

1 **Identifying support mechanisms to overcome barriers to food safety scheme**  
2 **certification in the food and drink manufacturing industry in Wales, UK.**

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22 Industry Centre. Her role is to support the food manufacturing sector to grow and prosper. This is via a  
23 flexible and responsive technical service which includes bespoke activities. She is responsible for delivering  
24 expertise and knowledge to the sector via an experienced team of technical and academic professionals who  
25 operate synergistically with Food and Drink manufacturers. Her work encompasses all product categories  
26 along the food supply chain from 'farm gate' to the retailers. The technical team work with over 150  
27 manufacturing companies of all sizes annually. The delivery of services is via several mechanisms, some of  
28 activity is via the HELIX Programme. This programme employs technical or sales and marketing affiliates  
29 and embeds them in Welsh food and drink manufacturing businesses. Project HELIX provides support for  
30 knowledge transfer in relation to global food production, trends, innovation and waste to help small to  
31 medium sized food manufacturers across Wales to improve efficiency and reduce waste.

1 **Abstract:**

2           Obtaining food safety certification is essential for food manufacturers. Potential barriers to  
3           obtaining certification are complex, interrelated and broadly relate to, ‘knowledge and skills’,  
4           ‘time, cost and resources’, and ‘communication and access to information’. This study aimed to  
5           explore requirements for support to enable food manufacturers in Wales to overcome identified  
6           barriers. Food manufacturers ( $n=37$ ) participated in group discussions ( $n=2$ ) and completed  
7           online-questionnaires ( $n=29$ ). Support mechanisms, perceived necessary to obtain food safety  
8           certification included; funding for training and audit-fees, support for implementing food safety  
9           scheme documentation, on-site support through mentoring/coaching and pre-audits. Findings  
10          identify the need for a food safety scheme certification support package pathway incorporating  
11          online, off-site, on-site and financial support to assist food and drink manufacturers obtain  
12          third-party food safety certification. Such assistance would support three critical areas. Findings  
13          may inform development of support mechanisms to increase uptake of food safety certification  
14          and accelerate food-sector growth.

15 **Keywords:**

16 Perceptions, Barriers, Support Mechanisms, Certification, Food Manufacturing,

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19 **Disclosure statement:**

20 The authors report no conflict of interest.

## 1 **Main introduction.**

2 Obtaining certification against accredited sector-recognised food safety schemes are essential to the  
3 food and drink industry, such schemes provide a framework for compliance to assist in the  
4 production of safe and legal food (BRC GS 2018). Certification requires a manufacturer to  
5 implement a Food Safety Management System (FSMS) to demonstrate their ability to control food  
6 safety hazards and ensure food safety (ISO 2018). In the UK, retailers have been proactively  
7 involved with the development of multiple third-party FSMS (such as the British Retail Consortium  
8 Global Standard (BRCGS) for Food Safety), these standards have become extremely prevalent in  
9 industry (Swoffer 2005). Numerous UK manufacturers have moved away from generic International  
10 Organization for Standardization (ISO) certification, towards such bespoke third-party certification  
11 standards that purposefully relate to industry requirements and retailer-specific compliance schemes  
12 (Grigg and McAlinden 2001). Compliance with a privately operated/owned schemes has become a  
13 prerequisite due to the globalization of the food supply chain (Manning and Baines 2004; Henson  
14 and Humphrey 2009).

15 Research suggests that food and drink manufacturing businesses implement independent  
16 third-party FSMS because they are required to do so by their customers (Taylor 2001; Karipidis et al.  
17 2009; Crandall et al. 2012; Qijun and Batt 2016), and that implementing FSMS improves product  
18 quality and safety (Macheka et al. 2013).

19 Indeed, there are multiple benefits to implementing FSMS and obtaining certification. The  
20 potential competitive advantages have previously been discussed as benefits of implementing FSMS;  
21 improving legal issues, increasing client trust, enhancing customer confidence, improving quality of  
22 management, improving company image and increasing food quality (Karaman et al. 2012; Fernando  
23 et al. 2014; Qijun and Batt 2016). The value of audit and assurance regimes must be recognized in  
24 identifying the risk of food crime in food supply networks in the UK (Elliott 2014).

