

How can we make businesses more compliant?

A comprehensive review of current literature

Food Standards Agency

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Abbreviations and Terms

AFN - alternative food networks

AOs – Authorised Officer

CIM - confidence in management

FBO - Food Business Operator

FBO culture – the practices (food safety and otherwise) of food business operators

FHR – Food Hygiene Rating

FLCoP - Food Law Code of Practice

FSA – Food Standards Agency

FSMS – Food Safety Management System

HACCP - Hazard Analysis and Critical Control Point

ISO 22000 FSM – International organization for standardization Food Safety Management

LAs – Local Authority

ROF – Regulating Our Future

Executive Summary

Two questions guided the review of decision sciences research to help meet the main objectives of this report: 1) *How do Food businesses behave?* 2) *Can knowledge of this kind be meaningfully utilized to improve food business compliance with food law?* By answering these questions this report translates the insights from the reviewed work to make several recommendations (see Table 1); each recommendation is derived from supporting evidence reviewed from extant literature.

The approach and organization of this report is as follows:

1) **Section 1:** The report starts by discussing various options regarding changes in regulatory practice and the potential impact that it would have on FBOs. In this section several recommendations are made (summarized here in Table 1) along with a brief rationale for the recommendations; a more detailed rationale can be found in the literature review section. Crucially, the recommendations take into account several behavioural factors. In particular, the report identifies a set of reliable behavioural indicators (perceived risk attitude – for proposed Toolkit see Appendix I, gaps between intentions and actions, receptiveness to feedback) that can be used to characterize and predict FBOs receptiveness to various types of regulatory interventions. These factors are discussed in detail in the next section on which the evidence base that serves as the foundations for the insights is presented.

2) **Section 2:** The second part of this report takes the form of a literature review which is the foundation for the recommendations presented in the first section. To structure the presentation of the literature, this report discusses insights from the decision sciences literature around a state-of-the-art model of decision-making (Figure 1) that helps to understand **how** FBOs behave, and also **why** FBOs behave in the way that they do. In addition, this forms the basis of some of the recommendations that are presented in the first main section of this report. The predictions from the model can be adapted to function in potential surveillance system that incorporate a risk-based approach that targets controls on non-compliant businesses and minimises the burden of controls on compliant businesses.

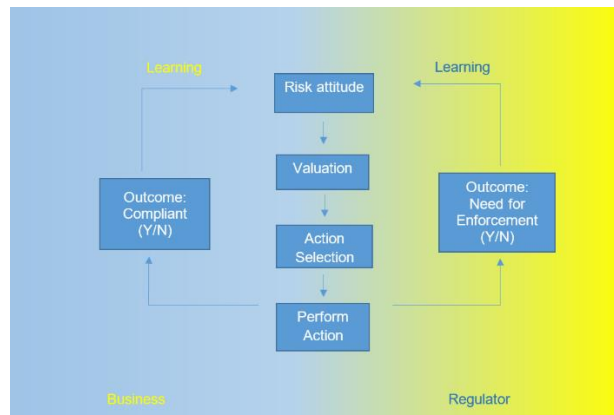


Figure 1. Dynamic-Value-Effort Decision-Making Model

3) **Approach taken in the review:** The aim of the literature review is to provide a synthesis of recent white literature (peer reviewed scientific publications) and grey literature (reports on websites of governmental, nongovernmental, intra-governmental agencies etc.) that has contributed to the understanding of food business decision-making behaviour and food business culture. At the same time, the review draws from a considerable body of work examining the delivery of official controls. These complimentary literatures are used to give an overall bigger picture of why FBOs behave in the way that they do, and what may likely contribute to positive shifts in behaviour, as well as maintaining poor behaviour with respect to food safety standards. Fundamentally the underlying decision-making process of FBOs and Authorised officers (AOs) is the same. Therefore, the same decision-making model used to describe and understand the process of decision-making of FBOs in relation to food safety is applied to understand Authorised officers (AOs) regulatory decision-making behaviour.

Table 1. List of recommendation and rationale for recommendations

Domain of regulation	Recommendation	Rationale
Surveillance	Given that risk attitude of FBOs (as well as AOs) shapes later behaviour, it is possible to build on insights from decision-sciences to better identify FBOs by simplifying current toolkits along the lines proposed in this report. <u>[see Appendix I for a proposed toolkit]</u>	This may serve as a useful behavioural tool that could be built into surveillance systems that profile FBOs, and can predict which FBOs are likely to need future support in training and coaching to prevent low or non-compliance.
Monitoring and Enforcement	Currently the process of monitoring and enforcement is not harmonised across Local Authorities and across Authorised Officers. Improvements in bringing decision-making behaviours into alignment will have a positive knock on effect on FBOs compliance levels.	If regulators (i.e. Authorised officers, and Local Authorities) are seen to be working in unison and making decisions/judgments that are consistent, then FBOs are likely to see the regulatory system as significantly more credible.
*Communication	Communication needs to be streamlined in such a way as to make it clearer and more obvious to FBOs how changes can be implemented efficiently as easily.	This is especially important for micro, small and medium FBOs, given that they have limited resources relative to large FBOs regarding processing of communication from LAs and AOs.
*Training	Training and coaching can take several forms that ought to involve face-to-face interactions between AOs and FBOs, but need not be face-to-face throughout.	A bank of online training tools and information resources could be provided to ensure a bespoke training scheme tailored to the particular gaps in knowledge that the FBOs have. Crucially this information needs to be centralised across LAs, or on the FSA website.
Alignment of goals	The frame of reference for communicating and for training should be from the point of view of the positive impact of compliance on business outcomes.	It is worth capitalizing on aligning the goals of improving compliance from the view of AOs with the goals that FBOs have for improving reputation, increasing their profile, competitive advantage and other such incentives that drive FBOs.
Funding Model	A funding model that takes as its starting point a reward focused approach rather than a punishment scheme as a means of promoting and supporting positive behavioural change.	This approach sends a clear signal to FBOs that the focus is on promoting good or even best practice, and this can easily be co-opted into FBOs food safety culture, especially if they are able to perceive the long-term benefits with respect to their own incentives.
Registration	A registration scheme can be a starting point for promoting compliance, though this requires motivation to sign up to a voluntary scheme that promotes and supports best practice, for which a sign-up fee, and annual fees could be built in.	Such a scheme could utilize current citizen and consumer appetite for greater transparency, particularly with efforts to post hygiene rating scores, as well as internal/external audits on food safety practices/food safety management. The positive impact of online posting of results can be tracked through consumer feedback on online forums, which in turn could be an independent index of the positive effects of compliance, both for the regulator and for FBOs.

(*) Indicates recommendations that are currently being explored in the FSA in the science and analytics team.

Answers in brief to the two main objectives:

How do Food businesses behave? Decision Sciences research shows that decision-making is largely governed by the amount of effort that is needed to gain the rewards that are of interest to the individual/group. Therefore, motivating change in FBO behaviour depends on understanding what FBOs deem effortful and rewarding, and how this differs from what is deemed effortful and rewarding by AOs; since both are two sides of the same regulatory coin. For FBOs the rewards are gauged in terms of benefits to business, and typically compliance is effortful and thus seen as a cost. For AOs the reward is FBOs improvements in compliance, which is judged relative to the amount of effort, as a cost, needed in terms of monitoring and enforcement activities. This characterisation in turn means that if the FBOs and AOs are incentivised in different ways, their views on compliance aren't necessarily aligned.

Risk attitude is placed squarely at the start of the decision-making process. This is because the perceived risk attitude (i.e. the perceived costs and benefits of compliance) of FBOs later impacts the extent to which they show willingness to comply (signalled intent) and the actual efforts put into improving compliance (action); referred to as the intention-action gap. This is a common situation in which what is being said (intention) is not consistent with what is actually done (action)). Moreover, FBOs past experiences (outcomes and feedback) reinforces their perceived risk attitude in the future. How reinforcement is experienced (positively or negatively) will lead to either a widening (if negative) or shortening (if positive) of the prospective intention-action gap.

Can knowledge of this kind be meaningfully utilized to improve food business compliance with food law? If the aim is to introduce efficiencies in the regulatory process, then knowing which FBOs are likely to need a light touch, and which need a more detailed set of training and coaching before typical enforcement takes place would save considerable time in the long run. Profiling FBOs risk attitude will serve as a good starting point (for proposed Toolkit see Appendix I), and can be built into surveillance systems that profile FBOs, and can predict which are likely to need future support in training and coaching to prevent low or non-compliance. As a compliment to this, improving compliance also requires changes in regulatory practice. An effective and trusted regulatory system entails one that functions in a consistent and coherent manner, and so, efforts need to be directed towards improving the decision-making behaviour of AOs and LAs regarding monitoring and enforcement. If the official controls and the enforcement procedures are experienced as consistent, then FBOs are more likely to see the regulatory system as significantly more credible, which in turn will impact their attitudes towards compliance.

Given that in the main rewards significantly drive all decision-making behaviour, understanding how rewards impact business is crucial. A flexible co-regulatory system needs to take an approach that promotes positive behaviour, and thus rewards it through several incentive structures. This is preferable to adopting a punishment scheme, which signals to FBOs that the focus of the regulator is primarily on identifying failures to comply. The rationale for a positive incentive scheme comes from a wealth of literature across several disciplines, and is supported by a decision-making model that captures the **why** as well as the **how** behind patterns of behaviours in FBOs and regulators.

Insights and recommendations

This section discusses the impact on FBO behaviour depending on what the functional role of the regulator if a co-regulatory framework is adopted, and it also examines potential funding models that could be implemented by the FSA.

To address these two points (co-regulation, funding models) the first part of this section considers what the literature has to say about different types of co-regulatory frameworks. This is followed by a brief summary of work from decision sciences (full details appear in the literature review section of this report) in connection with funding models and the impact it would likely have on FBOs behaviour. The concluding part of this section then draws to together what has been presented to outline a set of recommendations that are summarized in Table 1.

Types of co-regulation: associated benefits and concerns at different stages of regulation.

Co-regulation models of government are not new, and outside of food safety, this form of model can be found in environmental protection¹, e-commerce², media³, and banking⁴, to name but a few. *What is co-regulation?* A general definition suggests that it is "... a regulatory strategy that involves the participation of both public and private actors in the regulation of specific public policy interests and objectives." (Martinez, Verbruggen, & Fearn, 2013, pp1102). A more specific definition offered by the UK Cabinet office (2017) is as follows "Government sets the top-level regulatory requirements and leaves the sector to define how these general principles are met in terms of technical solutions" (Regulating Futures Review, 2017, pp. 36)⁵. Co-regulation requires a coordination between public and private agents in the regulatory process⁶, where the regulator typically has oversight over the implementation of regulation. Crucially it is important to highlight that as collaborative as the process of co-regulation appears to be, government still retains fundamental legislative power⁷.

¹ Gunningham, N., & Grabosky, P. (1998). *Smart Regulation: Designing Environmental Policy*. Oxford: Clarendon Press: 494p.

² Goldsmith, J.L., & Wu, T. (2006). *Who controls the Internet?* New York: Oxford University Press.

³ Dordeck-Jung, B., Oude Vrielink, M., Gosselt, J., van Hoof, J., & de Jong, M. (2010). Contested hybridization of regulation: Failure of the Dutch regulatory system to protect minors from harmful media. *Regulation & Governance*. 4, 154-174

⁴ Balleisen, E. J., & Eisner, M. (2009). The promise and pitfalls of co-regulation: How governments can draw on private governance for public purpose. *New perspectives on regulation*, 127, 133-134.

⁵ <https://www.gov.uk/government/publications/regulatory-futures-review>

⁶ Eijlander, P. (2005). Possibilities and Constraints In The Use Of Self-Regulation And CoRegulation In Legislative Policy: Experience In The Netherlands –Lessons To Be Learned For The EU? *Electronic Journal of Comparative Law*. 9(1).

⁷ Booth, C. (2018). Better Regulation Initiatives. In *Developments in Environmental Regulation* (pp. 91-136). Palgrave Macmillan, Cham.

Co-regulation can take on the form of creating new legislation or regulatory rules that are informed by the multiple stake holders (e.g., companies, consumers, voters, non-governmental organizations). This means that the process of co-regulation includes a variety of actors.

Overall, what the literature suggests is that, the implementation of co-regulation (based on work of case studies in North America and Europe) can be summarized as follows:

- 1) co-regulation is more likely implemented in institutional environments in which there is already a precedent for co-regulatory type frameworks: and
- 2) co-regulation tends to play a greater role in enforcement regimes than in the design of regulatory processes^{8 9}.

In other words, the focus of any co-regulatory process between regulator and business, at least in the food industry, is a mutual beneficial negotiation of the enforcement process of regulation, rather than the formulation/revision of regulations. In fact, the growing consensus in the literature is that the greatest scope for co-regulation of food safety is in the process of enforcement and monitoring. Before this is considered in more depth, it is worth considering the implications of alternatives to this position that have actually been explored.

Early Monitoring and Provision of Information

No monitoring: Taking a much lighter initial touch at early stages of the regulatory process has not been found to be especially effective. The evidence suggests that enabling FBOs to establish themselves and to demonstrate their compliance at the start, by going it alone, increases poor compliance. This is mostly because the process is entirely reliant on a high level of trust that the FBOs will show in terms of a willingness and ability to comply, and that they will actually put in the necessary resources to comply. In section 2 of this report the literature review presents several illustrations which suggest that the regulators trust in the FBOs' willingness to comply is no guarantee that the FBO will actually do what is needed. The reason for this is largely due to other factors including behavioural reasons such as the level of motivation and effort to comply, the perceived risk attitude, and available resources (financial, human) that the FBO has made available in order to comply.

Moreover, without the regulator placing some initial checks in place (i.e. an initial inspection, some training), FBOs are likely to show higher rates of non-compliance¹⁰. This is particularly the case with small FBOs, or FBOs that have not yet fully established themselves. What this also implies is that the regulator has a role to serve as information provider and this ought to include training so as to ensure that FBOs are given the right starting blocks to develop a food safety culture. Without this provision, few are likely to develop the initiative themselves, these exceptions will show a tendency towards a risk averse attitude (i.e. that they want to avoid the general costs of non-compliance) – which

⁸ Garcia Martinez, M., Verbruggen, P., & Fearn, A. (2013). Risk-based approaches to food safety regulation: what role for co-regulation?. *Journal of Risk Research*, 16(9), 1101-1121.

⁹ Rouvière, E., & Caswell, J. A. (2012). From punishment to prevention: A French case study of the introduction of co-regulation in enforcing food safety. *Food policy*, 37(3), 246-254.

¹⁰ Haukijärvi, Veera, and Janne Lundén. "Does waiving preventive food control inspections in Finland weaken the prerequisites for safe food handling in restaurants?." *Food Control* 71 (2017): 187-192.

in turn leads to more compliant behaviours in the long run; but this proportion of FBOs is likely to be rare.

Minimal monitoring: The evidence suggests that early stages of informal/formal controls tend to be effective, and typically include continuous dialogue between AOs and FBOs ¹¹ ¹² ¹³. There are many ways in which contact between AOs and FBOs can be fostered, some of which requires multiple face to face contact; though this can be scaled back once a relationship is established. In addition, some FBOs, especially small FBOs, show a preference for the provision of online tools (e.g., access to expertise and online training, videos) to help create efficiencies in educating their staff as to changes in food safety practices, and reminders of what they should be doing. The take home point here is that AOs serve an essential function in meeting with FBOs, particularly new FBOs, and face to face discussions at the start help to set the tone for how FBOs should proceed.

Provision of information: The review of the literature also highlights that FBOs' misperceive the costs to compliance, and this in turn can have a knock-on effect on how they behave, and the extent to which they comply. A simple solution to correcting misapprehensions is the provision of relevant information to help support FBOs in maintaining or improving compliance. Another insight related to the provision of information is its accessibility, which can also reinforce an FBOs' misperception of the cost to compliance. The more inaccessible information is seen to be, the less effort FBOs will put into gathering relevant information (i.e. training, keeping up to date with guidelines/regulation), and the more likely they are to think that compliance is a burden and as a consequence, there may in fact be attempts by the FBO to actively circumvent compliance.

Impact of charging for provision of information: Introducing a funding model that sets charges for access to the provision of relevant information (i.e. by charging for training, and/or access to online materials) is not necessarily optimal. It is likely to reinforce the view, for those FBOs that already perceive the cost of compliance as high (i.e. those that are characterised as risk-seeking, risk-neutral – for details see Literature review), that compliance is costly, not only in terms of effort, but also in terms of something even more salient, a financial cost.

If the role of regulator as service provider now includes charging for the provision of information, business, particularly medium and large FBOs will seek alternative ways to source information, especially if the alternative sources are cheaper. This may also have a knock-on effect on FBOs seeking to increase their overall control of monitoring processes, such as employing their own internal auditors to carry out the same kinds of informal controls that AOs typically would. Also, as a general point about charges is that, if the charges that FBOs have to face are steep with regards to accessing

¹¹ Kettunen, K., Nevas, M., & Lundén, J. (2015). Effectiveness of enforcement measures in local food control in Finland. *Food Control*, 56, 41-46.

¹² Jacxsens, L., Kirezieva, K., Luning, P. A., Ingelrham, J., Diricks, H., & Uyttendaele, M. (2015). Measuring microbial food safety output and comparing self-checking systems of food business operators in Belgium. *Food Control*, 49, 59-69.

¹³ van der Meulen, B. M. J., & Bremmers, H. J. (2013). Strategic responses of business operators to food information obligations. *Journal für Verbraucherschutz und Lebensmittelsicherheit*, 8(4), 357-36

information/training or other services provided by the regulator, this will have knock on effect on the consumer, in this case, in the form of price hikes on food items¹⁴.

Symmetry of information: There needs to be an important baseline in which the information shared by FBOs and regulators while not perfectly symmetric, is at least sufficient to engender trust, - that is if there is some understanding that the FBO has a good knowledge of food safety practices and has a reasonable record of complying (or at least will develop one), and in turn AOs that interact and occasionally intervene, do so with some degree of consistency, then these serve as secure foundations on which to build a good co-regulatory relationship. More importantly, the provision of information, guidance, and advice giving should be one which is not factored into the costing model of regulation¹⁵.

Charging for enforcement

Who should be responsible for enforcement? Much of the work that has examined the impact of co-regulatory models in various sectors tends to promote the view that the benefits of a coordination between regulators and industry should be around monitoring and enforcement; that is, while regulators have overall oversight of the procedures regarding monitoring and enforcement, the implementation of monitoring and enforcement is carried out by other authorities. There are two possible options regarding who is responsible for enforcement, it could come down to other public authorities, or, if the incentives are perceived to be sufficiently high enough (e.g., regular internal audits ^{16 17}) through a co-regulatory framework.

Standards setting: Enforcement and monitoring cannot take place until standards are agreed. The setting of standards of behaviour can take one of at least three forms, and this has implications for the enforcement process and how charges could be introduced. For instance if the regulator takes on the sole responsibility of standards setting then: 1) a general target can be set in which a specific safety level is not strictly specified or the ways of achieving them (high level of flexibility for FBOs), 2) specific performance standards can be set but the ways in which an FBO can achieve them isn't specified (moderate level of flexibility for FBOs), 3) specification standards are set which are strict and the ways of achieving those standards are also specified (low level of flexibility for FBOs)¹⁸.

Where to set charges: Distinguishing these different types of standard setting approaches also has implications for the level of charges that enforcement will take. In principle charges could be scaled to the level of specification of the ways in meeting the standards that are set. This means that enforcing standards not only involves ensuring **what** standards are met, but **how** those standards are met. The more specified the

¹⁴ Martinez, M. G., Fearn, A., Caswell, J. A., & Henson, S. (2007). Co-regulation as a possible model for food safety governance: Opportunities for public-private partnerships. *Food Policy*, 32(3), 299-314.

¹⁵ Fairman, R., & Yapp, C. (2005). Enforced Self-Regulation, Prescription, and Conceptions of Compliance within Small Businesses: The Impact of Enforcement. *Law & Policy*. 27 (4), 491-519.

¹⁶ Nunez, J. (2007). Can Self-Regulation Work? A Story of Corruption, Impunity and Cover-Up. *Journal of Regulatory Economics*. 31, 209-233.

