compliance… factors primarily concerned with demographic, behavioural and psychosocial features of employers and organisations of interest. The review takes an approach from a dual perspective, examining both employers and enforcers, and communication between the two.

Also, it makes sense to assume continuity vis-à-vis the first 'Evidence Review' by Wilson, Tyers and Wadsworth (2010) concerning other concepts. Namely, a view of

'culture' aligned to the Pennington Review's (Pennington 2009, 85; Wilson, Tyers, and Wadsworth 2010, 27):

> A manifestation of the values and beliefs and attitudes within a workforce. Its formation is dependent upon the knowledge, standards, motivation and leadership of the person in charge, how they communicate with, and are trusted by, the staff,

As well as an understanding of safety culture as per defined by the HSE (1999; Wilson, Tyers, and Wadsworth 2010, 27):

> 'Good' organisational safety culture… [is] where there are 'shared, accurate perceptions of risks and everyone adopts the same positive attitudes to health and safety'.

Purpose

This second review pegs significantly to the structure of its predecessor. It presents findings about the duty holders' structure and behaviours (dubbed 'organisational characteristics' in the previous review), their culture (dubbed 'organisational culture' during the last review), and their interactions with regulators (also dubbed 'interactions' in the previous review). However, this second review divides findings into more categories, five, to be precise:

(1) Structural or contextual factors can influence food business' compliance;
(2) Some organisational routines seem to have the potential to affect compliance;
(3) Organisations with features of a positive safety culture tend to be more compliant;
(4) While definitive evidence does not exist, some evidence suggests a link between the culture of the regulator and compliance;
(5) A substantial part of the literature about compliance highlights the role of training and monitoring interventions.

The five-category approach allows a manifest list of actionable items, summarised in table AA.5.

Table AA.5: Wilson model.

Context (1)	Behaviour (2)	Culture (3)
While small food businesses can struggle with compliance, they can attain high performance, and large food businesses can also struggle. So, variation may relate to large food businesses taking/rolling advice more efficiently. Financial constraints manifested as lack of access to expertise, training and information, staff time or capacity, matter. Some small food businesses, like takeaways, those paying low wages, and those in areas with rapid 'churn', have been linked to a tendency to comply less. Independent outlets appear to face more barriers than franchisees, probably due to lack of access to financial resources, standardised practices, and, some argue, less reputation at stake. Staff's individual characteristics, like language capacities, skills background, and employment status, may affect compliance. Commercial interests can drive compliance in smaller and large food businesses.	Managers/supervisors' encouragement, direct and indirect, incl. clear/explicit instructions and 'role modelling', is critical. Worker participation and involvement, incl. shared responsibility issue-raising, is advocated in the health and safety literature. Name and shame can foster unwillingness to speak out. Absent formal training, workers depend on managers/colleagues to communicate compliance information to them understandably and persuasively. Addressing language barriers is critical; graphics and suppl. materials can help.	A value system that prioritises avoidance of harm appears important. Staff at all levels have a role in creating and maintaining a positive food safety culture. A culture of compliance is not possible when food businesses do not perceive adherence to regulations as necessary or desirable. Management commitment is a recurring theme in the literature, as is the sense of taking 'ownership'. Risk attitudes have a major influence; if potential consequences are not viewed as disastrous, difficulties can emerge. Hand hygiene risk perception problems pervade the health care sector, and the relationship between cross-infection risk and staff compliance is complex. Typologies classifying food businesses can be helpful, with the potential to be of practical use in assessing safety culture and guiding enforcement activities. A 'passive' mindset is one of the most problematic to deal with. Cost, time constraints, and apathy can present barriers to compliance.

Regulator's Culture (4)	Interventions (5)
Basic characteristics of the working environment, like team seating arrangements, can impact how food safety professionals (such as EHOs) behave. Local authority restructuring potentially affects the time some staff can spend on enforcement. 'Pop-in' visits to food businesses can foster ongoing dialogue and engagement. An inspection bias towards visible evidence of food safety, like cleanliness, has been reported, but HACCP and other initiatives may have oriented inspectors towards more systemic and cultural aspects. Using language that food businesses can relate to is important. Qualitative descriptions are easier to understand and potentially have more impact. Local authority enforcers' sense of duty towards public health is concurrent to a commitment to supporting the local economy. Raw inspection scores can be poor predictors of foodborne illness. However, EHOs tend to take an approach with a broader definition of success than improved compliance ratings, and they look for (often subtle) qualitative indicators such as shifts in food business' mindset and evidence that	There is no data to prove it with certainty, but there is a widespread perception that the FHR schemes have driven up food safety scores. Certification and awards schemes that tap into motivations and win consumer confidence appear to be effective in driving compliance. Work in the USA has highlighted the importance of addressing ethnic diversity within local communities (incl. developing the 'cultural competence' of staff to help build trust with local food businesses). Existing relationships within supply chains can potentially be exploited to disseminate good practice, but this is bound by the prevailing cultures within sectors and the practical nature of risks. Knowing how to comply is important, but it is not a guarantee of compliance. It is key to recall that training content can falter over time, so regular updates are often needed. Staff's knowledge can differ across safety topics: awareness of strengths/weaknesses can help target future training. Food handlers should be constantly reminded of their crucial role as food service – customer interface; potential negative outcomes should be emphasised. Training evaluations should have longer follow-up periods than traditionally done; to assess improvement in the long term. The only reliable measure of effective food safety interventions material is direct observation of food preparation, highlighting a need for food safety researchers to look at actual practices. It has been suggested that food business managers could monitor the use of soap and towels as a proxy for the frequency of handwashing. Hospitals have used electronic devices to monitor hand hygiene compliance, food processing plants have used CCTV, but small

food safety messages have been understood. EHOs view enforcement action as a last resort. Its sole use risks food businesses not understanding their contraventions and the actions to rectify them. Enforcement strategies should be responsive to the prevailing culture within food businesses, rather than a 'one size fits all' strategy. The provision of advice and education seems a key part of the inspector role; enforcement is only one aspect. A partnership approach to enforcement, with enforcers and businesses working together to achieve compliance is said to be particularly effective in helping small businesses understand and meet responsibilities.	food businesses may find these approaches impractical or unaffordable. Barriers to compliance need to be understood fully in the design of training and other interventions. Training needs to be affordable, practical, and in context. Simplicity and relevance are key. Information should be task-specific, and learners should not be overburdened. To overcome attitudinal ambivalence, qualitative descriptions are more successful than quantitative information. Visual material should be hard-hitting. Signs' placement should be considered in relation to the activities targeted. Compliant worker behaviour appears best reinforced via the use of multiple feedback channels, including management communication, combined with feedback on performance levels. Hand hygiene is viewed as a complicated behaviour and appears to benefit from a multifaceted approach to feedback provision. Incentive schemes which award prizes for best compliance motivate employees.

In line with the first review, Wilson includes items for both diagnosis and management. Many items in table AA.5 can serve to categorise food businesses as more/less likely to have a satisfactory food safety culture. Consider, for example, the note about takeaways, low wages, and rapid 'churn' linking to compliance failures. This note is a checklist in and of itself.[22] Another example is the note about HACCP having reduced the tendency to focus on visible aspects of food safety, which essentially calls for continuing efforts in this direction.

At the same time, many of the items in table AA.5 could enable the management of food safety culture. For example, all the recommendations about the regulator's

[22] Is a food business a takeaway? Does it pay low wages? Is it in an area rapid 'churn' area?

culture and the interactions with food businesses seek to improve the relationship between these two parties and, through that, the behaviour of regulated organisations. Additionally, other items refer directly to management practices at food businesses, such as, for example, the item relating to the need for hard-hitting visual material.

Table AA.5 is extensive, so it altogether addresses diagnosis and management in a variety of manners. The trade-off, however, is parsimony. The sheer number of items in the table suggests that a single framework doing both diagnosis and management is cumbersome.