¹⁷ Bartle, I., & Vass, P. (2005). Self-regulation and the regulatory state: A survey of policy and practices. Research Report, University of Bath.

¹⁸ Henson, S., & Hooker, N. (2001). Private Sector Management of Food Safety: Public Regulation and the Role of Private Controls. *International Food and Agribusiness Management Review*. 4, 7-17.

process of meeting standards is, the more need there is for monitoring how that takes place. This in turn means higher cost of surveillance and monitoring to the regulator; here too the FBOs might be expected to bear the financial burden of this process. In fact, in the UK the trend¹⁹, much as in the US²⁰, has been to move away from strict specification. Therefore, following this trend, current co-regulatory relationships between regulator and FBO develop in such a way that the private sector has greater responsibility in monitoring compliance themselves.

Voluntary and active promotion of best practice: One of the ways to promote this type of co-regulatory approach is through voluntary agreements that take the form of a common set of good practices supported by the regulator. For instance, a very salient method of utilizing best practice that some regulators employ, is through the posting of results of inspections outside restaurants, or setting an agreed food safety scheme, such as the Food Hygiene Rating Scheme. Methods of this kind, sometimes referred to as “Scores on the doors”, have been shown to have a significant positive impact on both customer patronage and business performance^{21 22}.

Another way in which regulators can take advantage of “scores on the doors” schemes is to incorporate the feedback that consumers provide online about their experiences with FBOs, which not only include value for money and quality of service, but also general experience of the food standards and ambience (which includes how hygienic the established is perceived to be)^{23 24}. These kinds of online ranking and scoring systems, such as those provided by TripAdvisor, Yelp or Google, serve as a useful metric of consumer trust; though this could be open to and so independent ways of validating these metrics would be needed. Consumer trust means that the reviews that are posted by the service (e.g. TripAdvisor) are themselves trusted, because the service itself has established a reputation for providing an accurate and reliable means of shared feedback that is broadly accepted and utilized in order to make an effective decision as to where to eat out.

Consumer feedback as an incentive for best practice: A future model of co-regulation could usefully build in consumer feedback into a process of promoting best practice. This might require centralizing the way that consumers give ratings, or establishing an agreement with FBOs as to reliable intermediary online platforms such as TripAdvisor, from which consumer feedback can be used as an index of the success of FBOs best practices. As mentioned earlier, there would need to be an independent way of validating and tracking metrics on which ratings are given. Adopting this approach could

¹⁹ Fulponi, L. (2006). Private Voluntary Standards in the Food System: The Perspective of Major Food Retailers in OECD Countries. *Food Policy*, 30 (2), 115-128.

²⁰ Rouvière, E., Soubeyran, R., Bignebat, C. (2010). Heterogeneous Effort in Voluntary Programmes on Food Safety: Theory and Evidence from the French Import Industry of Fresh Produce. *European Review of Agricultural Economics*, 37(4), 479-499

²¹ Jin, G.Z., & Leslie, P. (2003). The effect of information on product quality: evidence from restaurant hygiene grade cards. *The Quarterly Journal of Economics* 118 (2), 409–451.

²² Boehnke, R.H., & Graham, C. (2000). International survey on public posting of restaurant inspection reports, and/or grade card posting scheme based on health inspections. Ottawa-Carleton Health Department, Ottawa.

²³ Zhang, Z., Ye, Q., Law, R., & Li, Y. (2010). The impact of e-word-of-mouth on the online popularity of restaurants: A comparison of consumer reviews and editor reviews. *International Journal of Hospitality Management*, 29(4), 694-700.

²⁴ Jeacle, I., & Carter, C. (2011). In TripAdvisor we trust: Rankings, calculative regimes and abstract systems. *Accounting, Organizations and Society*, 36(4), 293-309.

more usefully rely on existing online provisions for customer feedback that are commonly used by consumers, because this is a domain in which consumers already show trust in relying on the forum. An alternative but less satisfactory approach would be to develop an online feedback system agreed between FBOs and the regulator, but the uptake by consumers might be minimal, and will be perceived as an unnecessary burden in addition to more commonly used feedback forums on which consumers typically provide their feedback. For this reason, it is preferable to help support/improve online feedback systems that currently exist, rather than directing consumers to use new ones. Also, the consumer is likely to be overwhelmed with multiple ways of scoring a FBO, and so the better integrated the scores are, the more likely customers are going to pay attention to the score. This in turn means that scores will have meaningful impact on customer behaviour which will in turn have meaningful impact on FBO compliance rates. If customers pay attention to scores and turn away from FBOs that score poorly, then FBOs are more likely to want to improve because customer behaviour has a direct impact on profit.

Reactive vs. proactive strategies of regulation: From the point of view of developing a future co-regulatory model, what the discussion here spells out is that changes in practices that would likely have positive long term effects regarding compliance involve regulators shifting from economic incentives based on punishment (a reactive approach) to incentives based on prevention²⁵ (a proactive approach). In turn the frame of reference that FBOs have of regulation is one that should be promoted as a benefit to them, rather than further reinforcing that it is a costly burden on their time, effort, and resources (see Table 2). To illustrate what this looks like, it is worth looking to a case study in which there is actual evidence of the positive impact on FBO compliance rates, precisely because the regulator shifted from a reactive to proactive co-regulatory approach.

French case study of proactive regulation: Rouvière and Caswell (2012) present the details of empirical work examining the perceived positive impact of a change by FBOs, and the actual change in compliance rates, as a result of the food regulator moving from a reactive to a proactive approach. The details of Rouvière and Caswell's (2012) findings, and those of others comparing different forms of co-regulatory models^{26 27 28 29 30}, are summarised in Table 2.

In 2001 French importers of fresh produce negotiated with public authorities to have a voluntary scheme in which they carried out laboratory tests to monitor the levels of pesticide in their produce; the safety standards were based on those already set in European law at the time. What followed was that importers paid an annual subscription fee (€1000 at the time, 2001) and they decided the human and financial resources they

²⁵ Rouvière, E., & Caswell, J. A. (2012). From punishment to prevention: A French case study of the introduction of co-regulation in enforcing food safety. *Food policy*, 37(3), 246-254.

²⁶ Henson, S., & Hooker, N. H. (2001). Private sector management of food safety: public regulation and the role of private controls. *The International Food and Agribusiness Management Review*, 4(1), 7-17.

²⁷ Yapp, C., & Fairman, R. (2006). Factors Affecting Food Safety Compliance Within Small and Medium-Sized Enterprises: Implications For Regulatory And Enforcement Strategies. *Food Control*. 17(1), 42-51.

²⁸ May, P., & Burby, R. (1998). Making Sense Out of Regulatory Enforcement. *Law and Policy*. 20(2), 157-182.

²⁹ Fearn, A., Garcia-Martinez, M., Bourlakis, M., Brennan, M., Caswell, J., Hooker, N., Henson, S. (2004). Review of the Economics of Food Safety and Food Standards, Document prepared for the Food Safety Agency, Imperial College London, London.

³⁰ Fearn, A., Garcia-Martinez, M., Caswell, J., Henson, S., Kharti, Y. (2005). Exploring Alternatives Approaches to Traditional Modes of Regulation of Food Safety, Imperial College London, London. Document prepared for the Food Safety Agency:

would allocate to monitoring and reporting to the regulator the outcome of their own safety audits.

Table 2. Comparison of Reactive and Proactive Co-regulatory approaches

Functions	Traditional reactive regulatory approach	Alternative proactive co-regulatory approach
Enforcement Framework	Identify FBOs that do not comply with regulations and penalize them with sanctions	Implement measures that are necessary to avoid a breach of the regulation , including, e.g. education and coaching
Enforcement Strategy	Strict application of rules with inspections carried out in order to punish major regulatory offences	Promote compliance through the use of market incentives or relaxed inspections
Inspection Process	Official inspections performed by regulatory agencies through formal and random or scheduled on-site visits (inspections may be product or process-oriented)	Official inspections carried out through FBO self-reporting or registration . FBO self-reporting allows for second level inspections where regulatory agencies evaluate a firm's compliance by monitoring its records.*
Sanctions	Repressive sanctions: Using penalties, prosecution, and recalls to punish FBOs for committing an offence or repeatedly breaching regulations. Sanctions include closure of facilities, seizure of products, and disqualification from the market.	Informative sanctions: Following a breach in regulations, enforcement agencies may mandate certain corrective actions in order to motivate food operators to comply. There may be a hierarchical spectrum of sanctions depending on the severity of the regulatory offence. Negative information sanctions: Scores on the Doors methods, or “naming and shaming” programs that post results of official inspections and finding to FBO customers
Registration		Voluntary safety program based on the principles of HACCP/ ISO 22000. Annual cost of subscription to a voluntary safety programme (e.g., €1000).
Funding model	Fines for breach of compliance	Economy of Scale (Finances/Effort/Risk): FBOs scale the allocation of human and financial resources to monitoring and reporting annual results of internal audits and testing (e.g., the authority specifies total number of individual laboratory analysis for each €1 million of annual sales)

*Based on individual records, enforcement agencies can assess a FBO's internal rules (testing, corrective procedures, and actions taken) and check whether firms have implemented their quality/safety management system correctly. Under registration, regulatory agencies implement third level inspections where they assess food operators' compliance through formal verifications made by third party accreditors. Enforcement agencies

may support such third party accreditation bodies by issuing quality labels or signals for firms that have achieved a certain standard (e.g., organic production)". Rouvière and Caswell (2012)

Economy of Scale: In the case study ^{23,31}, one of the key discussion points that is highlighted is the effort FBOs face in complying, which varies, as argued in this report, by size of the FBO. That is, the effort in carrying out the same number of tests varies significantly by the size of FBO, so that a FBO that is half the size of a large FBO would experience twice the burden of carrying out the test in terms of allocation of effort (in human resources/time). For this reason, in the case study economy of scale in terms of finances, effort and risk was taken into account in the volunteering scheme. Also, the amount of testing needed was scaled to differences in levels of risk incurred by the products or process. The findings from the case study suggest that overall, more safety analyses were conducted (in fact more than the necessary amount) after the voluntary scheme was introduced as compared to before the scheme.

Typical safety control processes include official inspections carried out by authorities in which the outcome of non-compliance kick starts a progressively severe set of actions from warning letters to fines, to prosecution. For those FBOs in the case study that were not in the voluntary scheme, this was their experience. For those in the voluntary scheme, official inspections were reduced on the assumption that FBOs were operating in good faith. AOs relied on record-keeping and self-monitoring provided by the FBOs, in which they self-reported safety failures. Here also is an assumption of good faith that the FBOs would remedy any safety failures themselves, and only in situations where this was not the case would conventional enforcement procedures be initiated.

For good faith of this kind to be achieved the regulator took on a significant role in training and coaching FBOs. This involved a regular ongoing provision of training schemes on themes such as quality, methods, and risk management. In addition, the regulator supported FBOs in the voluntary scheme by allowing them to promote their participation through a special logo on their bills of sales. While the logo could not be used by consumers as a quality assurance, the logo was a signal of safety and quality assurance within a business-to-business context, which in turn built on the FBOs' incentives to maintain a competitive edge.

How might the case study be applied to a future regulatory model that could be adopted by the FSA?

Effective co-regulation: Overall, there is a clear consensus in white and grey literature that to support an effective co-regulatory framework between regulator and business, adopting a proactive approach compared to a reactive one appears to be popular, and potentially more effective (though more empirical/economic tests of this might be required).

Rationale for deferment of monitoring and enforcement to FBOs: Adopting a model that allocates a substantial part of the monitoring and enforcement process of regulation on to FBOs can work effectively, as long as there is an appetite for this from FBOs. This also requires that the regulator sets a level playing field with respect to provision of information, and the FBOs engender a level of trust with the regulator,

³¹ Rouvière, E., Soubeyran, R., Bignebat, C., 2010. Heterogeneous Effort in Voluntary Programmes on Food Safety: Theory and Evidence from the French Import Industry of Fresh Produce. *European Review of Agricultural Economics*. 37(4), 479-499.

because they take on ownership of the monitoring and enforcement processes. To support this, the regulator can make use of alternative methods (e.g., scores on the doors, incorporating consumer feedback, quality assurance recognition through logos for business to business trading) to promote compliance which focuses on the genuine benefits to business rather than the costs of limited or non-compliance. This also helps to promote food safety through FBO best practice, which again can help support a competitive edge for FBOs that are fully compliant as compared to broadly compliant.

Advantages of a proactive strategy: To further extend the idea of using a more proactive approach, more efforts would be needed to increase consistency in the delivery of assessments; for the large part this has been and currently is carried out by AOs, but could in the future be conducted by other agencies. The new functional role AOs take in a co-regulatory framework could be one in which they focus their responsibilities on providing FBOs training and coaching; this would require a standardized approach to ensure the consistency in the delivery of training and coaching. Consequently, this would be less time spent carrying out inspections. A proactive approach would instead mean that the AOs efforts would be directed towards assessing an FBO's internal processes (testing, corrective procedures, and actions taken) and checking whether FBOs have implemented their quality/safety management system correctly through their own recording-keeping and annual reporting. This was at least the model adopted in the French case study³². While there is no direct empirical evidence that can definitively speak to the question about whether a pro-active approach critically reduces AOs' load, there is evidence to suggest that a proactive approach along the lines suggested here does improve inspection scores, and compliance rates^{33 34}. Moreover, even under co-regulatory frameworks, FBOs tend to, when asked, want inspections to be carried out by AOs³⁵, so even if the key functional role of AOs changes under a new framework, FBOs recognize the importance and need for them to carry out inspections.

Another advantage to a proactive model of co-regulation is that it is flexible^{36 37} enough to adjust to the many new emerging profiles of FBOs. As highlighted in the literature review, this will be ever more of a factor as the scope for innovation increases with speedier advances in technology. Also, as noted in the review, the current taxonomy of FBOs doesn't yet fully encompass the range of new FBOs that exist, particularly those utilizing digital platforms. This means that the ways in which food safety regulation keeps up it to keep innovating as well, or else develop a robust but flexible system that can adapt to the changing FBO landscape. A proactive regulatory model would constitute an example of a robust and flexible model. While maintaining many of the proposals presented here, the flexibility of the proactive model is to simply build in advances of online digital monitoring and surveillance, which FBOs use themselves as operational

³² Rouvière, E., Soubeyran, R., Bignebat, C., 2010. Heterogeneous Effort in Voluntary Programmes on Food Safety: Theory and Evidence from the French Import Industry of Fresh Produce. *European Review of Agricultural Economics*, 37(4), 479-499.

³³ Yapp, C., Fairman, R., 2004. The Evaluation of Effective Enforcement Approaches for Food Safety in SMEs. Food Standards Agency.

³⁴ Yapp, C., Fairman, R., 2006. Factors affecting food safety compliance within small and medium-sized enterprises: implications for regulatory and enforcement strategies. *Food Control* 17 (1), 42–51.

³⁵ Bailey, A. P., & Garforth, C. (2014). An industry viewpoint on the role of farm assurance in delivering food safety to the consumer: The case of the dairy sector of England and Wales. *Food policy*, 45, 14-24.

³⁶ Soon, J. M., & Baines, R. N. (2013). Public and private food safety standards: facilitating or frustrating fresh produce growers?. *Laws*, 2(1), 1-19.

³⁷ Henson, S., & Hooker, N. H. (2001). Private sector management of food safety: public regulation and the role of private controls. *The International Food and Agribusiness Management Review*, 4(1), 7-17.

management processes³⁸. This can be done easily especially if FBOs register onto a voluntary safety programme in which they self-monitor and use online tools to post the results of their assessments. Though this is where economy of scale is of relevance, given that micro and small FBOs are unlikely to have an interest in or access to online technologies that would easily allow them to self-monitor, and so this is where AOs or other FBOs could provide useful support and advice.

FSA Case Study: Proactive Measures

It is estimated that Campylobacter is responsible for more than 280,000 cases of food poisoning each year. In 2011 and 2012 there were more than 72,000 laboratory confirmed cases of campylobacter per annum in the UK (also known as campylobacteriosis): a high proportion due to food; Campylobacter had been rising since 2005. In 2013 the FSA introduced the “Acting on Campylobacter Together” campaign to reduce levels of campylobacter in chicken. The programme encompassed a range of projects targeted at different points across the food chain, from farm to fork. It included a survey investigating the prevalence and levels of campylobacter contamination on fresh whole chilled chickens and their packaging at UK retail outlets, including smaller independent stores and butchers. Adopting a “naming and shaming policy” FSA published the results by the top nine (initially top six) retailers in the UK over the period 2014-2017. This encouraged retailers to take action and introduce innovative methods to reduce level of campylobacters in chickens across the production line. During the period of the survey the estimated prevalence of high-level campylobacter contamination (above 1000 cfu/g in neckskin) fell from almost 20% in mid-2014 to approximately 6% in mid-2017. During this same period a number of larger poultry processing plants trialled and implemented a range of interventions: e.g. secondary scalding of chicken carcasses.

In 2017, after a year-long negotiation process, the FSA had the agreement from 9 major UK retailers that they themselves would carry out the sampling, analysis, and publication of their own datasets on Campylobacter in poultry, to their consumers. This involved, through consensus, that the FSA be prescriptive in the exact protocols needed for sampling and analysis, a check list, and a time line for the publication of data. This was to ensure procedural consistency across all retailers that have signed-up to do their own testing. As yet, because this project is nascent, it is unclear how successful the process is, and there are procedural efforts that need to be clarified to ensure the future validity and reliability of the tests. However, the average result, across all retailers involved, is reasonably consistent with the previous year(s). Though this is preliminary, so no hard and fast conclusions can be drawn.

Ways of framing charges to FBOs, registering as a case in point: With respect to the funding model of a new proactive framework, the findings discussed in the literature review suggest that charges should be framed in a way that reinforces positive behaviour, rather than take a regressive punishment style approach (see Section 2 of this report). For instance, an annual fee for registration has been adopted in several countries, but the success of it depends on FBOs seeing the value of belonging to a scheme that gives them access to greater business opportunities through greater compliance. If a registration scheme is set up, then the question is also raised regarding what to do with FBOs that do not register, *should they be expected to pay a penalty?* Assuming that the French case study presented here is applicable to the UK, then the voluntary safety programme has to be recognized by a public authority, and enough FBOs need to show willingness to sign

³⁸ Nychas, G. J. E., Panagou, E. Z., & Mohareb, F. (2016). Novel approaches for food safety management and communication. *Current Opinion in Food Science*, 12, 13-20.

up to it to ensure that there is sufficient uptake into the register. This, by definition is a voluntary scheme, so there cannot be any penalty for not registering; except if they make a public statement that they are not participating in the scheme. Those that benefit are those that register, and those that do not simply face a more traditional reactive co-regulatory system.

Ultimately the introduction of fees to register, should depend on what the register is for, and how it is presented to FBOs with respect to their own interests and incentives. The choice of funding model the regulator promotes to ensure compliance presents a strong signal to FBOs as to the relationship between financial incentives/costs and compliant behaviour, and the nature of the relationship between FBO and regulator.

Positive reinforcement: The message from the vast literature that was reviewed (see section 2), is that compliance is perceived by FBOs as a cost. The amount of cost in effort that is estimated by the FBO depends on several factors, some warranted, some less so. If a funding model focuses only on punishing FBOs for poor behaviour (financially scaled to the level of severity of enforcement), then this already builds on a perception by some that the regulator is focused primarily on failures in compliance, rather than promoting compliance. Similarly, a flat fee that charges at multiple stages of the regulatory process, presents to the FBOs a clear signal that the regulator is a service provider, but can suffer the same issues as a funding model that focuses exclusively on introducing costs to the FBO for poor or non-compliance. If there is a strong rationale for maintaining either of these types of model, then there needs to be a compliment to it, which rewards for compliance. This is where FBOs are interested in reputation building opportunities, and this is where the regulator could support such interests through a register that promotes a type of well-established high standard of food safety practices. Some potential options for charging and corresponding outcomes based on insights summarized from the work presented in the literature review can be seen in Table 3.

Table 3. Potential avenues for charging for monitoring and enforcement and corresponding outcomes.

Domains for potential Charging	Current	Potential options	Outcomes in terms of improving compliance
Licensing	No fee	Initial fee Annual fee	Successful, but only if tied to an incentive scheme that matches FBOs interests
Register	No fee	Initial fee Annual fee	Successful, but only if tied to an incentive scheme that matches FBOs interests
Non-compliance	Sanctions	Fixed penalty Fee for fault	Limited change in compliance <i>[unless tied with a complementary scheme that rewards compliant behaviour – through promotion of business interests – i.e. reputation, competitive edge, improved business to business trading]</i>

Conclusions and recommendations

Overall, the aim of this report has been to present a framework for understanding FBO behaviour based on insights from current decision science research, including a state of the art decision-making model, and literature examining patterns of FBO behaviour. Alongside this, the report presents insights regarding AOs behaviour, and how this is also sensitive to, as well as responsive to FBO behaviours, and vice versa. The main point to take away from the literature discussed here is that decision-making is largely governed by the amount of effort that is needed to gain the rewards that are of interest. The reward goals will vary by agent. For FBOs the rewards are gauged in terms of benefits to business, and typically compliance is seen as a cost. For AOs the reward goals are improvements in compliance, but they are also seen as costs relative to the amount of effort needed in terms of monitoring and enforcement activities. As is clear from this characterisation, the goals of agents in a co-regulatory process are not necessarily the same, but the underlying decision-making process that underpins behaviour is the same.

Risk attitude is placed squarely at the start of the decision-making process (for supporting evidence see page 33-41). This is because the perceived risk attitude (i.e. the perceived costs and benefits of compliance – see Appendix I for proposed toolkit) of FBOs later impacts the extent to which they show willingness to comply (signalled intent) and the actual efforts put into improving compliance (action); referred to as the intention-action gap. This is a common situation in which what is being said (intention) is not consistent with what is actually done (action)). Any future efforts in effective behavioural change in improving compliance through a variety of inducements and training will depend on the extent to which FBOs past experiences reinforce their perceived risk attitude. If reinforced, only if negative, this will lead to a widening rather than shortening of the intention-action gap.

How might positive behavioural change be achieved?

Given that risk attitude of FBOs (as well as AOs) shapes later behaviour, it is possible to build on insights from decision-sciences to better profile FBOs by simplifying current methods and toolkits as proposed in detail in the literature review (see Appendix I for proposed toolkit). Current methods characterise FBOs in a complicated fashion that does not necessary lend itself to an approach that helps to predict FBOs receptiveness to different styles of interventions. If the aim is to introduce efficiencies in the regulatory process, then knowing which FBOs are likely to need a light touch, and which need more training and coaching before typical enforcement takes place would save considerable time in the long run. Using a simplified method of characterizing FBOs according to perceived risk attitude may serve as a useful behavioural tool that could be built into surveillance systems that profiles FBOs, and predicts which are likely to need future support in training and coaching to prevent low or non-compliance (for supporting evidence see page 33-41).

In addition, an effective and trusted regulatory system entails one that functions in a consistent and coherent manner, and so, efforts need to be directed towards improving the decision-making behaviour of AO regarding monitoring and enforcement. Currently the process requires greater harmonization at several levels. Improvements in bringing decision-making behaviours into alignment will have a positive knock on effect on FBOs compliance levels. If enforcers are seen to be working consistently by making similar

judgments and decisions (e.g., hygiene ratings), then FBOs are likely to see the regulatory system as significantly more credible.

Here and in previous grey and white literature, a common theme has been to recommend improvements designed to target the misperceptions that FBOs have regarding the effort (time, human & financial resources) required to meet acceptable food safety standards. Given that effort is generally perceived as a cost, and compliance is seen as a cost, there are several ways that FBOs perceptions can be modified to achieve a more positive attitude toward compliance that could lead to effective behavioural change.

- Communication needs to be streamlined in such a way as to make it clearer and more obvious how changes can be implemented efficiently and easily – especially for micro, small and medium FBOs.
- Training and coaching can take several forms that should involve some multiple face-to-face interactions between AOs and FBOs; though this can be scaled back over time. In addition, a bank of online training tools and information resources could be provided, and bespoke training may be tailored to specific gaps in knowledge that the FBOs might have. Though some effort is needed to ensure provisions for regular training, to maintain what knowledge is gained, and to keep FBOs up to date with new changes in food safety practices.
- The frame of reference for communicating and for training should be from the point of view of the positive impact of compliance on business outcomes, because this is the most important to any FBO. For FBOs, improvements in compliance is not seen as an end in and of itself, so capitalizing on aligning the goals of improving compliance from the view of AOs with the goals of the FBOs will be more effective in the long run. This can take the form of emphasising improvements to reputation, increasing their profile, competitive advantages, and other such incentives that drive FBOs.

A shift towards explicitly presenting a regulatory body as a service provider that charges for services that it offers needs to embrace a proactive rather than a reactive approach to co-regulation. This should also dictate where the charges should be factored into the regulatory process. The most important feature of a funding model is that it takes as its starting point a reward focused approach than a punishment approach. A positive approach sends a clear signal to FBOs that the focus is on promoting good or even best practice, and this can easily be co-opted into FBOs food safety culture, especially if they are able to perceive the long-term benefits with respect to business incentives. A registration scheme can be a starting point for such a strategy, though this requires motivation to sign up to a voluntary scheme that promotes and supports best practice, for which a sign-up fee, and annual fees could be built in; this means that FBOs that don't sign-up are not financially penalised, given that the scheme is voluntary. Similarly, such a scheme could utilize current consumer appetite for greater transparency, particularly with efforts to post hygiene rating scores, as well as internal/external audits on food safety practices/food safety management. Again, the positive impact of online posting of results can be tracked through consumer feedback on online forums, which in turn could be an independent index of the positive effects of compliance, both for the regulator and for FBOs.

The appetite for change exists, and as FBOs adapt and expand in scope, the pressures on regulation to do the same will increase. The rationale for this type of approach comes

from a wealth of literature across several disciplines and supported by a decision-making model that captures the why as well as the how behind patterns of behaviours in FBOs and enforcers of regulation.

Literature Review: Issues in Context ``

Broad description of the functional role of the FSA: There is huge variability from country to country as to the approach taken with respect to regulation. The UK takes a particular stance, and this has been most explicitly characterized in January 2017 by the UK Cabinet Office's *Regulatory Futures Review*³⁹. The review brings into sharp focus the UK's current and future approach to regulation. That is, it takes a middle ground between top-down (command and control) and bottom-up (self-regulation), which is co-regulation, a mixture of the two⁴⁰.

What does this mean in practice? A case in point is the FSA recent report published in July 2017 *Regulating our Future*⁴¹ that outlines the stated vision as a regulator, and the rationale behind this. Before discussing this some basic details are discussed regarding the regulatory processes as it stands.

``. A crucial part of this role is to ensure that food business operators (FBOs) provide safe food for consumers. To achieve this, the FSA works closely with local authorities to make sure that UK Food Law is upheld throughout the food chain. Local authorities (LA) via Authorised officers (AOs) enforce FBO compliance with food safety regulation using official guidance and training tools provided by the FSA. For instance, Annex 5 of the Food Law Code of Practice (FLCoP or 'the Code')⁴² specifies the approach which should be taken by local authorities when assessing food safety compliance. This outlines the specific domains captured under food safety (i.e. compliance with food hygiene and safety procedures, compliance with structural requirements – hygiene of food premises, confidence in management – reaching and maintaining food safety procedures).

Thus, the FSA determines how regulation should be enforced through a statutory code of practice that directs and advises AOs (e.g., setting out the frequency of food hygiene inspections). The inspection programme is based on a risk rating scoring system. Each premise receives a risk rating score based on various components including number of consumers at risk, and confidence in management of the premises. Typically, the higher the risk score an FBO receives, the more frequently inspections are carried out. As the number of FBOs increases, and the range of FBOs increases, the difficulty in maintaining this model of regulation enforcement also increases.

Regulating our Future (ROF): The *Regulating our Future* (ROF) vision of the FSA is to function under a co-regulatory framework that presents the FSA as a service provider, and this is articulated based on two reasons. The current one-size-fits all approach to

³⁹ *Regulatory Futures Review* (Cabinet Office, 2017).

⁴⁰ C Hodges, *Law and Corporate Behaviour: Integrating Theories of Regulation, Enforcement, Culture and Ethics* (Hart Publishing, 2015).

⁴¹ (FSA, 2017) <https://www.food.gov.uk/sites/default/files/rof-paper-july2017.pdf>

⁴² Food Code of Practice (2017) https://www.food.gov.uk/sites/default/files/food_law_code_of_practice_2017.pdf

regulating FBOs is simply not fit for purpose given the ever-changing landscape of FBOs (e.g., pop-up restaurants, crowd-funded restaurants, collaborative menus – this is where the customer and the FBO collaboratively decide on what meal is served to the customer, drone food delivery). Thus, a food safety regulator needs to be flexible enough so that it assesses food safety compliance in an effective and efficient way as FBOs change. In addition, not only are FBOs diversifying but they are growing, and this places a greater burden on the way in which food safety compliance is assessed and enforced. This also means that a flexible system of regulation is needed that takes a creative approach to the responsibilities that FBO and the regulator should have. These critical factors mean that the FSA has explicitly outlined:

“Businesses are responsible for producing food that is safe and what it says it is, and should be able to demonstrate that they do so. Consumers have a right to information to help them make informed choices about the food they buy – businesses have a responsibility to be transparent and honest in their provision of that information.... Businesses should meet the costs of regulation, which should be no more than they need to be ” (ROF, p5, 2017).

In all but name, the future vision of the FSA is to take a co-regulatory approach. It outlines that the FBOs are responsible for understanding risks and ensuring that they take necessary steps to mitigate them. In this context, the principal role of the FSA is to set standards so that food businesses of all types understand what is required of them. This entails a collaborative partnership with FBOs, so that the FSA serves as an information provider. Furthermore, by advancing new surveillance techniques, the FSA seeks to identify emerging risks and early interventions. Again, this provides a clear signal that the nature in which the FSA interacts with FBOs and the nature in which assessment of compliance takes place is streamlined, efficient and with minimal intervention; this constitutes the FSA’s stated vision of co-regulation under ROF.

An important factor regarding the stated responsibilities of FBOs in the ROF scheme is that FBOs will meet the cost of regulation, for the reason that the FSA, under ROF, is recognised as a service provider. Specifically, what this means is the introduction of a funding model which adjusts the cost incurred by the FBO relative to the level of intervention from the government. This presents a strong signal to FBOs as to the relationship between financial incentives/costs and compliant behaviour, and the nature of the relationship between FBO and regulator.

Types of Food Business Operator and changing profiles: Article 3 of Regulation (EC) No 178/2002 defines “„food business operator” as the natural or legal persons responsible for ensuring that the requirements of food law are met within the food business under their control”. The types of business entities are defined dependent on the legal system for an individual country but may include incorporations, partnerships, sole traders and other specialised types of organisation. The regulations governing different types of business entity may differ between countries. The approval of an “establishment” applies to both the premises and the business operating at the premises and, therefore, it is the “enterprise” that must be approved. To gain approval, the FBO must meet all the requirements of the EC Food Hygiene Regulations and other relevant legislation as required for the type of establishment⁴³.

⁴³ <https://www.food.gov.uk/sites/default/files/multimedia/pdfs/enforcement/idingfbochangesoperatorguide.pdf>

The range of FBOs that the FSA recognizes currently includes: Take-away, Supermarket/Hypermarket, Small retailer, School/College, Restaurants and caterers, Restaurants/Cafes/Canteens, Pub/Club, Mobile food unit, Manufacturers/Producers, Manufacturers and packers, Primary producers, Importers/Exporters, Hotel/Guest house, Distributors/Transporters, Caring premises.

It is worth highlight here that there is a need to expand these descriptors of FBOs. As mentioned in the previous section, the profile of FBOs is changing. Some of the key changes that have been tracked over the last 10 years have been associated with new opportunities that digital technologies offer, and changes in FBO culture, which may or may not be a direct consequence of this, as well as shifts in other contextual factors, such as social, economic and political climates^{44 45 46}. For instance, Alternative Food Networks (AFNs)^{47 48 49} (alternatively called Civic food networks) are a type of food system in which the supply chain between producer (e.g. farmer) and consumer (e.g., local community) is considerably short (e.g., Farmers' Markets, Solidarity Purchasing Groups). In 2016 a World Bank Report^{50 51} outlined the formative role that digital technologies play in facilitating bottom-up networks of this kind in developing, as well as developed, countries.

Digital technologies can create efficiencies in supply chains that in turn change the profile of FBOs, but digital technologies can also directly change food supply chains, which radically change what constitutes an FBO. One such example is digital platform economies⁵². These are a form of information technology that transforms the capabilities of services in a variety of business sectors. In the food industry this has been most obviously observed through platforms for online ordering of takeaway food such as *Deliveroo*, *Hungry house* and *Just Eat*. An insight report⁵³ supported by the European Commission in 2016 provides a sober warning of the difficulties in keeping track of changes to the labour market (e.g., gig-economy in which workers have short-term or even one off “gigs” for which they receive payment for) resulting from digital platforms. This in turn has implications for food regulators.

The EU insight report in 2016 suggests that existing regulatory frameworks are not yet able to effectively capture the changes to the working conditions of employees of digital platforms (e.g., those collecting and then delivering the food). Thus, food regulators face

⁴⁴ Ng, I. C. (2014). *Creating new markets in the digital economy*. Cambridge University Press

⁴⁵ Silva, A. C. (2017). Water, Energy and Environmental Challenges in the XXI Century: Solutions for the Future. *Procedia Earth and Planetary Science*, 17, 25-28.

⁴⁶ Quinton, S., Canhoto, A., Molinillo, S., Pera, R., & Budhathoki, T. (2017). Conceptualising a digital orientation: antecedents of supporting SME performance in the digital economy. *Journal of Strategic Marketing*, 1-13.

⁴⁷ Feenstra, G. W. (1997). Local food systems and sustainable communities. *American journal of alternative agriculture*, 12(1), 28-36.

⁴⁸ Renting, H., Schermer, M., & Rossi, A. (2012). Building food democracy: Exploring civic food networks and newly emerging forms of food citizenship. *International Journal of Sociology of Agriculture and Food*, 19(3), 289-307.

⁴⁹ Fonte, M., & Cucco, I. (2017). Cooperatives and alternative food networks in Italy. The long road towards a social economy in agriculture. *Journal of rural studies*, 53, 291-302.

⁵⁰ <http://documents.worldbank.org/curated/en/481581468194054206/pdf/WPS7669.pdf>

⁵¹ Deichmann, U., Goyal, A., & Mishra, D. (2016). Will digital technologies transform agriculture in developing countries?. *Agricultural Economics*, 47(S1), 21-33.

⁵² Kenney, M., & Zysman, J. (2016). The rise of the platform economy. *Issues in Science and Technology*, 32(3), 61.

⁵³ https://www.ceps.eu/system/files/PI201730_Government%20Responses%20to%20the%20Platform%20Economy.pdf

parallel problems because the supply chain of market place platforms can be opaque. It is hard to track who is responsible for what at different stages of the food chain from production right through to the transportation of it to the consumer⁵⁴. Different agents in the food chain will require different types of regulation because of what products they produce and what they retail. Thus far, there is limited literature exploring the complexities that food regulators are posed from innovations in FBOs of the kind discussed here, and more importantly, there is limited work looking at to how to surmount these problems.

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 (Large, medium, small, micro) around food hygiene, safety and food management⁵⁵. More to the point, it also provides a valid motivation for developing ways of anticipating the challenges that a regulator will face in ensuring the safety of food in emerging establishments. Nevertheless, while the characteristics of FBOs is changing, and will continue to change as a reflection of technological innovation, this does not preclude the need to understand how they fundamentally behave. 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.

The next section outlines the type of literature that will be the focus of the review, and the framework from which FBO behaviour will be interpreted and described.

⁵⁴ de Sequeira, J. A., Haysom, I., & Marshall, R. (2015). Food Safety Training and Teaching in the United Kingdom and Europe. In *Food Safety*, 427-439.

⁵⁵ Brice (2017). Regulating food in the platform economy: understanding and governing emerging online marketplaces for food. ESRC Festival of Social Science Workshop, BEIS conference centre, London.

Literature Review: Methodology and approach

This literature review considered academic publications, government reports, and other grey literature. The author undertook online searches of academic journal databases, competent authority websites, and other online materials.

The search of white papers was conducted in the bases of ScienceDirect, Medline and Google Scholar, Web of Science databases, and the Web of Knowledge platform that includes the foundations of Web of Science. The search was limited to full text articles written in English, with a focus on incorporating the most recent empirical work (published between 2013-2017, but not excluding other relevant literature predating this period). It used the following Boolean terms: (food handler, food business operator), (Food regulators, regulation, local authorities), (compliance, non-compliance) (knowledge, attitudes, behaviour, intention-action gap, outcome, feedback), (risk), (effort), (incentives), (decision-making), (training). This initial search resulted in approximately 4,000 grey and white papers. After consulting the titles and abstracts, and excluding articles/reports that included the terms in the main text but did not discuss them in any level of detail, the final number of reports/articles that contributed to this report was refined to approximately 150 research articles/reports.

Decision Science Approach: As mentioned, the objectives of this report are to give a comprehensive understanding of FBO behaviour with respect to compliance, and to consider ways in which change in behaviour could be supported. There are several published reviews that do an excellent job of this already. Rather, because of the objective of this report, the aim is to go beyond reviewing critical evidence by focusing on consolidating the key findings, and to synthesise them with respect to current models of decision-making behaviour. By doing so, this review reveals common patterns of behaviour in FBOs with regards to compliance, and common behaviours with regards to AOs assessment of and enforcement of food safety standards. Both of these are seen through the lens of a decision-making model that gives a rationale for behaviour of actors on both sides of the food system, namely businesses and regulator.

The relevance of decision science literature for understanding FBO behaviour: This report isolates two areas of interest from the decision sciences literature: Effort and value. The rationale for this is as follows. Compliance involves, time, effort and resources (i.e. cost), and a value assignment is made with respect to the relative costs and benefits of complying (values). Given this as the starting point, the application of research on effort and value based decision-making to the current focus of this report is twofold. First, while

individual and collective behaviour may vary substantially⁵⁶, at a fundamental level, both are subject to the same decision-making process, which is to weigh up the amount of effort needed to put into a task against the returns that would be received (gains vs. losses).

Second, there is no escaping the fact that individual/collective decision-making contains basic ingredients that help to explain predictable patterns of behaviour. In fact, disciplines that fall under decision Science (Behavioural Economics, Computer Science, Economics, Finance, Management, Neuroscience, Political Science, Psychology), will say that irrespective of whether we are referring to an individual or collective, the effort needed to maintain an outcome (i.e. a reasonable profit margin) is informed by the rewards that are gained or lost. So, it is important to understand how the insights from research in this area can be used to address the two main objectives of this report:

Using decision science to address how food businesses behave: The overarching position taken in this review is that the basis on which FBO decisions are made (e.g., improve food hygiene practices), be it at an individual (e.g., micro FBO) or collective (e.g., large FBO) level, is dependent on identifying the way that values (benefits and costs) are assigned to various options concerning compliance (e.g. cost in time, training, resources, effort). Correspondingly, from the view of the regulator, while the incentive structure is different for an individual (e.g. AO inspector) /collective (e.g., FSA), the amount of effort dedicated to ensuring that laws are understood and adhered to will impact the rewards that are experienced, which need not be financial, and are no less relevant (e.g. increases in compliance rates). By using this as the framework for understanding behaviour it is possible to characterize the **Why** as well as the **How** of FBO behaviour.

Using decision science to address how to improve food business compliance with food law: The goal of understanding FBO behaviour is to help determine how micro, small, medium and large FBOs will respond to various interventions (e.g., incentives, sanctions). The overarching position taken in this review is that a value-effort based decision model provides a framework for connecting the cost of compliance (with respect to effort in time/resources) against the gains of compliance (gaining a greater market share by increases in reputation).

The aim of the next section is to provide the details that lay out the framework for understanding FBO behaviour – and, as a corollary, AO inspector’s decision-making behaviour.

⁵⁶ Ladley, D., Wilkinson, I., & Young, L. (2015). The impact of individual versus group rewards on work group performance and cooperation: A computational social science approach. *Journal of Business Research*, 68(11), 2412-2425.