Jespersen, Griffiths, and Wallace (2017)

Jespersen, Griffiths, and Wallace (2017) compare food safety culture systems previously developed by Brita Ball (Ball, Wilcock, and Colwell 2010; Wilcock, Ball, and Fajumo 2011), Elien De Boeck (De Boeck et al. 2015; 2016), Dan Denison (Denison and Mishra 1995; Denison 1997; Denison et al. 2012), Lone Jespersen (Jespersen and Huffman 2014; Jespersen et al. 2016), Wright, Leach and Palmer (2012), a commercial model known as 'TSI', short for Taylor Shannon International (J. Taylor et al. 2015), another commercial model dubbed 'CEB' per attribution to a consultancy known back then as the Corporate Executive Board (Jespersen, Griffiths, and Wallace 2017, 376; CEB 2016),[23] and another commercial model attributed to NSF International (Jespersen, Griffiths, and Wallace 2017, 376).

Coverage

At the foundation, the argument builds on the idea of organisational culture. The authors even conceptualise culture after Schein's (2010, 18) definition of organisational culture noted in this report's theory section as a robust foundation (Jespersen, Griffiths, and Wallace 2017, 371):

> The culture of a group can now be defined as a pattern of shared basic assumptions that was learned by a group as it solved its problems of external adaptation and internal integration, that has

[23] Now part of Gartner.

> worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems.

Further, the authors see the matter of organisational culture as a reflexive dilemma where the same group of people affected by a culture also redefine the said culture through their actions.

Additionally, the authors also specify a definition for food safety culture based on previous work by one of them (Griffith, Livesey, and Clayton 2010, 435; Jespersen, Griffiths, and Wallace 2017, 371):

> The aggregation of the prevailing, relatively constant, learned, shared attitudes, values and beliefs contributing to the hygiene behaviours used in a particular food handling environment.

The definition is interesting as it declares interest for, both, constant behaviours, i.e., practices, and the more norm-like type of considerations such as values and beliefs.

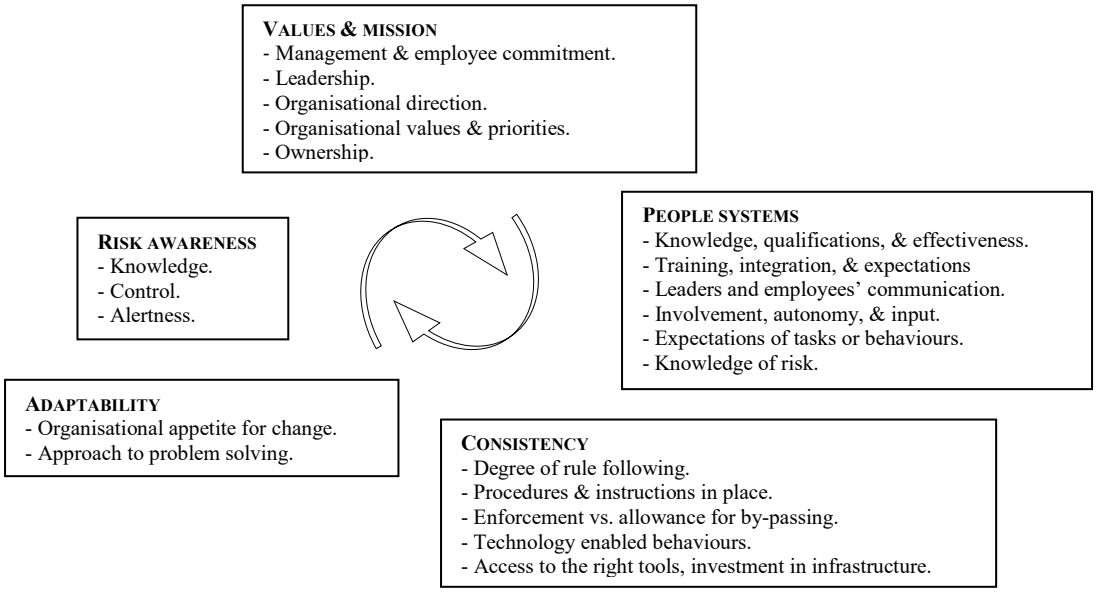
Purpose

The authors conclude that all the systems that they compare are narrow in applicability, which calls for a synthesised model. To this end, Jespersen, Griffiths, and Wallace (2017, 376–78) highlight that the systems they compare have commonalities across five dimensions:

- ✓ values and mission, relating to underlying normative motivations and communication, including the behaviour and charisma of management;
- ✓ people systems, focused on operations, including training, a division of labour, and knowledge of risks;
- ✓ consistency, the degree to which the organisation has good procedures set throughout, the frequency of rule-following, and the existence of technological and organisational resources to aid compliance;
- ✓ adaptability, which is about resilience to exogenous challenges; and,
- ✓ risk awareness, whether staff know, control, and are alert of risks.