Review of Decision Science Work on Effort and rewards

Value: Rewards come in many forms, and while commonly thought of as monetary, and from the point of view of gains, rewards can also be subjective (e.g., feeling happy), of which the source can be social (e.g., being acknowledged for a job well done), and from an approach that attempts to minimising losses as well maximising gains.

Effort: Effort also comes in many forms, but generally falls into the category of physical effort, which is the energetic cost of physical movement, or mental effort, which is the cost of having to direct mental resources to perform an activity.

Common sense view of value and effort: By surveying a large body of work from the social and decision sciences, the literature suggests that people are motivated by rewards, however subjective, and there is no action, no matter how trivial or complex, that doesn't involve the expenditure of effort. In connecting the two (i.e. values and effort), the common perception that people have is that "*we get back what we put in*". This implies something fundamental about human behaviour. When deciding how much effort to put into **ANY** activity, what people choose to do is determined by estimates of what the returns will be, (either through getting more of what we want [maximizing gains], or less of what we don't want [minimizing losses])⁵⁷. Summarizing the wealth of work on effort that spans several disciplines within the social sciences (Behavioural Economics, Computer Science, Economics, Finance, Management, Neuroscience, Political Science, Psychology), there are three core assumptions regarding **effort**:

- **Effort is aversive**
- **Increases in effort in turn increase performance**
- **Mental and Physical effort are equivalent** (see Figure 2 for schematic)

Similarly, there is a wealth of work that has examined the role that rewards play in shifting behaviour with respect to how much more effort is directed towards an activity. This work tells us that reward magnitude (i.e. the amount of reward) influences choice behaviour regarding effort-based decisions, and that effort aversion can be surmounted by the presentation of the right amount of rewards, and the most appropriate reward information. This leads to the following three core assumptions regarding **rewards and effort**:

⁵⁷ Osman, M., Glass, B. D., Hola, Z., & Stollewerk, S. (2017). Reward and Feedback in the Control over Dynamic Events. *Psychology*, 8(07), 1063.

- **Effort aversion can be overridden by rewards**
- **There is a monotonic relationship between effort and reward** – as rewards go up, so does effort
- **Rewards drive effort-based decision-making** – you put in as much as you think you will get back (see Figure 2 for schematic)

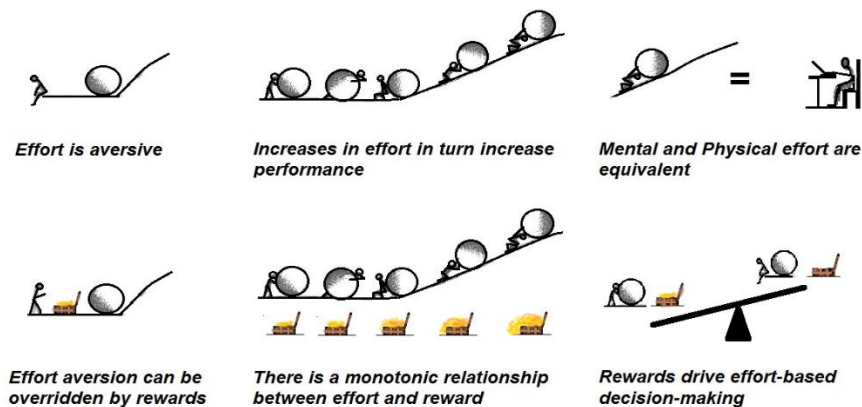


Figure 2. Schematic of canons of effort and value in human behaviour

Given the state of the art research (i.e. economics, psychology, neuroeconomics, and behavioural economics) on value-based decision-making, there are several popular value-based decision-making frameworks that describe the process, and in turn make different claims regarding the association between effort and rewards^{58 59 60 61 62 63 64}. The basic claims these models have made have been extended to understanding business behaviour in a variety of contexts⁶⁵, including the food industry⁶⁶.

Effort-Value Based Models in a nut shell: The models describing how decisions are made in which we face a choice between options that involve different levels of effort and reward are applicable to any context, and so are a viable framework for understanding FBO behaviour, and correspondingly AOs regulatory decision-making process.

⁵⁸ Doya, K. (2008). Modulators of decision making. *Nature Neuroscience*, 11, 410–416

⁵⁹ Ernst, M., & Paulus, M. P. (2005). Neurobiology of decision making: A selective review from a neurocognitive and clinical perspective. *Biological Psychiatry*, 58, 597–604.

⁶⁰ Assadi, S. M., Yucel, M., & Pantelis, C. (2009). Dopamine modulates neural networks involved in effort-based decision-making. *Neuroscience and Biobehavioral Reviews*, 33, 383–393.

⁶¹ Kable, J. W., & Glimcher, P. W. (2009). The neurobiology of decision: consensus and controversy. *Neuron*, 63, 733–745

⁶² Rangel, A., Camerer, C., & Montague, P. R. (2008). A framework for studying the neurobiology of value-based decision making. *Nature Reviews: Neuroscience*, 9, 545–556

⁶³ Rigoux, L., & Guigon, E. (2012). A model of reward- and effort- based optimal decision making and motor control. *PLoS Computational Biology*, 8, e1002716.

⁶⁴ Osman, M., & Wiegmann, A. (2017). Explaining Moral Behavior. *Experimental Psychology*, 64, 68-81.

⁶⁵ Kreps, D.M. (1990), *A Course in Microeconomic Theory*, Princeton University Press, Princeton, NJ.

⁶⁶ Weiss, M.D. (1995), "Information issues for principal and agents in the 'market' for food safety and nutrition", in Caswell, J.A. (Ed.), *Valuing Food Safety and Nutrition*, University of Colorado Press, Boulder, CO, pp. 69-79

All the models conceptualize decision-making as a process consisting of several steps. They propose that for any decision-making situation, to start off with, it is necessary to figure out what the options are – *which is referred to as the representation stage*, then an assignment of values to the different options (i.e. cost, benefits) – *referred to as valuation*, then a choice is made as to what to do based on the valuation – *referred to as action selection*, which is followed by actually then carrying the behaviour that was chosen - *referred to as action execution*, reviewing the outcome that followed from the behaviour – *outcome stage*, and then updating one’s experience of the decision-making situation – *referred to as learning*.

The critical elements of all prior models have been previously summarised⁶⁷, and are presented in Figure 3; there are some minor adaptations to suit the purposes of this review. First, the way in which FBOs and AOs approach a decision-making situation in the context of food safety is with respect to risk, which is labelled in Figure 3 as **Risk attitude**. Second, that the outcome of a decision with respect to FBOs is how compliant they are, and correspondingly the outcome of the decision of AOs with respect to a given mode of enforcement; this is labelled **Outcome** in Figure 3.

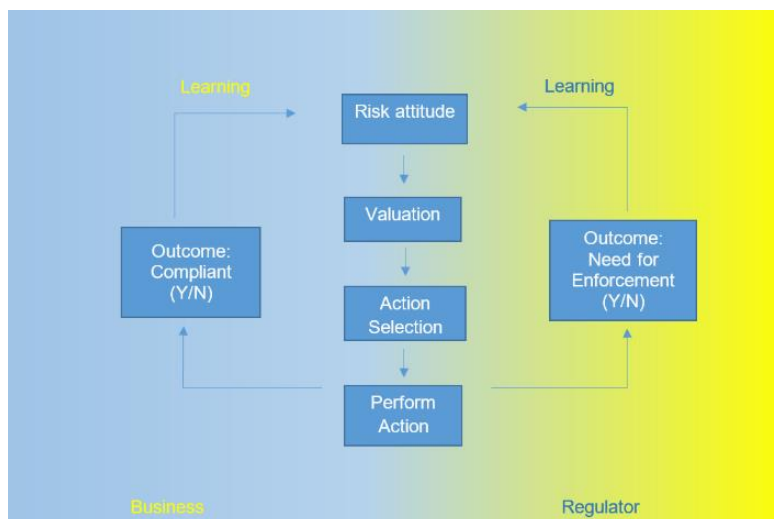


Figure 3. Dynamic-Value-Effort Decision-Making Model

The next three sections (Perceived Risk-Attitude, Intention-action gap, Outcome and feedback) will present different elements of the decision-making process presented in Figure 3 in order to understand the findings from various literatures examining FBO behaviour with respect to compliance, as well as AOs approach to regulatory decision-making. For the purposes of helping the reader, a summary of the key insights of each section is provided at the end of each section.

⁶⁷ Osman, M., & Wiegmann, A. (2017). Explaining Moral Behavior. *Experimental Psychology*.64, 68-81.

EVDM model: Perceived Risk Attitude in relation to effort and rewards

This section focuses on detailing behaviour with respect to the first component of the Effort-Value based decision-making model, risk attitudes and the assignment of values to potential courses of action (see Figure 4).

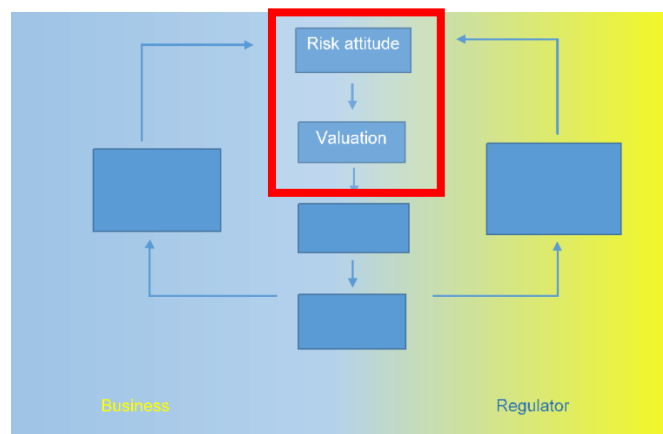


Figure 4. Risk with respect to the Dynamic-Value-Effort Decision-Making Model

Perceived Risk attitude: One of the most widely applicable insights from decision sciences research is that people vary with respect to risk attitude. There are many ways in which risk attitude can be measured in order to help predict risky behaviour in various contexts^{68 69}. In short, perceived risk attitude reflects the way in which people weigh up the gains and losses; losses here include the amount one stands to lose and the chances of that actual loss⁷⁰. The literature shows that, in any given context, a small proportion of people will appraise risk in a positive way (referred to as risk seeking) which in turn means that they then go on to select risky options; this has often been linked to behaviour that maximizes interests in the short term, and leads to impulsive behaviours. A reasonable number will appraise risk neutrally (referred to as risk neutral) which in turn means that they sometimes select risky options and sometimes don't. A large proportion of people will appraise risk negatively (referred to as risk averse), and will go on to consistently avoid

⁶⁸ Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica: Journal of the econometric society*, 263-291.

⁶⁹ Weber, E. U., Blais, A. R., & Betz, N. E. (2002). A domain-specific risk-attitude scale: Measuring risk perceptions and risk behaviors. *Journal of behavioral decision making*, 15(4), 263-290.

⁷⁰ Weber, E. U., & Milliman, R. A. (1997). Perceived risk attitudes: Relating risk perception to risky choice. *Management science*, 43(2), 123-144

selecting the risky option; this has often been linked to behaviour that maximizes interests in the long term, and leads to methodical and well-planned behaviours.

Differences in FBO attitudes and behaviours: In several FSA reports, FBO behaviour^{71 72 73 74 75}, as well as findings reported by Defra⁷⁶, there is a clear recognition of differences between businesses with respect to their attitudes and behaviours, and this in turn impacts the way they respond to regulation. While there are many attempts to characterize the different attitudes and behaviours, or “mindsets” of FBOs, as seen in Figure 5 and 6, it is possible to simplify them to a few key properties, which are presented in Table 4.

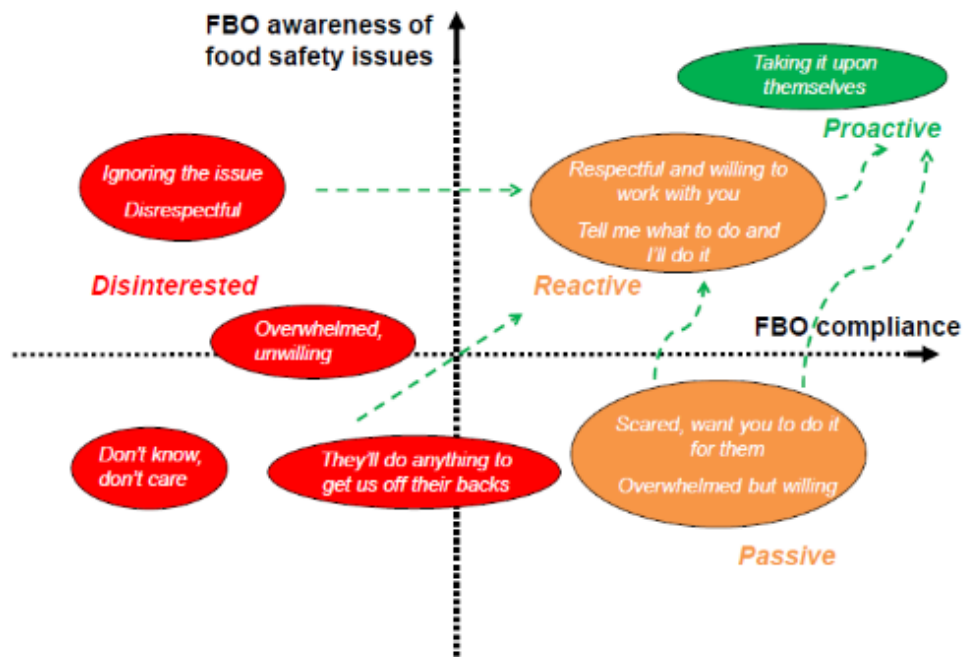


Figure 5. Sustained compliance requires awareness and a proactive FBO mindset

⁷¹ FSA report (2012) Qualitative review of food safety regulatory decision-making behaviour
<https://www.food.gov.uk/science/research/choiceandstandardsresearch/fs245004>

⁷² FSA (2012) Compliance and enforcement strategy

<https://www.food.gov.uk/sites/default/files/multimedia/pdfs/enforcement/compliance.pdf>

⁷³ FSA report (2015) Evidence review of regulation culture and behaviours.

<https://www.food.gov.uk/sites/default/files/Evidence%20Review%20on%20Regulation%20Culture%20and%20Behaviours.pdf>

⁷⁴ FSA report, Wright, M, Paul, L., & Palmer, G. (2012) “A tool to diagnose culture in Food Business Operators” Reports from Greenstreet Berman Ltd for the Food Standards Agency GSB CL2567 R1 V6 FCA

⁷⁵ FSA Brook Lyndhurst report (2012). Segmentation of small and medium-sized food enterprises | A report for the Food Standards Agency.

⁷⁶ DEFRA (Pike, T) November 2008. Understanding behaviours in a farming context: Bringing theoretical and applied evidence together from across Defra and highlighting policy relevance and implications for future research. Published online:

<http://archive.defra.gov.uk/evidence/statistics/foodfarm/enviro/observatory/research/documents/ACEO%20Behaviours%20Discussion%20Paper%20%28new%20links%29.pdf>

ELEMENT	Category				
	a) Calculative non-compliers:	b) Doubting compliers:	c) Dependent compliers:	d) Proactive compliers:	e) Leaders:
Business priorities and attitudes towards food hygiene					
Business's perception and knowledge of food safety hazards					
Business's confidence in food hygiene requirements					
Business ownership of food safety and hygiene					
Competence, learning and training in food safety and hygiene systems					
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					

Figure 6. Identifying food safety culture

Based on a set of qualitative studies reported by Bukowski, Boal and Tavakoli (2012), they assessed an FBOs attitudes towards compliance. AOs and staff working at FBOs provided responses that lead to the formation of a classification system of the FBO “mindset” which could either be mostly **Disinterested, Reactive, Passive, or Proactive** (See Figure 5). The report also discussed the relationship between FBO mindset and the AOs views on how much emphasis to place on a given regulatory style i.e. (informal vs. formal). This is relevant because how AOs identify FBOs clearly impacts how they gauge how much effort to put into food control activities.

Another key report prepared by Wright et al (2012) identified five categories of FBOs, which include **Amoral calculators, Dependent, Doubters, Proactive compliers and Leaders**. The classification system, which also serves as a toolkit for measuring FBO food safety culture, was supported by a comprehensive review of the state of the art of the academic research regarding safety culture assessment tools. In addition, just as with the Bukowski et al (2012) report, Wright et al conducted several workshops in which they interviewed FBOs and AOs to further refine the tool (see Figure 6) for identifying different types of Food safety culture. While the report presents a series of validated questions that include assessment of perceived-risk attitude, precisely how FBO culture would be scored, and the tool kit would be implemented was not fully explored in the report.

Some of these characterizations were built on early white literature which sought to characterize all businesses, regardless of type and sector, into three categories based

around the typologies of non-compliance: **Amoral calculators**: These are business motivated entirely by profit seeking, and that non-compliance stems from economic calculations of costs and benefits in compliance. **Political citizens**: These are businesses ordinarily inclined to comply with the law, but non-compliance stems from a principled disagreement with regulations regarded as arbitrary or unreasonable. **Organisationally incompetent**: These are business that are non-compliant because of failures of management, knowledge and systems, rather than being wilfully non-compliant^{77 78}. While helpful, this taxonomy doesn't include categories of business that are motivated to comply, or are at least broadly compliant and has limited relation to insights from work in the decision sciences.

More recently, a report by Brook Lyndhurst (2012) that examined ways in which small and medium sized FBOs could be characterized based on their attitudinal responses to food hygiene and safety, regulations, and compliance⁷⁹. They proposed five different types of FBOs characterized as follows; **Rules are there to be followed** (25.9); **My kitchen is my castle** (18.6); **Its as easy as apple pie** (16.6); **Weight of compliance on my shoulders** (11); **Learning the ropes** (12.8); **Just leave me to it** (15.1). The ordering of the labels starts from most compliant to least compliant, and the details in parentheses are the proportion of the FBOs they sampled that fell into each category. The advantage of the work is that not only were the categories developed, there is also evidence to show the distribution of FBOs by category. This could also be used to develop forms of performance measures that could be used to track changes in FBOs attitudes, and the extent to which this impacted behaviour; though this has not been carried out.

Problems with previous toolkits for identifying different FBOs: The various characterizations of FBOs presented in these earlier papers have since been empirically investigated. Nayak and Waterson (2017)⁸⁰ conducted a study on a group of industry stakeholders (Environmental Health Officers, Food and Beverage Managers, Academics) regarding their understanding of food safety culture, as well as their views on Wright et al's (2012) tool kit. While the tool kit received favourable comments from various stakeholders, concerns were raised. Specifically, the length of the document, the repetitive nature of the document, the complicated titles used in the categorization of FBOS – there was over classification, difficulty in capturing the scale/size of the FBO, and the various categories that might apply to different elements (e.g., production, packaging, cleaning and transport) of the food business chain. More to the point, the authors concluded that the tool kit needed to be succinct, comprehensive, reliable, valid, and easily implemented, and that it ought to be incorporated as a small addition to the Food Hygiene Rating Scheme (FHRS) or the confidence management systems. Put simply, while there was enthusiasm for Wright et al (2012)'s toolkit, but in its current state it was viewed as unwieldy and over complicated. Also, the report by Brook Lyndhurst (2012) that proposed

⁷⁷ Hawkins, K. (1984). *Enforcement and environment*. Oxford: Oxford University Press

⁷⁸ Kagan, R., & Scholtz, J. (1984). *The criminology of the corporation and regulatory enforcement strategies*. In K. Hawkins & J. Thomas (Eds.), *Enforcing regulation*. Boston: Kluwer-Nijhoff.

⁷⁹ FSA Brook Lyndhurst report (2012). *Segmentation of small and medium-sized food enterprises | A report for the Food Standards Agency*.

⁸⁰ Nayak, R., & Waterson, P. (2017). *The Assessment of Food Safety Culture: An investigation of current challenges, barriers and future opportunities within the food industry*. *Food Control*, 73, 1114-1123.

a segmentation model of small and medium sized FBOs⁸¹ suffers slightly from basic methodological issues. For instance, the evidence supporting their Segmentation model is based on 4 focus groups comprised of 6-8 representatives from small and medium sized FBOs, and follow up survey work on approximately 15 representatives from small and medium sized FBOs. The data set seems to be rather small, and no follow work was conducted to assess the reliability of the segmentation model, however the insights from the model do reveal similar patterns to those that appear in other toolkits.

A simpler toolkit for identifying different types of FBOs: To help find a way to simplify the various insights that have tried to categorize FBO behaviour in meaningful ways the starting point here was to consider if there were underlying similarities in approaches. Looking closely, there are family resemblances across the various reports examining differences in FBO behaviour, and they do so according to risk.

To condense them, and in a scrupulous way, based on prior work in economics and organizational research ^{82 83 84}, Table 4 (for a comprehensive version see Appendix II) presents the mapping of the different prior methods of characterising FBOs attitudes/behaviours, onto a simple FBO’s perceived risk attitude: risk seeking, risk neutral or risk averse.

Table 4. Perceived Risk-attitude towards compliance and enforcement ⁸⁵

Perceived	Risk Seeking	Risk Neutral	Risk Averse
FBOs	FBOs that are non-compliant, or doubt the relevance of compliance	FBOs that are indifferent to the relevance of compliance	FBOs that are proactively compliant
Cost vs. Benefit of compliance	High/Low	Moderate/Moderate	Low/High
AOs	AOs perceiving FBOs as non-compliant, or doubt the relevance of compliance	AOs perceiving FBOs as indifferent to the relevance of compliance	AOs perceiving FBOs as proactively compliant
Cost vs. Benefit of enforcement	High/Low	Moderate/Moderate	Low/High

In each case characterised below compliance includes all aspects of food safety: effect food handling and storage, hygiene and maintenance (e.g. storage at unsafe temperatures, inadequate cleaning, pest infestations, etc.).

Risk Seeking FBOs: To put the details of Table 4 in context, FBOs that are risk seeking will appraise a situation in which they have to make a decision regarding compliance, and will likely assign a **high cost to compliance** (e.g., effort, time, and financial resources needed to change behaviour), and **low benefit of compliance** (e.g., adherence to FHR/IS, FSMS, CIM, HACCP, establishing a good reputation).

⁸¹ FSA Brook Lyndhurst report (2012). Segmentation of small and medium-sized food enterprises | A report for the Food Standards Agency.

⁸² Nooteboom, B. (1996), "Trust, opportunism and governance – a process and control model", *Organizational Studies*, Vol. 66, pp. 3-21

⁸³ Nooteboom, B. (2004), *Inter-firm Collaboration, Learning and Networks: An Integrated Approach*, Routledge, London

⁸⁴ Hirschauer, N., Bavorová, M., & Martino, G. (2012). An analytical framework for a behavioural analysis of non-compliance in food supply chains. *British Food Journal*, 114(9), 1212-1227.

⁸⁵ For an extended detailed version see Appendix II

Risk Neutral FBOs: FBOs that are risk neutral will likely assign a **moderate cost to compliance** (e.g., effort, time, and financial resources needed to change behaviour), and equally will assign a **moderate benefit of compliance** (e.g., adherence to FHR/IS, FSMS, CIM, HACCP, establishing a good reputation).

Risk Averse FBOs: FBOs that are **risk averse** will appraise a situation in which they have to make a decision regarding compliance, and will likely assign a **low cost of compliance** (e.g., effort, time, and financial resources needed to change behaviour), and a **high benefit of compliance** (e.g., adherence to FHR/IS, FSMS, CIM, HACCP, establishing a good reputation).

Prediction: Further condensing the insights from Table 4, bearing in mind that perceived risk-attitude depends on weighing up the benefits of compliance against the costs (e.g., effort, time, money), based on the value-effort decision-making model, the prediction is: **As perceived risk attitude veers towards risk averse, the perceived cost of compliance looms less.**

Evidence to support prediction: Consistent with the prediction, there is plenty of evidence to suggest that FBOs perceive the costs of compliance relative to the benefits of compliance^{86 87 88 89 90 91}. Regardless of size of FBO, the perceptions of small business owners, managers of larger FBOs, and shop floor workers, take into account the costs of compliance relative to the gains in real terms. The perceptions reflect the value they assign to the amount of effort needed to change behaviour to improve compliance against the estimated value in returns as a result of changing behaviour to improve compliance.

Attempts to change perceived risk attitudes: Of course, these perceived risk-attitudes, are just that, they are perceived, and this also means that they are amenable to change. For instance, the perceived costs to maintaining high levels of food hygiene are often based on misinformed concerns. There is work showing a reliable association between the amount of knowledge food handlers have of food hygiene and their attitudes and behaviour towards food hygiene^{92 93 94}. The more accurate the knowledge, the better the attitude, and the more hygienic the food handling is.

In addition, the general findings show that the more knowledge and training managers and food handling staff have, the more they are likely to see the importance of food hygiene practices (e.g., hand washing, storing food at correct temperatures). However, the impact of training of this kind diminishes if training isn't maintained or if there isn't any specific

⁸⁶ Pennings, J. M., & Smidts, A. (2000). Assessing the construct validity of risk attitude. *Management Science*, 46(10), 1337-1348.

⁸⁷ Mari, Nevas, Kalenius Saija, Lundén Janne (2013). "Significance of official food control in food safety: Food business operators' perceptions." *Food Control* 31(1): 59-64

⁸⁸ Lupo, C., Wilmart, O., Van Huffel, X., Dal Pozzo, F., & Saegerman, C. (2016). Stakeholders' perceptions, attitudes and practices towards risk prevention in the food chain. *Food Control*, 66, 158-165.

⁸⁹ Djekic, Ilija, Nada Smigic, Eleni P. Kalogianni, Ada Rocha, Lamprini Zamioudi, and Rita Pacheco. "Food hygiene practices in different food establishments." *Food control* 39 (2014): 34-40

⁹⁰ FSA (2012) Compliance and enforcement strategy

⁹¹ FSA report (2015) Evidence review of regulation culture and behaviours

⁹² Lääkkö-Roto, T., & Nevas, M. (2014). Restaurant business operators' knowledge of food hygiene and their attitudes toward official food control affect the hygiene in their restaurants. *Food control*, 43, 65-73.

⁹³ Soares, K., Garcia-Diez, J., Esteves, A., Oliveira, I., & Saraiva, C. (2013). Evaluation of food safety training on hygienic conditions in food establishments. *Food Control*, 34, 613-618.

⁹⁴ McIntyre, L., Vallaster, L., Wilcott, L., Henderson, S., & Kosatsky, T. (2013). Evaluation of food safety knowledge, attitudes and self-reported hand washing practices in FOODSAFE trained and untrained food handlers in British Columbia, Canada. *Food Control*, 30, 150-156.

regular training incorporated into the employees working schedules, and/or as part of an appraisal programme^{95 96 97 98}.

That is, FBOs may see the cost of changing their food hygiene practices as quite high (i.e. they have to put a lot of effort into changing their behaviour). But this is often based on misperceptions around the amount of effort needed to improve hygiene standards. In some instances, FBOs are willing to take the risk associated with low compliance or non-compliance, because in weighing up the costs and benefits, the cost of doing nothing is significantly less than the perceived cost in changing behaviour. What the findings reviewed here suggest is that this perceived risk attitude is susceptible to change through training, but this has to be sustained, because once the training stops, the improvements in behavioural change quickly diminish.

Associating size of FBO to perceived risk-attitude: Available resources (both human and financial) does appear to be a key factor that distinguishes Large FBOs from medium, small, and certainly micro FBOs^{99 100 101 102 103}, and this in turn contributes in a significant way to perceived risk attitude towards compliance. The bigger the FBO the lower the perceived cost of compliance, because of the available resources dedicated to comply; though the level of compliance does matter (i.e. broad vs. full compliance).

Nevertheless, regardless of size of FBO, the relevance of risk prevention measures to FBOs depends on the frequency of visitations of local inspectors, because this provides the easiest access to food legislation. The more frequent the inspection visits are the more relevant food safety becomes, and in turn, the greater the perceived benefits to compliance increase^{104 105}. Much like the evidence concerning knowledge and awareness of food hygiene, the more prominent the aspect of food safety practice becomes to the FBO, the more likely they are to respond to it. But, the critical issue is the translation of these changes in perception to practice, this is clearly where the size of the FBO matters,

⁹⁵ Soares, L., Almeida, R., Cerqueira, E., Carvalho, J., & Nunes, I. (2012). Knowledge, attitudes and practices in food safety and the presence of coagulase-positive staphylococci on hands of food handlers in the school of Camacari, Brazil. *Food Control*, 27, 206-213.

⁹⁶ Buccheri, C., Mammina, C., Giammanco, S., Giammanco, M., La Guardia, M., & Casuccio, A. (2010). Knowledge, attitudes and self-reported practices of food service staff in nursing homes and long-term care facilities. *Food Control*, 21, 1367e1373

⁹⁷ Park, S.-H., Kwak, T.-K., & Chang, H.-J. (2010). Evaluation of the food safety training for food handlers in restaurant operations. *Nutrition Research and Practice*, 4(1), 58-68.

⁹⁸ Roberts, K., & Barret, B. (2009). Behavioral, normative, and control beliefs impacts on the intention to offer food safety training to employees. *Food Protection Trends*, 29(1), 21-30.

⁹⁹ Mari, Nevas, Kalenius Saija, Lundén Janne (2013). "Significance of official food control in food safety: Food business operators' perceptions." *Food Control* 31(1): 59-64

¹⁰⁰ Bradford-Knox, R., & Kane, K. (2014). Safe and Local Supplier Approval—A case study of the third party supplier approval scheme for micro and small food businesses. *International journal of management and applied research*, 1(1), 30-47.

¹⁰¹ Yapp, C., & Fairman, R. (2005). Assessing compliance with food safety legislation in small businesses. *British food journal*, 107(3), 150-161.

¹⁰² Fielding, L.; Ellis L.; Clayton D. and Peters, A. (2011), "An evaluation of process specific information resources, aimed at hazard analysis, in Small and Medium Enterprises in food manufacturing", *Food Control*, Vol. 22, No. 8, pp. 1171-1177.

¹⁰³ Taylor, E and Kane, K, (2005), "Reducing the burden of HACCP on SMEs", *Food Control*, Vol. 16, No. 10, pp. 833-839

¹⁰⁴ Mari, N., Saija, K., & Janne, L. (2013). Significance of official food control in food safety: Food business operators' perceptions. *Food control*, 31(1), 59-64.

¹⁰⁵ Lupo, C., Wilmart, O., Van Huffel, X., Dal Pozzo, F., & Saegerman, C. (2016). Stakeholders' perceptions, attitudes and practices towards risk prevention in the food chain. *Food Control*, 66, 158-165

because the perceived cost of implementation is going to be lower, if there are available resources (human, financial) to deploy in order to increase food safety practices^{106 107}.

AOs variation in perceived risk attitude: Correspondingly with AOs, there is variation in the perceived level of effort in enforcement; this tracks their own variation in perceived risk-attitude¹⁰⁸, and this might also help to explain another well-known feature of AOs behaviour. Several studies examining AOs suggests a high level of inconsistency in food hygiene assessment^{109 110 111 112 113 114}. This is due to several factors, most of which can be reduced to AOs perceptions of FBOs willingness to comply, which are subject to biases, in much the same way as FBOs misperceive the cost of compliance. For instance, previous negative reports of a facility can later bias an AOs future assessment of the same facility in such a way that a future inspection report inaccurately anchors on the previous unfavourable assessment¹¹⁵. Table 4 present the complement of perceived risk perceptions of AOs, largely based on the literature examining inconsistencies in judgments and assessment practices of AOs. What it suggests is that AOs can also be profiled in terms of their perceived risk attitudes towards enforcement, which can be broadly categorized as risk averse, risk neutral and risk seeking; this could be aligned with objective measures of FBO compliance to determine their reliability

The relationship between AOs and FBOs and the knock on effects on compliance: The consistent message from a large body of empirical work, suggests that, AOs enforcement actions are adjusted to the control history and behaviour of the FBO. This is a sensible and efficient approach to promoting compliance among regulated business. AOs need to establish a rapport with FBOs in order to establish an effective relationship. But the variability in how AOs profile FBO's behaviour, their understanding of national guidelines, and how they perceive FBOs with respect to their attitudes towards compliance is in turn going to impact AOs interactions (and assessment) with FBOs^{116 117}

¹⁰⁶ Sampers I., Hajime, T., , Pieternel, A., Mieke, U., & Jacxsens, L., (2012). "Semi-quantitative study to evaluate the performance of a HACCP-based food safety management system in Japanese milk processing plants." *Food Control* **23**(1): 227-233

¹⁰⁷ FSA report (2015) Evidence review of regulation culture and behaviours.

<https://www.food.gov.uk/sites/default/files/Evidence%20Review%20on%20Regulation%20Culture%20and%20Behaviours.pdf>

¹⁰⁸ Kettunen, K., Nevas, M., & Lundén, J. (2017). Challenges in using administrative enforcement measures in local food control. *Food Control*, *76*, 34-41.

¹⁰⁹ Nieboer, J., Reader, T., & Leardini, D. (2015). Consistency and cognitive influences on the expert judgement of Environmental Health Officers. FSA report. <https://www.food.gov.uk/sites/default/files/consistency-regulatory-work-research2.pdf>

¹¹⁰ Shah, H. (2015). Analysis of LAEMS data to inform a study on inconsistencies in the delivery of official food safety controls <https://www.food.gov.uk/sites/default/files/consistency-regulatory-work-research3.pdf>

¹¹¹ Lee-Woolf, C., Bain, J. & Fell, D. (2015) Consistency in the delivery of official food safety controls: the role of organisational-level factors. A report for the Food Standards Agency.

<https://www.food.gov.uk/sites/default/files/consistency-regulatory-work-research4.pdf>

¹¹² Kettunen, K., Pesonen, S., Lundén, J., & Nevas, M. (2017). Consistency and risk-basis of using administrative enforcement measures in local food control. *Food Control*

¹¹³ Yapp, C., & Fairman, R. (2006). Factors affecting food safety compliance within small and medium-sized enterprises: implications for regulatory and enforcement strategies. *Food Control*, *17*(1), 42-51.

¹¹⁴ <https://www.food.gov.uk/sites/default/files/consistency-regulatory-work-research4.pdf>

¹¹⁵ Nieboer, J., Reader, T., & Leardini, D. (2015). Consistency and cognitive influences on the expert judgement of Environmental Health Officers. FSA report. <https://www.food.gov.uk/sites/default/files/consistency-regulatory-work-research2.pdf>

¹¹⁶ Läikkö-Roto, T., & Nevas, M. (2014). Auditing local official food control: Perceptions of auditors and auditees. *Food Control*, *37*, 135-140.

¹¹⁷ Läikkö-Roto, T., Mäkelä, S., Lundén, J., Heikkilä, J., & Nevas, M. (2015). Consistency in inspection processes of food control officials and efficacy of official controls in restaurants in Finland. *Food Control*, *57*, 341-350

¹¹⁸ ¹¹⁹. This has consequences for FBOs perceptions of the costs and benefits of compliance.

Consistency in enforcement: If it appears that there is limited harmonisation of enforcement actions, given the well documented inconsistencies in the delivery of food safety controls, then FBOs will shift their perceived risk-attitude perceptions from risk averse to risk neutral, or else maintain their risk seeking attitude towards compliance [i.e. show a preference towards non-compliance/limited compliance]. That is, if there is inconsistency in the way AOs perceive FBOs when they conduct their assessment, based on variability in their understanding of national guidelines, and control practices, then this can undermine the credibility of the regulatory process in the mind of FBOs, regardless of size. In real terms, what it will do is likely reinforce those FBOs with perceived risk-seeking or risk-neutral attitudes, because their limited interest in complying is further validated if they judge the enforcement process of compliance as lacking in coherence and therefore credibility.

Summary of Perceived-Risk attitude

As a modern regulator, the FSA's ROF programme proposes a bespoke method of co-regulation that is sensitive to differences in FBO behaviour. To achieve this, the regulator first has a duty to educate and reduce inconsistencies in AOs delivery of food safety controls and create a uniform approach to the understanding of enforcement actions. The evidence suggest that this is of particular importance because how AOs behave influences FBOs perceptions (i.e. perceived-risk attitude) of the relevance of compliance with respect to the costs and benefits associated with improving compliance. There would be little reason for FBOs to change their perceptions if the enforcement process is seen to be incoherent.

¹¹⁸ Hutter, B.M., & Amodu, T. (2009). Risk regulation and compliance: Food safety in the UK. London School of Economics and Political Science

¹¹⁹ Kettunen, K., Lundén, J., Läikkö-Roto, T., & Nevas, M. (2017). Towards more consistent and effective food control: learning from the views of food business operators. *International Journal of Environmental Health Research*, 1-15

EVDM model: Intention-Action gap in relation to effort and rewards

This section focuses on detailing behaviour with respect to the second component of the Effort-Value based decision-making model, which is the discrepancy between what the FBOs indicate they will do with respect to compliance, and what they actually do (see Figure 7).

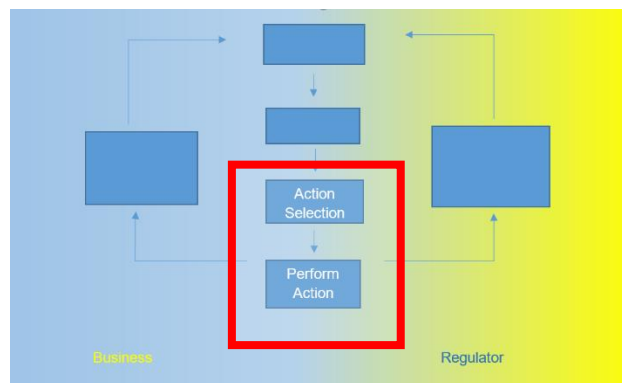


Figure 7. Intention-action gap respect to the Dynamic-Value-Effort Decision-Making Model

Intention-action gap in general: The Dynamic-Value-Effort Decision-Making model separates choosing actions (action selection) from performing actions, because this helps capture a well-known distinction in psychological literature. This is the intention-action gap¹²⁰ (alternatively referred to as the value-action gap¹²¹, intention-behaviour gap¹²², attitude-action gap¹²³, judgment-action gap¹²⁴). Essentially this is the difference that occurs between what people say they aim to do (i.e. in the model - selecting an action to perform), and what they actually end up doing (i.e. in the model - the actual action that is performed).

Prediction: What the decision sciences literature suggests is that, at the point at which people appraise a situation, they will consider the costs in time, financial resources, and effort needed to carry them out, and this will be weighed up against the potential benefits, whatever objective or subjective rewards they might be. The problem is that, there are

¹²⁰ Fogassi, L., Ferrari, P. F., Gesierich, B., Rozzi, S., Chersi, F., & Rizzolatti, G. (2005). Parietal lobe: from action organization to intention understanding. *Science*, 308(5722), 662-667.

¹²¹ Blake, J. (1999). Overcoming the 'value-action gap' in environmental policy: Tensions between national policy and local experience. *Local environment*, 4(3), 257-278.

¹²² Rhodes, R. E., & Bruijn, G. J. (2013). How big is the physical activity intention-behaviour gap? A meta-analysis using the action control framework. *British journal of health psychology*, 18(2), 296-309

¹²³ Warner, L. G., & DeFleur, M. L. (1969). Attitude as an interactional concept: Social constraint and social distance as intervening variables between attitudes and action. *American Sociological Review*, 153-169.

¹²⁴ Jennings, P. L., Mitchell, M. S., & Hannah, S. T. (2015). The moral self: A review and integration of the literature. *Journal of Organizational Behavior*, 36, S104-S168

many occasions in which at the point of choosing an action, it may well be judged to be worth carrying out despite the costs, but at the point at which the action needs to be carried out, the costs appear to loom larger than the gains, and the action isn't performed^{125 126 127 128 129}. This leads to the following prediction: ***The gap between intending to improve compliance, and actually improve compliance, will be reduced depending on the available resources the FBO has to meet the perceived costs of compliance.***

Illustration of how the prediction applies to FBO behaviour: To illustrate, after an inspection is carried out, the FBO might communicate that they understand what is needed for them to change their practices (e.g. change the temperature settings on the fridge, limit the amount of times food is re-heated, ensure staff wash their hands regularly) to ensure better compliance. However well intended the FBO may be, when an inspector returns, none of the changes in behaviour have been implemented. This is an example of the intention-action gap, where there is an intention to change behaviour, and at this point the effort to change behaviour to improve compliance is traded-off against the potential benefit, such that value of greater compliance outweighs the cost in effort. But, when it came to actually implementing the changes in behaviour, a re-appraisal occurs, and the cost of behavioural change is seen to outweigh the gains achieved through greater compliance. The reasons for this are because of the effort costs that become more obvious at the point of having to implement an action, which at the point of choosing an action are less obvious, or else ignored. In this example, any effort needed to enforce compliance would require targeting the FBOs' perceptions of the relative costs incurred in actually complying, which in reality may be considerably lower than what the FBOs perceives them to be.