The resulting model, depicted in figure AA.1, acknowledges feedbacks across all dimensions.

Figure AA.1: Jespersen, Griffiths, and Wallace's model.



As is evident by the emphasis given to operational aspects such as leadership, ownership, knowledge, qualifications, communication, involvements, expectations amongst the staff, alertness, appetite for change, and, indeed, most items in figure AA.1, the model aims to serve as a guide for improving food safety culture. Ergo, the model is for management.

Management is not possible without measurement of some sort. After all, managers need information to act. So, naturally, the model includes considerations that enable a manager to get a sense of what the organisation's food safety culture is. The reason this is not considered diagnosis, however, is that the evaluation/assessment that the authors speak of is by the food businesses themselves rather than by a regulator (Jespersen, Griffiths, and Wallace 2017, 378):

> By evaluating culture, food manufacturers can get a snap-shot of strengths and weaknesses and make decisions about actions and resources. Such decisions can make the difference between a group's assumptions and beliefs regarding food safety practices; whether or not to implement them; and subsequently if consumers are put in harms way or not. Hence the research behind a culture evaluation system must optimize quality, trustworthiness, and cover the broadest possible content to inform the food manufacturer correctly.

In this much, the synthesised model is, indeed, a device to enable food businesses to manage their food safety culture, not a tool that a regulator could automatically convert into diagnosis.

It is possible, of course, to play with the language and say that evaluation/assessment by a food business is a type of diagnosis, which is semantically correct. However, semantics does not change that evaluation/assessment by a food business does not automatically allow the regulator to diagnose its food safety culture.

At the very least, it would be necessary to share the information with the regulator. Absolute sharing is doubtful. There are privacy issues to consider, and even if not, many aspects involved in self-evaluation are situational and qualitative, so much would be lost in translation. Furthermore, managers can consider information about their own single organisation without the need for heavy analytics. However, a regulatory or compliance body would need a robust analytical framework to consider data from thousands of organisations. Finally, even if all these problems went away, without the regulator gathering additional data on its own, the situation would entail the diagnosis of potentially biased data. So, in a nutshell, self-evaluation of food safety culture by food businesses is necessary for management but not enough for diagnosis by the regulator.

Osman (2018)

The FSA's 'How can we make businesses more compliant? A comprehensive review of current literature' (Osman 2018) was an effort to develop a coherent understanding of food business behaviour in as broader terms as possible. Through a decision sciences lens, the review considers core behavioural barriers and opportunities that impact food businesses' compliance and the activities of authorised officers.

The purpose of this review was to articulate three points. That the underlying decision-making process guiding behaviour is dynamic and underpinned by a need to increase rewards and minimise costs, particularly in the expenditure of effort. That

this applies to, both, food businesses and authorised officers, so any differences are in degree rather than kind. Finally, understanding the decision-making process as context-situated enables seeing food businesses' and authorised officers' behaviour in terms of goals and incentives.

Coverage

Osman's argument is situated at the individual rather than at the organisational level. However, the argument bridges into the organisational level through an explanation of how individual behaviour affects compliance at organisations (Osman 2018, 26):

> Hopefully this small snapshot of the range of FBO types, and the changing profile of what an FBO is, provides a strong rationale for investigating trends in the behaviour of FBOs… Any business is subject to basic principles of decision-making behaviour, and the insights from decision science goes some way to helping provide a useful framework for understanding it.

Osman (2018, 28) even explicitly defends a view of individual and collective behaviour being subject to the same decision-making process at a fundamental level, i.e., value-informed assessment of costs and benefits.

As opposed to defining culture, organisational culture, and food safety separately, Osman gives a single definition for food safety culture (Osman 2018, 57):

> By food safety culture, what is meant is a set of behaviours that are learned and shared among people, and which are based on accepted assumptions, values, and beliefs, and which are dynamically impacted by an array of factors and situations.