Support for the prediction: This type of example is well documented in the literature examining FBO non-compliance^{130 131 132}. The willingness to comply for many FBOs is genuine, but countermending factors such as lack of time, continuing lack of relevant knowledge, financial resources, expertise, human resources, and limited experience in action planning, means that these detracting factors become salient at the point at which implementation of behavioural change should take place.

Characterization of Intention-action gap according to different risk attitudes:

Table 5 presents a characterisation of the extent to which the gap between willingness to comply and actually complying (or maintaining/improving compliance) plays out with

¹²⁵ Akerlof GA. Procrastination and obedience. *The American Economic Review*. 1991;81(2):1-19

¹²⁶ Sniehotta FF, Scholz U, Schwarzer R. Bridging the intention-behaviour gap: Planning, self-efficacy, and action control in the adoption and maintenance of physical exercise. *Psychology & Health*. 2005;20(2):143-60

¹²⁷ Blake J. Overcoming the 'value-action gap' in environmental policy: Tensions between national policy and local experience. *Local environment*. 1999;4(3):257-78

¹²⁸ Rhodes RE, Buijn GJ. How big is the physical activity intention-behaviour gap? A meta-analysis using the action control framework. *British journal of health psychology*. 2013;18(2):296-309

¹²⁹ Godin G, Conner M, Sheeran P. Bridging the intention-behaviour gap: The role of moral norm. *British journal of social psychology*. 2005;44(4):497-512

¹³⁰ Brough, M., Davies, B., & Johnstone, E. (2016). Inside the black box of food safety: a qualitative study of 'non-compliance' among food businesses. *Health Promotion Journal of Australia*, 27(1), 10-14.

¹³¹ FSA report (2015) Evidence review of regulation culture and behaviours. <https://www.food.gov.uk/sites/default/files/Evidence%20Review%20on%20Regulation%20Culture%20and%20Behaviours.pdf>

¹³² Luu, P. H., Davies, B., & Dunne, M. P. (2017). The association between factors which affect the food safety practices of seafood distributors within the southern domestic distribution chains in Vietnam. *Food Control*, 73, 332-340

respect to the different types of FBO. The greater the perceived costs in compliance are the greater the effort needed to actually comply, which means that for some FBOs, continual effort from AOs is needed through various food safety control activities in order to reduce the gap.

Table 5. Gap between intention and action towards compliance and enforcement

Perceived	<i>Risk Seeking</i>	<i>Risk Neutral</i>	<i>Risk Averse</i>
FBOs	FBOs that are non-compliant, or doubt the relevance of compliance	FBOs that are indifferent to the relevance of compliance	FBOs that are proactively compliant
Gap between willingness to comply and complying	High	Moderate	Low
AOs	AOs perceiving FBOs as non-compliant, or doubt the relevance of compliance	AOs perceiving FBOs as indifferent to the relevance of compliance	AOs perceiving FBOs as proactively compliant
Effort required to enforce compliance	High	Moderate	Low

Risk Seeking FBOs: FBOs that are risk seeking will appraise a situation in which they have to make a decision regarding compliance, and will likely assign a **high** cost to compliance (e.g., effort, time, and financial resources needed to change behaviour), and **low** benefit of compliance (e.g., adherence to FHR/IS, FSMS, CIM, HACCP, establishing a good reputation). This means that the gap between showing willingness to comply and actually complying will remain considerably **high**.

Risk Neutral FBOs: FBOs that are risk neutral will likely assign a **moderate** cost to compliance (e.g., effort, time, and financial resources needed to change behaviour), and equally will assign a **moderate** benefit of compliance (e.g., adherence to FHR/IS, FSMS, CIM, HACCP, establishing a good reputation). This means that the gap between showing willingness to comply and actually complying is **moderate**.

Risk Averse FBOs: FBOs that are **risk averse** will appraise a situation in which they have to make a decision regarding compliance, and will likely assign a **low** cost of compliance (e.g., effort, time, and financial resources needed to change behaviour), and a **high** benefit of compliance (e.g., adherence to FHR/IS, FSMS, CIM, HACCP, establishing a good reputation). This means that the gap between showing willingness to comply and actually complying is **low**.

Asymmetric appreciation of compliance: FBOs willingness to comply and eventual compliance (or improving compliance) may be seen as an end in itself for AOs concerned with the delivery of food safety control¹³³. But for FBOs this is not necessarily the case. This is because FBOs willingness to comply and eventual compliance (or improvements

¹³³ FSA report (2015) Evidence review of regulation culture and behaviours. <https://www.food.gov.uk/sites/default/files/Evidence%20Review%20on%20Regulation%20Culture%20and%20Behaviours.pdf>

in compliance) is likely to be tied to other factors that directly feed into the FBOs underlying incentives^{134 135 136}

^{137 138 139 140}, such as the relative impact on their consumer base. Thus, if FBOs have a poor record of food safety standards, they may only see the relevance of behavioural change, if they experience negative coverage in local national media, online critical feedback from consumers, negative ratings on online consumer forums, reduced customer loyalty, and reputational damage from negative perceptions. As an aside, some FBOs have noted the potential stresses of inspections, and that a willingness to comply would be motivated by a need to avoid regular inspections^{141 142}. Thus, the extent to which the gap can be bridged between intending to improve compliance and actually changing behaviour in order to improve compliance depends on the impact this will have on the incentives that drive business.

AOs attempts to bridging the intention-action gap: Table 5 also outlines the relative effort needed by AOs to bridge the gap between willingness to comply and actually complying. There are different levels of compliance ranging from broad to full compliance. As suggested by various grey papers^{143 144 145}, full compliance is associated with food businesses that go beyond minimum legal standards; in practice, this means sustaining a high level of compliance and exceeding national guidelines or industry code of recommended practice. This might to be the gold standard that AOs would want FBOs to work towards, but, given limitations in available resources that AOs and LAs have, regarding time, effort, human resources, AOs also face a gap between their ultimate intentions to achieve full compliance, and the effort needed to ensure some form of broad compliance. The bigger the estimated gap between FBOs willingness to improve and actually improving is, the more time and effort the AOs will have to put into reducing the gap. To introduce efficiencies in the food control activities, AOs are likely to adjust what

¹³⁴ Tomašević, I., Šmigijć, N., Đekić, I., Zarić, V., Tomić, N., Miocinovic, J., & Rajković, A. (2016). Evaluation of food safety management systems in Serbian dairy industry. *Mljekarstvo/Dairy*, 66(1).

¹³⁵ Powell, D. A., Jacob, C. J., & Chapman, B. J. (2011). Enhancing food safety culture to reduce rates of foodborne illness. *Food Control*, 22(6), 817-82

¹³⁶ Hirschauer, N., Scheerer, S., & Zvoll, S. (2007). Few considerations for the prevention of deviance and economic white-collar crime in the food sector. *JOURNAL OF CONSUMER PROTECTION AND FOOD SAFETY*, 2(3), 259-271

¹³⁷ Grob, K. (2017). The European system for the control of the safety of food-contact materials needs restructuring: a review and outlook for discussion. *Food Additives & Contaminants: Part A*, 34(9), 1643-1659

¹³⁸ Kettunen, K., Nevas, M., & Lundén, J. (2015). Effectiveness of enforcement measures in local food control in Finland. *Food Control*, 56, 41-46.

¹³⁹ Mandarino, P. (2017). *Temporary Restaurant Closures and Food Handling Violations: Inspection Reports in British Columbia* (Doctoral dissertation, Walden University)

¹⁴⁰ Beber, C., Padilla, M., Razès, M., Fort, F., & Rastoin, J. L. (2016). Sustainability of processed foods supply chain: Social, economic and territorial performance. In *BIO Web of Conferences* (Vol. 7, p. 03009). EDP Sciences.

¹⁴¹ Brough, M., Davies, B., & Johnstone, E. (2016). Inside the black box of food safety: a qualitative study of 'non-compliance' among food businesses. *Health Promotion Journal of Australia*, 27(1), 10-14.

¹⁴² Martinez, M. G., Fearne, A., Caswell, J. A., & Henson, S. (2007). Co-regulation as a possible model for food safety governance: Opportunities for public-private partnerships. *Food Policy*, 32(3), 299-314.

¹⁴³ FSA report (2015) Evidence review of regulation culture and behaviours.

<https://www.food.gov.uk/sites/default/files/Evidence%20Review%20on%20Regulation%20Culture%20and%20Behaviours.pdf>

¹⁴⁴ FSA report (2012) Qualitative review of food safety regulatory decision-making behaviour
<https://www.food.gov.uk/science/research/choiceandstandardsresearch/fs245004>

¹⁴⁵ FSA (2012) Compliance and enforcement strategy

<https://www.food.gov.uk/sites/default/files/multimedia/pdfs/enforcement/compliance.pdf>

they can feasibly do to support any improvements, and the adjustment will be determined by how big they judge the intention-action gap of the FBO to be.

Relationship between size of intention-action gap and size of FBO: Just as perceived risk-attitude will determine the way in which FBOs will estimate the relative costs and benefits to compliance, the same goes for reducing the intention-action gap. An important point to highlight here, that reflects sensitivity to the size of the FBOs, is that FBOs may initially see the value of the time and effort needed to comply, but when it comes to actually implementing change, their re-appraisal leads them to shift the onus of responsibility onto AOs¹⁴⁶. This seems to be typical for smaller FBOs that display large intention-action gaps. In contrast, for large FBOs the intention-action gap can be small simply because they can take advantage of their available resources (human, financial) to enact changes needed to reach broad or even full compliance on a regular basis.

The relationship between AOs and FBOs and the knock on effects on compliance: The complement between FBOs and AOs behaviour, and the interactive nature of this relationship has consequences for the intention-action gap, just as it did for perceived risk-attitudes. AOs will judge their role in bridging the FBOs intention-action gap relative to the effort needed to do so. For instance, Bukowski et al noted, “AOs could often recognise that FBOs were in need of a consultant, sympathetic to the amount of time and effort that compliance required, especially for small businesses, but they did not see it as their job to fill this role.” (p54, 2012). This helps to illustrate the importance, as articulated throughout this report, of examining the behaviour of FBOs relative to the interactions they have with AOs. If FBOs, particularly micro and small FBOs consider the costs of ensuring compliance as high, even if there is a willingness to comply (as noted by much of the literature), then at the point of attempting to introduce changes in their practices, they will likely defer responsibility back to AOs. This might be because there is still a lack of clarity and ambiguity in what changes the FBOs need to make, or there is a great level of difficulty in introducing those changes, or there is simply a lack of interest in changing behaviour once the day to day activities of running the business take precedent.

More to the point, one concern regarding AOs interventions and enforcement practices, as documented by several studies examining lack of consistency of expert judgments of AOs (see previous section for details), is what AOs prioritize as areas for change in the food safety practices of FBOs. Taking a check list approach, without developing an overall picture of the FBOs food safety culture, can lead to an over identification of visible evidence of food safety, such as cleanliness of the facility, or hand washing provisions. This is why HACCP and other initiatives are seen as more effective approaches in orienting inspectors towards a fuller picture of the cultural aspect of the FBOs food safety practices. This translates back to the issue of effort against relative rewards. In order to streamline the delivery of food safety controls, an AO can also face a gap between intending for the FBO to achieve full compliance on a regular basis and the efforts needed to help the FBO achieve full compliance. Therefore, biases that help short cut behaviour are likely to creep into the practices of AOs because the AOs judge the effort needed to reduce the intention-action gap to be high/moderate.

If the judged gap between willingness to comply and likely change in effort to comply of FBOs is high, this in turn requires a high level of effort from AOs to reduce the gap. There

¹⁴⁶ Yapp, C., Fairman, R., 2006. Factors affecting food safety compliance within small and medium-sized enterprises: implications for regulatory and enforcement strategies. *Food Control* 17 (1), 42–51.

may be inconsistencies in the AOs delivery of food safety controls to help reduce the gap because of differences in available human resources. This in turn means some AOs resort to developing sort cuts that reduce their burden, but incidentally continue to foster the gap. This provides a rationale for why in some cases there is an over reliance on attending to visible evidence of food safety at the expense of assessing and monitoring the business' management of food safety in depth.

Effective reduction of the intention-action gap: The literature ^{147 148 149 150 151} suggests that FBOs (mis)perceived costs to compliance (by overstating them); these include such factors as lack of time, continuing lack of relevant knowledge, financial resources, expertise, human resources, and variable knowledge in action planning. Assuming that in most cases, simple minor changes to food safety practices are achievable, and require low levels of effort, then reducing the intention-action gap amongst several FBOs (regardless of size) is possible. This requires targeting two essential factors:

1) simplifying the methods of communication to FBOs as to what those changes to food practice need to implemented

2) communicating those changes in relative terms that connect to the specific incentives that the FBOs operate under

Clearly what should matter is the alignment of the goals of the AOs with the goals of the FBOs. In both cases the most obvious basis of alignment is the cost of enforcement of compliance, and the cost of actually complying. Though the complement to this is more relevant, and that is the benefits in reducing efforts in the enforcement of compliance. The benefits of compliance with respect to FBO incentives includes reputation building/maintenance, maintaining a loyal consumer base, and maintaining a competitive edge through demonstrable best practice, to name but a few.

¹⁴⁷ Brough, M., Davies, B., & Johnstone, E. (2016). Inside the black box of food safety: a qualitative study of 'non-compliance' among food businesses. *Health Promotion Journal of Australia*, 27(1), 10-14.

¹⁴⁸ FSA report (2015) Evidence review of regulation culture and behaviours. <https://www.food.gov.uk/sites/default/files/Evidence%20Review%20on%20Regulation%20Culture%20and%20Behaviours.pdf>

¹⁴⁹ Luu, P. H., Davies, B., & Dunne, M. P. (2017). The association between factors which affect the food safety practices of seafood distributors within the southern domestic distribution chains in Vietnam. *Food Control*, 73, 332-340

¹⁵⁰ Heikkilä, J., Heinola, K., Läikkö-Roto, T., & Nevas, M. (2016). Evaluating the determinants of public and private costs of local food control. *Food Control*, 70, 145-151.

¹⁵¹ Yapp, C., Fairman, R., 2006. Factors affecting food safety compliance within small and medium-sized enterprises: implications for regulatory and enforcement strategies. *Food Control* 17 (1), 42–51.

Neither of these two identified factors is new, since several white and grey papers have been making the same suggestions for some time now ^{152 153 154 155 156 157 158 159 160}

^{161 162 163 164 165 166 167 168 169 170 171}. Furthermore, the aim of this review is not to reinvent a well-worn wheel. However, the contribution that this review makes, is to provide a rationale for **why** these two factors matter using a decision science model that explains the underlying decision processes of FBOs and AOs.

In the UK the types of interventions that an AO has at their disposal can be grouped into non-official (e.g., advice, education training) and official (e.g., inspection, monitoring, surveillance, auditing) methods. At the stage at which formal enforcement action is needed, the enforcement pathway goes from warning letters, improvement notices, prohibition, cautions to prosecution. What much of the cited literature says is that non-official and official interventions vary by how the AO carries them out, which has been

¹⁵² FSA report (2015) Evidence review of regulation culture and behaviours. <https://www.food.gov.uk/sites/default/files/Evidence%20Review%20on%20Regulation%20Culture%20and%20Behaviours.pdf>

¹⁵³ FSA report (2012) Qualitative review of food safety regulatory decision-making behaviour <https://www.food.gov.uk/science/research/choiceandstandardsresearch/fs245004>

¹⁵⁴ FSA (2012) Compliance and enforcement strategy <https://www.food.gov.uk/sites/default/files/multimedia/pdfs/enforcement/compliance.pdf>

¹⁵⁵ FSA (2012) report Compliance and Enforcement strategy. <https://www.food.gov.uk/enforcement/enforcework/compliance>

¹⁵⁶ Mari, N., Saija, K., & Janne, L. (2013). Significance of official food control in food safety: Food business operators' perceptions. *Food control*, 31(1), 59-64.

¹⁵⁷ Serafim, A. L., Hecktheuer, L. H. R., Stangarlin-Fiori, L., Medeiros, L. B., Martello, L., & Machado, C. E. (2015). Evaluation of the implementation of good handling practices in food and beverage areas of hotels. *Journal of food protection*, 78(11), 2043-2051.

¹⁵⁸ Powell, D. A., Jacob, C. J., & Chapman, B. J. (2011). Enhancing food safety culture to reduce rates of foodborne illness. *Food Control*, 22(6), 817-822

¹⁵⁹ Hirschauer, N., Scheerer, S., & Zwoll, S. (2007). Few considerations for the prevention of deviance and economic white-collar crime in the food sector. *JOURNAL OF CONSUMER PROTECTION AND FOOD SAFETY*, 2(3), 259-271

¹⁶⁰ Stangarlin-Fiori, L., Medeiros, L. B., Serafim, A. L., Bertin, R. L., Medeiros, C. O., & Hecktheuer, L. H. (2016). Good hygiene practices in hospital nutrition services: the view of internal and external auditors. *Food Science and Technology (Campinas)*, (AHEAD), 0-0.

¹⁶¹ Kettunen, K., Lundén, J., Lääkkö-Roto, T., & Nevas, M. (2017). Towards more consistent and effective food control: learning from the views of food business operators. *International Journal of Environmental Health Research*, 1-15.

¹⁶² Freeman, J. T., Dawson, L., Jowitt, D. M., White, M., Callard, H., Sieczkowski, C., ... & Roberts, S. A. (2016). The impact of the Hand Hygiene New Zealand programme on hand hygiene practices in New Zealand's public hospitals. *The New Zealand medical journal*, 129(1443), 67-76.

¹⁶³ Fatimah, U. Z. A. U., Strohbehn, C. H., & Arendt, S. W. (2014). An empirical investigation of food safety culture in onsite foodservice operations. *Food control*, 46, 255-263.

¹⁶⁴ Nydahl, M., Jacobsson, F., Lindblom, M., & Marklinder, I. (2012). A simplified health information model increased the level of knowledge regarding "five a day" and food safety in a city district. *British Food Journal*, 114(7), 910-925

¹⁶⁵ Nychas, G. J. E., Panagou, E. Z., & Mohareb, F. (2016). Novel approaches for food safety management and communication. *Current Opinion in Food Science*, 12, 13-20.

¹⁶⁶ Folinias, D., Manikas, I., & Manos, B. (2006). Traceability data management for food chains. *British Food Journal*, 108(8), 622-633

¹⁶⁷ Powell, D. A., Jacob, C. J., & Chapman, B. J. (2011). Enhancing food safety culture to reduce rates of foodborne illness. *Food Control*, 22(6), 817-822

¹⁶⁸ Pichler, J., Ziegler, J., Aldrian, U., & Allerberger, F. (2014). Evaluating levels of knowledge on food safety among food handlers from restaurants and various catering businesses in Vienna, Austria 2011/2012. *Food Control*, 35(1), 33-40.

¹⁶⁹ Seaman, P., & Eves, A. (2010). Perceptions of hygiene training amongst food handlers, managers and training providers—A qualitative study. *Food Control*, 21(7), 1037-1041.

¹⁷⁰ Yapp, C., Fairman, R., 2004. The Evaluation of Effective Enforcement Approaches for Food Safety in SMEs. Food Standards Agency

¹⁷¹ Yapp, C., Fairman, R., 2006. Factors affecting food safety compliance within small and medium-sized enterprises: implications for regulatory and enforcement strategies. *Food Control* 17 (1), 42–51.

highlighted as problematic (see previous section). At the point at which formal enforcement takes place, typically warning letters and improvement notices are the preferred options, with little interest in escalating enforcement.