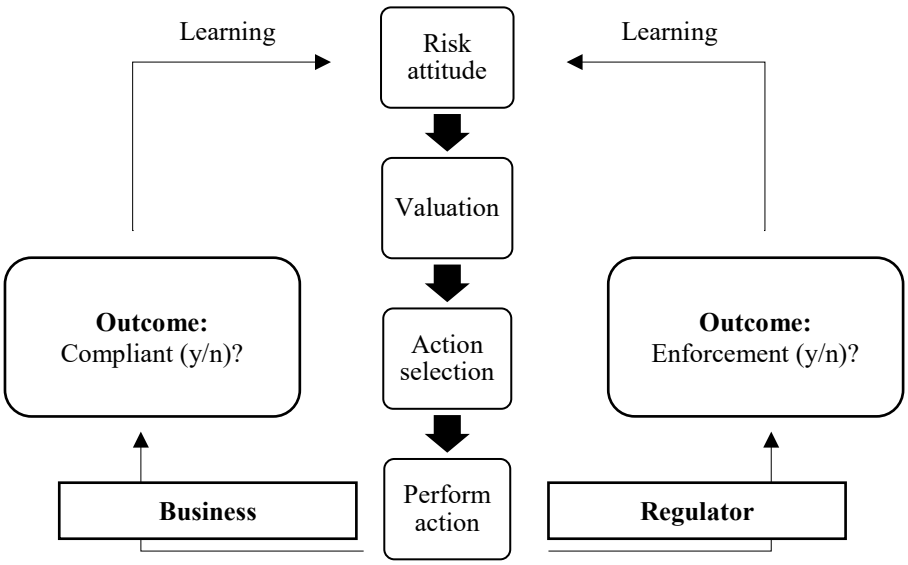
This definition is distilled from several sources, including Griffith, Livesey, and Clayton (2010), Schein (2010) and Jespersen, Griffiths, and Wallace's (2017).

Finally, Osman (2018, 56) demonstrates the close overlap between her dynamic-value-effort decision-making (D-V-E-D-M) model and Jespersen, Griffiths, and Wallace's (2017) argument. As seen above, Jespersen, Griffiths, and Wallace (2017) present a discussion specific to the food sector. In contrast, the D-V-E-D-M comes from the decision sciences literature (for a review, see Osman and Wiegmann 2017). The overlap, thus, suggests that there is likely a share of the food safety culture phenomenon that is more about general behaviour than about the food sector, per se.

Purpose

The process explained by the D-V-E-D-M involves establishing the range of options, primarily determined according to the risk appetite of the food business or authorised officer (*risk attitude*). Once the range of possibilities is determined, so too are the cost and benefits of each option (*valuation*). A choice is then made as to what action to take based on the weighing of costs and benefits (*action selection*). Afterwards, the choice is carried out (*perform action*), and then the outcome is reviewed (*outcome stage*). The outcome may differ somewhat for the food business and authorised officers, as each assesses the new situation from their perspective (*learning*), which feeds into future decisions. Figure AA.2 summarises the full process.

Figure AA.1: Osman's D-V-E-D-M model.



At its base, the D-V-E-D-M is agnostic concerning diagnosis and management. Regulators that understands how decisions happen at food businesses probably can diagnose food safety culture better than those that do not understand decision making. A manager who understands how its staff makes decisions is likely to manage food safety culture much better than a manager who does not. The model, thus, is about decision-making and can be applied to different sides of the food safety culture challenge. However, the model, as such, is not specifically about food

safety culture. Accordingly, while it can strengthen food safety culture's understanding of the process by which individuals interpret the organisational context and make decisions upon it, specifics are needed for operationalisation in the context of food safety culture.