Why improving communication matters for reducing the intention-action gap:

Given that typical enforcement involves warning letters and improvement notices, these carry a particular style and tone of communication. Unfortunately, the formal communication can be difficult to process for FBOs that are micro, small or even medium size, because there may not be familiar with the terminology, and may not have the available level of expertise/resources to interpret the recommendations being made. This provides a looming barrier to any effort in bridging the intention-action gap, even if there is willingness to change behaviour. Again, this serves to add to the perceptions of the high cost of compliance for those with characteristics of perceived risk-seeking/risk-neutral attitudes, and in turn maintains or increases the gap between intentions to improve compliance and actually introducing positive changes in behaviour.

Clarity and frequency of communication: With respect to transparency of communication, some of the work cited here has shown that improvements in FBOs compliance are tied to the clarity and ease of access of information; this also includes a reduction in excessive levels of overprovision of information, that is, unless information is streamlined to its essentials. Burdening FBOs, particularly micro, small and medium size¹⁷², with far too much information (e.g., multiple information packs, guidelines, resource materials) will quickly be seen as another unpleasant cost to compliance. Navigating the information deluge will further feed any negative risk attitudes towards compliance, and add to the perceived high levels of effort needed to comply.

Thus, a first step to making manageable improvements involves increasing the simplicity of the information provided, and the access to it, so FBOs have clear and direct ways of ascertaining what changes need to be made and why. This involves reducing misperceptions in the level of effort needed to comply by prioritizing simple changes that can be made, and promoting, in clear terms, the consequences of poor hygiene standards on consumers, and their own business. Thus, a simple coherent and consistent risk communication strategy is a first step to allaying the concerns of FBOs with respect to the cost in effort to comply (particularly for micro, small, and medium size FBOs), and raising the perceptions of the benefits of compliance – i.e. AOs making salient the likely knock on effects of good practice in terms of the incentives that drive FBOs.

Maintaining dialogue between AOs and FBOs: Increasing the simplicity of information provided is not enough to regularly reduce in the intention-action gap, because much of the literature suggests that the communication needs to be kept up regularly, so that continual dialogue between AO and FBO is maintained. There is work to show that this need not be dependent on face-to-face communication^{173 174}; though often face-to-face communication is preferable. Access to training materials that could be provided online including photographs, infographics, presentations, video clips as well as

¹⁷² Yapp, C., Fairman, R., 2006. Factors affecting food safety compliance within small and medium-sized enterprises: implications for regulatory and enforcement strategies. *Food Control* 17 (1), 42–51.

¹⁷³ Soon, J. M., Baines, R., & Seaman, P. (2012). Meta-analysis of food safety training on hand hygiene knowledge and attitudes among food handlers. *Journal of food protection*, 75(4), 793-804

¹⁷⁴ Egan, M. B., Raats, M. M., Grubb, S. M., Eves, A., Lumbers, M. L., Dean, M. S., & Adams, M. R. (2007). A review of food safety and food hygiene training studies in the commercial sector. *Food Control*, 18(10), 1180-1190

simplified details of regulatory guidelines such as fact sheets. The literature also shows that these training resources are preferred by FBOs because they are accessible and less costly in time and financial resources – which matters hugely for micro and small FBOs; though there is some evidence to the contrary¹⁷⁵. In turn this eases the burden on AOs that may be expected to provide this information themselves through multiple face to face interactions. More to the point, having a centralized set of materials that could be used by AOs across all LAs would result in further standardizing the information the FBOs are required to know with respect to food safety practices, and it increases the efficiency of the interventions that AOs take to supporting compliance behaviour amongst FBOs.

Summary of Intention-action gap

The FSA's ROF programme presents an approach that is co-regulatory in nature. This means that it is sufficiently flexible and adaptable to ensuring food safety compliance by adjusting to the differing profiles of FBOs. In turn, this means a collaborative partnership with FBOs in order to be an effective information provider; this provides an important anchor for determining how to reduce the intention-action gap.

The intention-action gap is evidenced by a distance between the intentions that FBOs signal to relevant authorities with respect to a willingness to comply, and failure to introduce effective changes that show actual substantive changes in food safety practices. This is explained in terms of the perceived costs in effort required to change behaviour and available resources to support those changes. In turn AOs delivery of food safety controls is adjusted (unsystematically) to the level of effort needed to reduce the wide, moderate or small gap between the FBOs intentions to change and actual observable changes in compliance behaviour. The intention-action gap is likely to be maintained, unless efforts are taken to align the goals of the AOs with the goals and incentives of FBOs.

There are two effective means of reducing the aforementioned gaps, which serve to correct FBOs misapprehensions regarding the costs in effort needed to achieve broad or even full compliance. First, what is needed is a scaling back of the complexity of the information provided to FBOs regarding what actions plans are needed to achieve regular compliance, and increasing efforts to connect those action plans to the incentives that underpin the goals of the FBO. As an information provider, a regulatory body has a duty to make sure that the information provided and the channels it uses to provide that information are comprehensible and easy to access. Second, to achieve meaningful changes in risk communication and risk management, efficiencies in the provision of information can include standardizing and centralizing access to a variety of materials (e.g., online training, videos, presentations, fact sheets) that AOs can direct FBOs towards. This does not necessarily require systematic face-to-face communication between AOs and FBOs, though early interactions, particularly for new FBOs will more likely require frequent face-to-face interactions.

¹⁷⁵ Ivey, M. L. L., LeJeune, J. T., & Miller, S. A. (2012). Vegetable producers' perceptions of food safety hazards in the Midwestern USA. *Food Control*, 26(2), 453-465.

Outcomes and feedback in relation to effort and rewards

This section focuses on detailing behaviour with respect to the final component of the Effort-Value based decision-making model, which concerns the way in which the outcomes of behaviour (e.g., compliance, non-compliance) and the consequences that follow are feed back into future FBOs decision-making processes (see Figure 8).

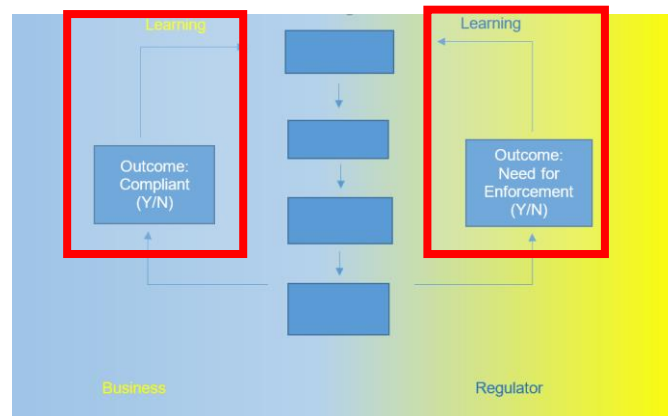


Figure 8. Outcome and feedback in the Dynamic-Value-Effort Decision-Making Model

Outcomes and Feedback: Rarely is it the case that people make one-off decisions (or alternatively referred to as one-shot decisions). The contexts in which we make decisions repeat, which is why we often rely on what we have done before to determine what we do in the future¹⁷⁶, and which is why the decision-making process is typically an iterative one. This means the whole process of decision-making cycles and it is dynamic – that is, we update from past experiences and adjust future decision-making behaviour accordingly¹⁷⁷. Both of these properties are helped by the fact that our decision-making process stores the details of the outcome of a decision that we made (and associated rewards), and then feeds this back into the decision-making process to determine what ought to be done in the future.

Across the different sections of this review, what has been described is a process of decision-making that starts with estimating the perceived costs and benefits of pursuing complaint behaviour (perceived risk-attitude), and then the re-assessment of the costs

¹⁷⁶ Osman, M. (2014). *Future-minded: The psychology of agency and control*. Palgrave Macmillan.

¹⁷⁷ Osman, M. (2010). Controlling uncertainty: a review of human behavior in complex dynamic environments. *Psychological bulletin*, 136(1), 65-86.

and benefits of compliant behaviour at the point at which those behaviours are implemented/or not implemented (Intention-action gap). This section considers relevant literature around the issue of motivated change in future behaviour following the outcome of past decisions to comply or not.

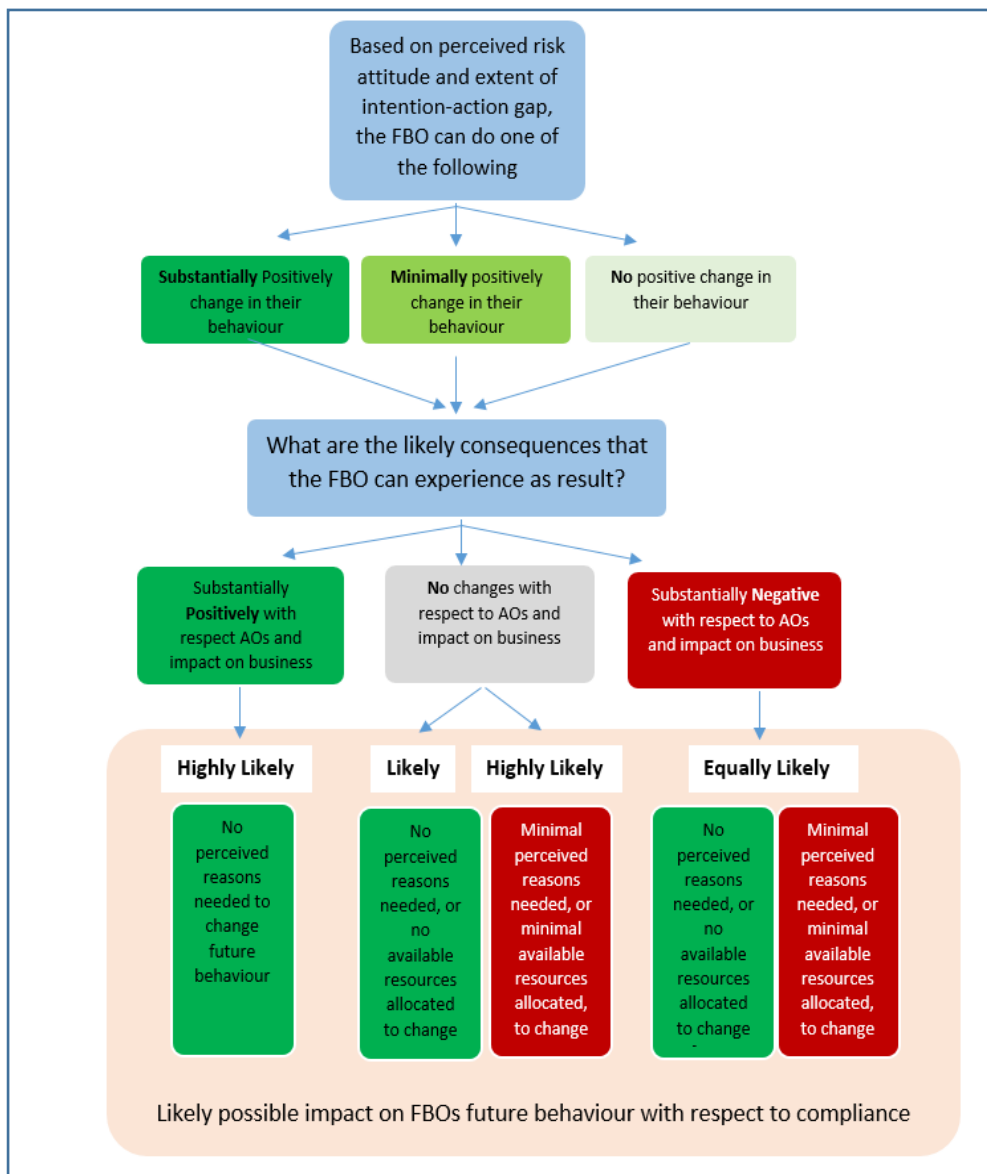


Figure 9. Future possible decision-making behaviours as a result of outcomes and consequences experienced by FBO

Based on the work from decision sciences, and the Dynamic-Value-Effort Decision-Making Model presented in this review, Figure 9 presents the way in which different outcomes (and their consequences) fed back into the FBOs decision-making process, and what likely future outcomes will occur.

Predictions: Figure 9 is a schematic of what determines the likely possible outcomes of future decisions taken by the FBO with respect to compliance, based on their prior experiences, and taking into account the outcomes and consequences. It is worth highlighting here that while the size of the FBO is not captured in the various possible

scenarios that could take place, what is taken account of is the allocation of available resources (no allocation, minimal allocation) with respect to future behaviour. No or minimal allocation can be taken as a proxy for the size of the FBO. That is, the FBO may not change their future behaviour because they do not see the need to change [perceived effort] or do not see that they have the available resources [perceived cost in resources – indicative of size of FBO] to introduce any substantive changes in their food safety practices. As a result, from the details presented in Figure 9, the follow predictions can be made: (1) **Positive sustained future behavioural change in FBOs is dependent on sustained positive experiences of the outcomes and consequences of compliance**^{178 179}. (2) **Effective short term behavioural change in FBOs is dependent on positive rather than negative experiences of the outcomes and consequences of minimal compliant behaviour**¹⁸⁰.

Illustration of how prediction 1 applies to FBO behaviour: To flesh these predictions out in an imagined scenario, consider an FBO that may have estimated that relative to the benefits, the costs of compliance were too high in order to change behaviour. Despite later showing willingness to change behaviour following interactions with AOs, the FBO fails to change behaviour in any observable way, thus sustaining their initial estimates of the costs (e.g. high) and benefits (e.g. low) of compliance. In this case the outcome of behaviour is not complying. Depending on what happens next with respect to the range of interventions (i.e. non-official controls, official controls), or point of the enforcement pathway (i.e. from warning letters to eventual prosecution) that the AO is undertaking, this will in turn determine how the FBO is going to behave in the future. If the consequences are limited, then the FBO may see little reason to change their behaviour, if the consequences are more severe, then this may lead to changes in the FBOs behaviour in the future.

Support for prediction 1: Indeed situations of the kind described here have been documented in the literature in which responses by FBOs to enforcement measures taken by AOs requires recurrent measures because the FBOs continue to violate food safety laws; the rate at which this varies country by country^{181 182 183}. In addition, variability in the implementation of enforcement measures also adds to the likelihood that FBOs found in violation of food safety standards will continue to violate, because the enforcement process is experienced as inconsistent¹⁸⁴, and therefore the FBO's perceptions of the regulator's credibility is low.

¹⁷⁸ Van Duijvenvoorde, A. C., Zanolie, K., Rombouts, S. A., Raijmakers, M. E., & Crone, E. A. (2008). Evaluating the negative or valuing the positive? Neural mechanisms supporting feedback-based learning across development. *Journal of Neuroscience*, 28(38), 9495-9503.

¹⁷⁹ Camerer, C., Babcock, L., Loewenstein, G., & Thaler, R. (1997). Labor supply of New York City cabdrivers: One day at a time. *The Quarterly Journal of Economics*, 112(2), 407-441

¹⁸⁰ Ashby, F. G., & O'Brien, J. R. B. (2007). The effects of positive versus negative feedback on information-integration category learning. *Perception & psychophysics*, 69(6), 865-878

¹⁸¹ Kettunen, K., Nevas, M., & Lundén, J. (2015). Effectiveness of enforcement measures in local food control in Finland. *Food Control*, 56, 41-46.

¹⁸² Mandarinino, P. (2017). *Temporary Restaurant Closures and Food Handling Violations: Inspection Reports in British Columbia* (Doctoral dissertation, Walden University)

¹⁸³ Olmedo, P. V., Stangarlin-Fiori, L., Opolski Medeiros, C., Tondo, E. C., & Ferreira, S. M. R. (2017). A profile of foodservices in Curitiba and a critical analysis of the results of sanitary inspections at these establishments. *Journal of Food Safety*.

¹⁸⁴ Kettunen, K., Nevas, M., & Lundén, J. (2017). Challenges in using administrative enforcement measures in local food control. *Food Control*, 76, 34-41.

Illustration of how prediction 2 applies to FBO behaviour: Similarly, in an alternative imagined scenario, an FBO may have estimated that the benefits outweigh the costs of compliance with respect to changing behaviour. The FBO may indicate a willingness to change behaviour following interactions with AOs, and in turn, the FBO makes improvements to their food safety practices in an observable way (i.e. there is no intention-action gap). Thus, they substantiate their initial estimates of the costs (e.g. low) and benefits (e.g. high) of compliance. In this case the outcome of the decision process is complying with whatever recommendations the AO makes. Depending on what happens next with respect to the positive impact of complying (e.g. improvement in sales, increases in reputation, increases in competitive edge), this will in turn determine how the FBO is going to behave in the future. If the consequences are experienced as positive, then this will feedback into a future decision-making with respect to food safety practices, and maintain or even improve compliant behaviours in the future.

Rationale for prediction 2: Appealing to the incentives that improve business is a way to support FBOs effort to comply and to continue to comply. As mentioned in the previous section, the goals of the FBO depart from the AOs with respect to the fact they do not see compliance as a relevant end in and of itself. However, compliance is valued if perceived as a gateway to increasing a consumer base, consumer confidence, ensuring a competitive edge, and reputation building, to name but a few^{185 186 187 188 189 190}. Rewarding FBOs by increasing the value of their compliant behaviour on consumer confidence provides some rationale for prediction 2. It appears reward that the positive consequences following compliant behaviour that are associated with the incentives that are most likely to drive FBOs behaviour, will in turn increase the likelihood of future compliant behaviour. For this reason, it is important that in the communication between AOs and FBOs the goals of ensuring compliance (from the AOs perspective) and achieving/maintaining compliance (from the FBOs perspective) are aligned. This also paves the way for steps to be taken by the FBO to introduce changes not as minimal one offs, but as part of their long-term food safety practices^{191 192 193}.

Sustained behavioural change: Thus, an important issue to bear in mind for any AO is the extent to which any positive changes in behaviour are short term or sustained. For FBOs, effective responses to food inspections, means being efficient in doing what is necessary in response to specific recommended actions. The most efficient response

¹⁸⁵ Grob, K. (2017). The European system for the control of the safety of food-contact materials needs restructuring: a review and outlook for discussion. *Food Additives & Contaminants: Part A*, 34(9), 1643-1659.

¹⁸⁶ Chen, E., Flint, S., Perry, P., Perry, M., & Lau, R. (2015). Implementation of non-regulatory food safety management schemes in New Zealand: A survey of the food and beverage industry. *Food control*, 47, 569-576.

¹⁸⁷ Guchait, P., Neal, J. A., & Simons, T. (2016). Reducing food safety errors in the United States: Leader behavioral integrity for food safety, error reporting, and error management. *International Journal of Hospitality Management*, 59, 11-18.

¹⁸⁸ Tomašević, I., Šmigić, N., Đekić, I., Zarić, V., Tomić, N., Miocinovic, J., & Rajković, A. (2016). Evaluation of food safety management systems in Serbian dairy industry. *Mljekarstvo/Dairy*, 66(1)

¹⁸⁹ Powell, D. A., Jacob, C. J., & Chapman, B. J. (2011). Enhancing food safety culture to reduce rates of foodborne illness. *Food Control*, 22(6), 817-822.

¹⁹⁰ Chen, E. (2015). *Non-regulatory food safety management in New Zealand: motivation, effectiveness, and implications: a thesis presented in partial fulfilment of the requirements of the degree of Doctor of Philosophy in Food Safety Management at Massey University, Palmerston North, New Zealand* (Doctoral dissertation, Massey University).

¹⁹¹ Garcia Martinez, M., Verbruggen, P., & Fearn, A. (2013). Risk-based approaches to food safety regulation: what role for co-regulation?. *Journal of Risk Research*, 16(9), 1101-1121

¹⁹² Garcia Martinez, M., and N. Poole. 2004. The development of private fresh produce safety standards for developing Mediterranean exporting countries. *Food Policy*, 29: 229–55.

¹⁹³ Gunningham, N., P. Grabosky, and D. Sinclair. 1998. *Smart regulation*. Oxford: Oxford University Press.

means short term minimal changes, which are unlikely to result in radical shifts in perceived risk attitudes amongst some FBOs, particular micro, small or medium FBOs that struggle with introducing behavioural change given limitations in resources (human, financial).

Cultural change: The problem is that a broader approach is needed for thinking about food safety in order to make effective stable behavioural changes in food safety practices. In others, given that effort is a cost, any effort required to change behaviour will mean that the minimum changes are made. However, to change behaviour so that it becomes a habit, cultural changes are needed. This is why so much of the literature makes reference to promoting a food safety culture amongst FBOs^{194 195 196 197 198 199 200}. 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^{201 202}.

Difficulties in generating cultural change: Put in context of the decision science framework presented here, instilling a food safety culture in an FBO results in attitudinal change (e.g., a shift from perceived risk-neutral to perceived risk averse) which has knock on consequences across the entire decision-making process. For instance, the gap between intention and action closes (or appears frequently less often in future decisions taken by FBOs) when the benefits are seen to outweigh the costs. The rewards of compliance are then actually experienced, and this feeds back into the decision-making process, so prompting a cycle of decision-making that maintains compliant behaviour into the future.

The problem is that while there is a large evidence based to draw on, the evidence base itself has come under considerable scrutiny because of the poor empirical methods used to determine FBO food safety culture, which limit what conclusions can be drawn about any interventions designed to improve it^{203 204 205}.

¹⁹⁴ Powell, Douglas A., S. Erdozain, Charles Dodd, R. Costa, K. Morley, and Benjamin J. Chapman. "Audits and inspections are never enough: a critique to enhance food safety." *Food Control* 30, no. 2 (2013): 686-691.

¹⁹⁵ De Boeck, E., Mortier, A. V., Jacxsens, L., Dequidt, L., & Vlerick, P. (2017). Towards an extended food safety culture model: Studying the moderating role of burnout and jobstress, the mediating role of food safety knowledge and motivation in the relation between food safety climate and food safety behavior. *Trends in Food Science & Technology*, 62, 202-214.

¹⁹⁶ Sarter, G., & Sarter, S. (2012). Promoting a culture of food safety to improve hygiene in small restaurants in Madagascar. *Food Control*, 25(1), 165-171.

¹⁹⁷ Fatimah, U. Z. A. U., Strohbehn, C. H., & Arendt, S. W. (2014). An empirical investigation of food safety culture in onsite foodservice operations. *Food control*, 46, 255-263.

¹⁹⁸ Abidin, U. F. U. Z., Arendt, S. W., & Strohbehn, C. H. (2013). Exploring the culture of food safety: the role of organizational influencers in motivating employees' safe food-handling practices. *Journal of Quality Assurance in Hospitality & Tourism*, 14(4), 321-343.

¹⁹⁹ Jespersen, L., Griffiths, M., & Wallace, C. A. (2017). Comparative analysis of existing food safety culture evaluation systems. *Food Control*, 79, 371-379

²⁰⁰ Abidin, U. F. U. Z., Arendt, S. W., & Strohbehn, C. H. (2014). Food Safety Culture in Onsite Foodservices: Development and Validation of a Measurement Scale. *Journal of Foodservice Management and Education*, 8(1), 1-11.

²⁰¹ Griffith, C. J., Livesey, K. M., & Clayton, D. (2010). The assessment of food safety culture. *British Food Journal*, 112(4), 439e456.

²⁰² Schein, E. H. (2004). *Organizational culture and leadership*. San Francisco: San Francisco : Jossey-Bass.

²⁰³ Jespersen, L., Griffiths, M., & Wallace, C. A. (2017). Comparative analysis of existing food safety culture evaluation systems. *Food Control*, 79, 371-379.

²⁰⁴ Jespersen, L. (2017). *Evaluating and Predicting Maturity of Food Safety Culture in Food Manufacturing* (Doctoral dissertation).

²⁰⁵ Jespersen, L., MacLaurin, T., & Vlerick, O. (2017). Development and validation of a scale to capture social desirability in food safety culture. *Food Control*, 79.

Food safety culture model: In a detailed evaluation of several models, frameworks, and approaches to studying food safety culture in FBOs, Jespersen, Griffiths, and Wallace, (2017) present a synthesis of previous work, and propose a framework of food safety culture which has 5 dimensions: Values & Mission, People systems, Adaptability, Consistency, and Risk awareness. The framework clearly has some similarities with the Dynamic-Value-Effort Decision-Making Model used to capture FBO behaviour in this report. It is worth highlighting here that this provides significant independent validation of the Dynamic-Value-Effort Decision-Making Model, and that the insights from it directly support other independent research in the domain of FBO behaviour.

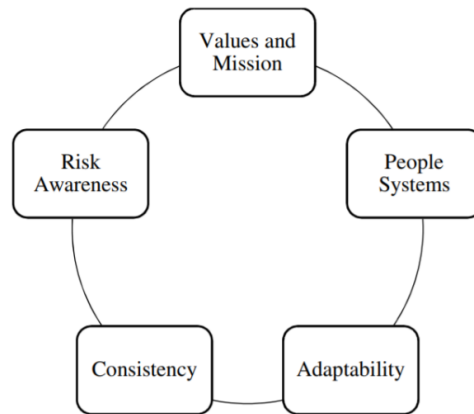


Figure 10. Jespersen, Griffiths, and Wallace, (2017) Food Safety Culture Framework

The **values and mission** of the FBO regarding compliance with food safety guidelines maps onto the Dynamic-Value-Effort Decision-Making Model depiction of perceived risk attitude as a key determinant of FBOs estimated costs and benefits associated with compliance. **Consistency** relates to the extent to which FBOs follow rules and regulations, and have the available infrastructure to follow through on their perceived values and apparent priorities related to food safety. This maps onto the Dynamic-Value-Effort Decision-Making Model's differentiation between intentions and actions, namely, the intention-action gap. **Adaptability** refers to how an FBO embraces or resists change, and how problems with respect to food safety are tackled. This maps onto the Dynamic-Value-Effort Decision-Making Model depiction of the process of likely future change in FBO behaviour in light of present outcomes and consequences of decisions to comply/or not. **People systems** refers to knowledge, access to training, and expectations of competency in food safety practices, and communication across people in the FBO around food safety matters. **Risk awareness** refers to the extent to which FBOs show understanding of risks, and how to manage them, as well as the extent to which employees are alert to actual and potential food safety risks.

Effective methods of generating a positive food safety culture: Using these dimensions as a basis to cast an eye over previous literature on food safety culture, the emerging picture is that, any effective interventions designed to promote a positive food

safety culture take the form of simple and accessible training methods^{206 207 208 209 210}. This is because the consistent message of work investigating food safety culture is that there is a clear relationship between food safety behaviours, employee training and food safety²¹¹. Moreover, there is also a clear positive relationship between educational activities and inspection scores and compliance levels²¹² across various sizes of FBOs²¹³. Based on this work, what is required is that:

1. ***The training needs to address the fact that what seems like sufficient compliant behaviour for FBOs is not necessarily sufficient compliant behaviour by AOs standards***^{214 215}
2. ***Training and guidance needs a frame of reference about compliance from the point of view of benefits to the FBO, rather than the costs.*** As mentioned earlier in this review, psychologically people are oriented to pay more attention to losses than gains²¹⁶, so a communication strategy adopted by AOs that emphasises the consequences of non-compliance in the form of sanctions (e.g., fines, prosecution), is likely to exacerbate FBOs view of compliance as a cost²¹⁷. Instead, a better communication strategy, as mentioned in several sections of this review, is to focus on emphasising the importance of the gains made through compliance with respect to FBOs own goals which are business oriented ²¹⁸.
3. ***The training needs to be bespoke to the requirements of the FBOs shortfalls on knowledge.*** In other words, avoid preaching to the choir, because this is likely to lead to the FBOs disinvestment in efforts to improve/maintain food safety standards.
4. ***The training needs to ensuring consistency across those employed by the FBOs.*** There is work suggesting that while management may demonstrate that they are committed to food safety practices, and are aware of the risks of poor safety standards, shop floor workers are not positively disposed in the same way

²⁰⁶ Bona, E., Costa Dias, M. A., Sant'Ana, A. S., Cruz, A. G., Faria, J., & Fernandes de Oliveira, C. A. (2012). On the implementation of good manufacturing practices in a small processing unity of mozzarella cheese in Brazil. *Food Control*, 199e205

²⁰⁷ Da Cunha, D. T., Stedefeldt, E., & de Rosso, V. V. (2014). The role of theoretical food safety training on Brazilian food handlers' knowledge, attitude and practice. *Food Control*, 43, 167e174

²⁰⁸ Jespersen, L., & Huffman, R. (2014). Building food safety into the company culture: A look at maple leaf foods. *Perspectives in Public Health*, 134(4), 200e205.

²⁰⁹ McKay, F. H., Singh, A., Singh, S., Good, S., & Osborne, R. H. (2016). Street vendors in Patna, India: Understanding the socio-economic profile, livelihood and hygiene practices. *Food Control*, 70, 281e285

²¹⁰ Samapundo, S., Cam Thanh, T. N., Xhaferi, R., & Devlieghere, F. (2016). Food safety knowledge, attitudes and practices of street food vendors and consumers in Ho Chi Minh city, Vietnam. *Food Control*, 70, 79e89.

²¹¹ Nayak, R., & Waterson, P. (2017). The Assessment of Food Safety Culture: An investigation of current challenges, barriers and future opportunities within the food industry. *Food Control*, 73, 1114-1123.

²¹² Yapp, C., Fairman, R., 2004. The Evaluation of Effective Enforcement Approaches for Food Safety in SMEs. *Food Standards Agency*

²¹³ Yapp, C., Fairman, R., 2006. Factors affecting food safety compliance within small and medium-sized enterprises: implications for regulatory and enforcement strategies. *Food Control* 17 (1), 42–51.

²¹⁴ Baldwin, R. (1995) *Rules and Government*. Clarendon Press, Oxford

²¹⁵ Hutter, B.M. (1997) *Compliance: Regulation and Environment*. Clarendon Press, Oxford

²¹⁶ Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica: Journal of the econometric society*, 263-291.

²¹⁷ Martinez, M. G., Fearn, A., Caswell, J. A., & Henson, S. (2007). Co-regulation as a possible model for food safety governance: Opportunities for public-private partnerships. *Food Policy*, 32(3), 299-314.

²¹⁸ Hutter, B. M., & Amodu, T. (2009). *Risk regulation and compliance: Food safety in the UK*. London: London School of Economics and Political Science.

as management, or else do not show the same level of awareness of risks^{219 220 221 222}. Just as there is inconsistency in AOs assessment and enforcement, those employed by FBOs, particularly in Medium to large size businesses in which the interactions between management and non-management staff is limited, also show inconsistencies in their food safety behaviours. This is why training across the board is needed to ensure a baseline level of understanding of risks across the entire labour force; this means standardising training that is overseen and endorsed by the FSA. If this is done well, then this can instil a food safety culture, particularly for new businesses, that reduces the burden on AOs interactions with FBOs in the future.

Summary of Outcomes and Feedback

The FSA's ROF programme proposes a method of co-regulation that is sensitive to the different needs and behaviour of the FBO. This means tracking the outcome of FBOs decisions (i.e. level of change in meeting recommendations regarding compliance) together with the consequences (i.e. AOs delivery of food safety controls and impact of business interests – customer feedback, competitive advantage, reputation etc...) to predict future decisions they make with respect to compliance. Potential methods of surveillance may consider taking advantage of the insights from decision science research that predicts the likely future behaviour of FBOs based on characterising current outcomes and consequences of FBOs behaviour. Moreover, the FSA's role as information provider bears relevance in the context of shaping FBOs future behaviours, particularly in efforts to train FBOs into a food safety culture. The evidence suggests that effective training programmes ought to target all staff, are bespoke to the specific knowledge gaps of the FBO, address the fact that FBOs and AOs depart when it comes to what counts as sufficient compliant behaviour, and takes into account the fact that the incentives for FBOs to comply are centred on the potential returns on business that compliant behaviour brings.

²¹⁹ Griffith, C. J. (2000). Food safety in catering establishments. In J. Farber, & E. Todd (Eds.), *Safe handling of foods* (pp. 235e256). New York: Marcel Dekker

²²⁰ Griffith, C. J. (2010). Do businesses get the food poisoning they deserve?: the importance of food safety culture. *British Food Journal*, 112, 416e425.

²²¹ Griffith, C. J., Livesey, K. M., & Clayton, D. (2010a). The assessment of food safety culture. *British Food Journal*, 112(4), 439e456.

²²² Griffith, C. J., Livesey, K. M., & Clayton, D. A. (2010b). Food safety culture: The evolution of an emerging risk factor? *British Food Journal*, 112, 426e438.

Appendix I. Simplified toolkit for identifying FBOs according to Perceived risk-attitude

Perceived Risk-attitude Scale for FBOs

Perceived	<i>Risk Seeking</i>	<i>Risk Neutral</i>	<i>Risk Averse</i>
FBOs	FBOs that are non-compliant, or doubt the relevance of compliance	FBOs that are indifferent to the relevance of compliance	FBOs that are proactively compliant
Cost vs. Benefit of compliance	High/Low	Moderate/Moderate	Low/High

Characterisation of behaviours associated with the three different perceived risk attitudes:

Risk Seeking FBOs: FBOs that are risk seeking will appraise a situation in which they have to make a decision regarding compliance, and will likely assign a **high cost to compliance** (e.g., effort, time, and financial resources needed to change behaviour), and **low benefit of compliance** (e.g., adherence to FHR/IS, FSMS, CIM, HACCP, establishing a good reputation).

Risk Neutral FBOs: FBOs that are risk neutral will likely assign a **moderate cost to compliance** (e.g., effort, time, and financial resources needed to change behaviour), and equally will assign a **moderate benefit of compliance** (e.g., adherence to FHR/IS, FSMS, CIM, HACCP, establishing a good reputation).

Risk Averse FBOs: FBOs that are **risk averse** will appraise a situation in which they have to make a decision regarding compliance, and will likely assign a **low cost of compliance** (e.g., effort, time, and financial resources needed to change behaviour), and a **high benefit of compliance** (e.g., adherence to FHR/IS, FSMS, CIM, HACCP, establishing a good reputation).

Tool kit questions: The proposed questions posed to FBOs as part of the toolkit are adapted from prior empirical studies that are discussed in the literature review²²³. Though for this to be implemented the tool would need to be tested in order to determine its predictive validity and its reliability.

For each of the following statements, please indicate your agreement with each statement based on whether you adopt a similar attitude in your business practices. 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. *Taking a leap of faith is an unnecessary way to ensuring progress in business
4. *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. *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

* reverse scores

Scoring of responses: A range of scores between 40+ reflects Risk Seeking FBOs, a range of scores between 25-39 reflects Risk Neutral FBOs, and a range of scores between 1-24 reflects Risk Averse FBOs.

²²³ Weber, E. U., Blais, A. R., & Betz, N. E. (2002). A domain-specific risk-attitude scale: Measuring risk perceptions and risk behaviors. *Journal of behavioral decision making*, 15(4), 263-290; Weber, E. U., & Milliman, R. A. (1997). Perceived risk attitudes: Relating risk perception to risky choice. *Management science*, 43(2), 123-144

Appendix II

Mapping of prior Classification systems of FBO behaviour on to Perceived-risk attitude

Perceived Risk Attitude	Bukowski et al (2012) FSA report on FBO "Mindset"	Wright et al (2012) FSA report on FBO Culture	Brook Lyndhurst (2012) FSA report on segmentation of small and medium sized FBOs
Risk Averse	<p>Proactive: FBOs who displayed both the will to comply and clear ownership of food safety issues. These scored highly on 'confidence in management' demonstrating recognition of risk and implementation of appropriate controls which in turn reassured AOs that standards were likely to be sustained. This was evident in some businesses who made it their job to self-educate, comply and, where needed, contact the regulator for advice and guidance if they were unsure.</p>	<p>Leaders: view food hygiene as a critical business issue that they must tightly manage and offer potential business benefits through achievement of a good reputation for food safety and hygiene. Provide visible leadership in continually improving food hygiene.</p>	<p>"My kitchen is my castle": Tend to be highly competent and confident when it comes to food safety. Inclined to be independent-minded and to trust their professional judgement and experience to guide their actions on food safety. Tend to hold positive attitudes towards food safety legislation and regulation – although likely to feel that there is more to food safety than formal rules and guidelines.</p>
		<p>Proactive compliers: understand that the risk posed by food hygiene is significant and accept that requirements are effective and necessary. Management provide a lead in encouraging compliance for the sake of the business as well as regulatory compliance but may not go beyond good practice.</p>	<p>Rules are there to be followed: Tend to be very conscientious about food safety and compliance, often with a strong food safety culture. Likely to buy into the concept of food safety legislation and regulation, and to find food safety and compliance tasks easy. Most process-oriented segment, likely to have rules and systems in place – to the point that compliance tends to be almost second nature. Perhaps slightly less likely to think independently as a result.</p>
Risk Neutral	<p>Reactive: these types of FBO were considered the most commonplace, with FBOs taking some positive steps towards ownership of risk and compliance while still relying on AOs for guidance to move them in the right direction. Their willingness to comply was evident both in the verbal exchanges they had with the AO (the questions they asked) and their overall demeanour (the way they voluntarily showed an AO around their business and talked them through paperwork), as well as in their general approach to FSMS, the upkeep of their paperwork and sufficiency of their systems.</p>	<p>Dependent: these dutyholders wait upon advice or instruction from regulators and other third parties to make improvements and view food hygiene as something driven by third parties. They tend to view requirements as unfairly complex and unreasonable to expect them to take a lead in understanding and applying. They may have low levels of knowledge and training, and may not have any clear perception or knowledge of the risk posed by food hygiene.</p>	<p>"Learning the ropes": Tend to claim they keep on top of food safety, but may be less likely to follow guidance, and some may doubt their own competence – possibly due to lack of experience. Often hold negative attitudes towards compliance and the FHRS, but may wish to improve their scores – of which they tend not to be proud. Common barriers to improvement include lack of belief in the FHRS, lack of resources, and a tendency to think food safety is not a concern for customers.</p>
	<p>Passive: FBOs show a bare minimum of compliance by not taking their own initiative or showing real commitment to improve. A passive mindset such as this was considered by AOs as extremely difficult to deal with as it often led to what they termed 'yo-yo' behaviour where broad compliance was achieved only temporarily and often not sustained from one regulatory visit to the next. FBOs with this mindset were motivated more by a desire to avoid enforcement action and incur</p>		<p>"Weight of compliance on our shoulders": Claim to find food safety and compliance harder than any other segment, but in reality often perfectly competent. May be worried about their own abilities, and sometimes unsure of requirements, but likely to try very hard to do their best. Tend not to fully buy into the concept of food safety compliance and regulation – this is likely to be due to feeling threatened by the</p>

	financial or reputational costs than by a real appreciation of the public health risks that their business posed.		system or a sense that they 'know better'.
			"It's as easy as apple pie" : Tend to feel they have the necessary skills and capabilities, and to be confident in their abilities to keep on top of food safety. However, more likely to do things their own way rather than following formal processes, due to being inclined to be independent-minded when it comes to food safety. Not necessarily hostile towards the FHRS, formal compliance or regulation, but often feel that these processes are not directly relevant to them.
Risk Seeking	Disinterested : this type of mindset is the sort that drives FBOs who show deliberate non-compliance. It was generally thought to be rare yet could occur just as easily in small, medium and even large food businesses. The best indicator of a FBO's disinterest was likely to be a clear lack of ownership for food safety. A key sign of a 'disinterested' mindset was likely to be that staff and managers alike all displayed a general air of disregard for an AO's presence, their feedback, education and food safety messages communicated during a visit. The FBO was unlikely to take much interest in their score on any food hygiene rating scheme (FHR/IS).	Doubters : doubt the significance of the risk posed by food hygiene and the effectiveness of food hygiene regulations and requirements in managing these risks. They may have the capability to understand requirements but doubt the risk. They may express cynical view to staff and do not promote compliance other than for legal purposes.	"Just leave me to it" : Tend to feel they are taking sufficient measures to ensure food safety in day-to-day practice, if not enough to meet compliance requirements. Tend to hold the most negative attitudes of all the segments towards food hygiene law and regulation, and towards the FHRS scheme, and likely to see formal compliance requirements and inspections as a burden. Lack of resources – time, finance and information – is often a key barrier to improving their practices.
		Amoral calculators : these intentionally breach regulations for the sake of financial gain, disputing or disregarding risk to people.	