To resolve this, Osman (2018, 63) condenses previous empirical literature investigating the D-V-E-D-M and literature about food safety culture into a questionnaire that aims to facilitate diagnosis:

> For each of the following statements, please indicate your agreement… based on whether you adopt a similar attitude… Provide a rating from 1 to 5, where 1 refers to strongly disagree and 5 refers to strongly agree.
>
> 1. In the long run when it comes to making highly risky business decisions the rewards outweigh the costs
> 2. Spending time fact finding before making business decisions does not generally lead to better outcomes
> 3. *[Reverse score] Taking a leap of faith is an unnecessary way to ensuring progress in business
> 4. *[Reverse score] Businesses will reliably succeed because they adopt strategies that focus on planning for the long term
> 5. Often the first business decision that comes to mind is better than business decisions that have been mulled over multiple times
> 6. *[Reverse score] The most reliable way to make any good business decision is to carefully identify the costs and benefits and weighing them up
> 7. Understanding the finer details can often be an unnecessary burden to a good business decision
> 8. Cutting corners is justified in some business decisions in order to improve efficiency in the business
> 9. Business decisions are made which are characterized as risky, when in actual fact they are simply necessary decisions
> 10. Making prudent business decisions often means finding ways around red tape

So, while D-V-E-D-M is agnostic about the diagnosis/management question, the questionnaire above gears the effort toward diagnosis.

GFSI (2018)

The GFSI position paper was the result of an eighteen-month-long working group aimed at creating “a blueprint for embedding and maintaining a positive culture of food safety in any business, regardless of its size or focus” (GFSI 2018, 3). The working group consisted of thirty-five people, so the paper synthesises the views of many experts, including Lone Jespersen, one of the authors of the framework analysed previously.

Being that the GFSI is currently one of the most salient initiatives in the field of food safety, it is worth clarifying that the entire effort aims to formalise the GFSI’s position, to develop a benchmark tool, and to propose a voluntary measurement system (GFSI 2018, 8). The summary below and the analysis in this report’s body refer to the first part of this effort. Accordingly, the analysis, and particularly the aspects relating to the need for food businesses to self-assess their food safety culture as a step into improvement, should be read, separately, against GFSI’s effort toward an assessment framework for businesses. It is reasonable to expect this effort to enhance food business’ understanding of their own food culture and, by extension, perhaps allow regulators like the FSA to improve their diagnostical efforts.

Coverage

The position paper grounds itself on organisational culture (GFSI 2018, 6):

> The purpose of this document is to provide global stakeholders with the Global Food Safety Initiative’s position on what organizational dimensions drive the maturity of food safety, and how a strong food safety maturity can be sustained over time through the organization’s culture.

The paper even presents itself as a general model with effect on food businesses (GFSI 2018, 8), which reflects a desire to speak of food safety culture as about organisational culture.

The paper defines culture explicitly (GFSI 2018, 3):

> Culture draws its power from the unspoken and intuitive, from simple observation, and from beliefs as fundamental as “This is the right thing to do” and “We would never do this.” Rules state facts; culture lives through the human experience.

Likewise, the authors also give a definition specifically for food safety culture (GFSI 2018, 9):

> Shared values, beliefs and norms that affect mindset and behaviour toward food safety in, across and throughout an organization.

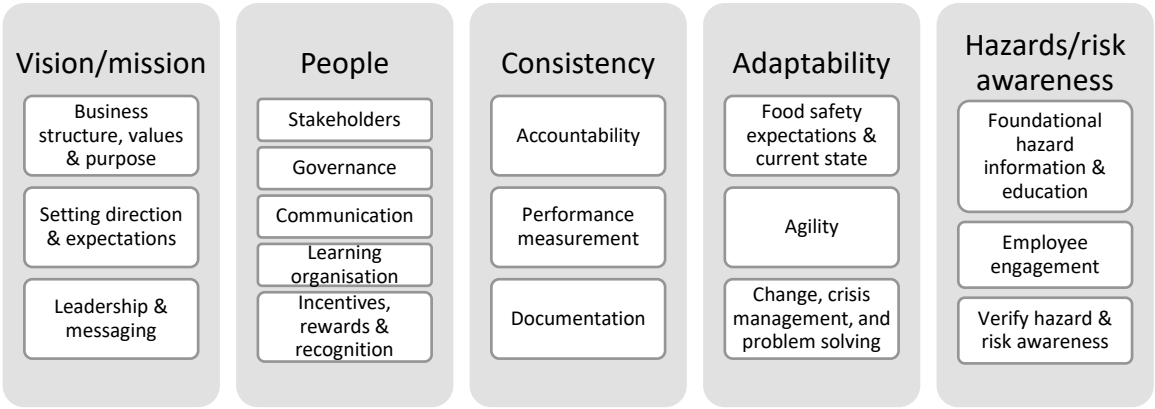
Additionally, for clarity, the paper specifies the meaning of some of the terms used as part of the definitions. For example, the document explains what it means by 'shared values, beliefs and norms', a set of unwritten oft-unspoken rules of appropriateness (GFSI 2018, 10). Similarly, it also details the mechanism by which food safety culture can impact compliance behaviour, when noting that "in a work environment, we are affected by the group we identify with, including our department, coworkers, our role and position, job security, formal and informal authority, and our own habits and consciousness around the job at hand" (GFSI 2018, 10).

Finally, the paper also explains that while it offers a single model, the model should not be understood as homogeneously relevant or applicable across all levels of an organisation. Instead, the authors argue that the dimensions "must be viewed as integrated and in some cases working against each other, e.g., displaying a strong commitment to systems while remaining nimble enough to integrate change" (GFSI 2018, 10).

Purpose

As visualised in figure AA.3, the GFSI model takes a dimensional approach that resembles Jespersen's previous work with Griffiths and Wallace, to the point that the GFSI's model's dimensions, as such, are very similar than Jespersen, Griffiths, and Wallace model's dimension.

Figure AA.2: GFSI model.



Within each dimension, however, the GFSI goes into more detail than its predecessor. For example, the leadership/messaging section adds nearly a page of considerations about the links between leadership and communication. Similarly, the section about food safety governance specifies necessary governance elements: strategic direction; structure and accountability; policies and standards; risk and issues management; culture and behaviours (GFSI 2018, 15). Likewise, the employee capabilities section adds a behavioural model dividing staff into four categories: high understanding / high confidence; high understanding / low confidence, wrong understanding / high confidence; and low understanding / low confidence (GFSI 2018, 16). So, the GFSI's model shares its predecessor design but packs more specificity. Therefore, it is possible to describe the effort as a guide for the management of food safety culture.

Appendix B: Terms for world cloud

Word: frequency.
Organisation: 8.
Attitudes: 7.
Beliefs: 7.
Shared: 7.
Values: 7.
Learned: 5.
Group: 4.
Health: 3.
Pattern: 3.
Practice: 3.
Staff: 3.
Think: 3.
Accurate: 2.
Adopts: 2.
Aggregation: 2.
Assumptions: 2.
Charge: 2.
Communicate: 2.
Company: 2.
Constant: 2.
Contributing: 2.
Demonstrate: 2.
Dependent: 2.
Employees: 2.
Environment: 2.
Everyone: 2.
Formation: 2.
Handling: 2.
Hygiene: 2.
Knowledge: 2.
Leadership: 2.
Manifestation: 2.
Motivation: 2.
Particular: 2.
Perceptions: 2.
Person: 2.
Positive: 2.
Prevailing: 2.
Problems: 2.
Relatively: 2.
Risks: 2.
Routinely: 2.
Same: 2.
Social: 2.
Standards: 2.
Throughout: 2.
Trusted: 2.
Workforce: 2.
Accepted: 1.
Account: 1.
Across: 1.
Adaptation: 1.
Affect: 1.
Array: 1.
Based: 1.
Basic: 1.
Characterise: 1.
Collective: 1.
Commitment: 1.
Common: 1.
Competencies: 1.
Considered: 1.
Correct: 1.
Determine: 1.
Dynamically: 1.
Experience: 1.
External: 1.
Factors: 1.
Facts: 1.
Feel: 1.
Fundamental: 1.
Human: 1.
Impacted: 1.
Individual: 1.
Integration: 1.
Internal: 1.
Intuitive: 1.
Lives: 1.
Management: 1.
Members: 1.
Mindset: 1.
Norms: 1.
Observation: 1.
People: 1.
Perceive: 1.
Persist: 1.
Power: 1.
Processes: 1.
Product: 1.
Proficiency: 1.
Programs: 1.
Provide: 1.
Purpose: 1.
Relation: 1.
Right: 1.
Rules: 1.
Simple: 1.
Situations: 1.
Solved: 1.
State: 1.
Style: 1.
Taking: 1.
Taught: 1.
Thought: 1.
Time: 1.
Unspoken: 1.
Valid: 1.