25 A recent study focusing upon the food manufacturing sector in Wales discussed the potential  
26 positive impact of obtaining and maintaining certification upon local employment particularly in

1 rural areas of high unemployment in Wales which rely upon the food sector for employment (Evans  
2 and Taylor 2019). The importance of the food sector for employment in Wales is clear, as the Welsh  
3 Government Action Plan for the Food and Drink Industry 2014-2020 (Welsh Government 2014)  
4 expresses a commitment to promote and support the uptake of recognized food safety schemes of  
5 food, drink and feed businesses in Wales.

6 To support food manufacturers to obtain certification there is a need to understand the  
7 barriers that exist to obtaining certification in order to explore potential support mechanisms.  
8 Literature suggest the barriers to implementing certified FSMS can differ according to multiple  
9 factors, including company size and product category (Taylor 2001). The cost of a food safety  
10 programme is reportedly a key barrier to the implementation of FSMS in the food manufacturing  
11 industry internationally (Panisello and Quantick 2001; Baş et al. 2007; Karaman et al. 2012; Qijun  
12 and Batt 2016). The 'cost' barrier can relate to internal budgetary constraints, problems in obtaining  
13 external funding required to enable the implementation of the FSMS, or issues in covering the high  
14 costs of certification. Many food manufacturers with limited knowledge of certification are largely  
15 unaware of the high costs and paperwork required to obtain certification (Qijun and Batt 2016).

16 The knowledge and skills of employees are important in the implementation of FSMS. Issues  
17 recruiting suitably qualified staff and insufficient training are barriers to implementing FSMS  
18 (Tunalioglu et al. 2012), indeed finding experienced and technically qualified staff is said to be one  
19 of the most important factors in the successful implementation of FSMS (Taylor 2001). Recent  
20 research with Welsh manufacturers and stakeholders identified barriers to obtaining certification  
21 related to (i) time, cost and resources, (ii) knowledge and skills and (iii) communication and access  
22 to information (Evans and Taylor 2019).

23 Research has identified the potential barriers to obtaining food safety certification in the  
24 Welsh food manufacturing sector (Evans and Taylor 2019), although literature suggest the need for  
25 governments to provide financial support to businesses to establish FSMS (Karaman et al. 2012);  
26 there is a need to explore what specific support mechanisms food manufacturers in Wales perceive to

1 be necessary to overcome the barriers to obtaining certification. Given that such data on UK food  
2 manufacturers and particularly those in Wales are limited, the aim of this study with food  
3 manufacturers in Wales is to identify the support required to overcome barriers to certification. Such  
4 data may inform the development of support mechanisms to enable increased certification and  
5 accelerate food sector growth in line with Welsh Government aspirations (Welsh Government 2014).

## 6 **Materials and methods.**

### 7 *Design and development.*

8 A thorough literature review was conducted to obtain insight into UK and international food safety  
9 certification schemes. Literature regarding the perceptions of the food industry to barriers in  
10 implementing FSMS were collated. Findings from previous research with food manufacturers and  
11 stakeholders that identified the barriers to obtaining certification as: (i) time, cost and resources, (ii)  
12 knowledge and skills and (iii) communication and access to information, were reviewed (Evans and  
13 Taylor 2019). The findings from which were used in the development of documentation such as a  
14 discussion guide to conduct the group discussions with manufacturers for this study.

15 Following the completion of the group discussions, findings were analysed to identify  
16 potential support mechanisms to overcome barriers to certification, which were used to inform the  
17 development of an online self-complete questionnaire. The purpose of the follow-up questionnaire  
18 was to obtain an additional understanding of the attitudes and perceptions of manufacturers towards  
19 the usefulness of potential support mechanisms. Triangulation of the findings from the group  
20 discussions and the questionnaire gives a complementary qualitative and quantitative insight.  
21 Utilising a mixed-methods approach such as this promotes a more comprehensive understanding and  
22 enhances the rigour of the research (Heale and Forbes 2013).

### 23 *Recruitment.*

24 The Welsh food and drink producers' directory (Food Innovation Wales 2016) was utilized to  
25 identify manufacturing businesses of varying sizes, with and without certification in Wales ( $n=403$ ).

1 Project invitations with participant information sheets were sent to managing directors, technical  
2 managers and owners of identified food and drink manufacturers.

3 Such technical leaders were specifically recruited as participants for this study given their  
4 position and responsibility for implementing and maintaining third-party FSMS within the  
5 manufacturing businesses. Typically, in small businesses the owner or manager would be  
6 responsible, whereas established businesses may have a designated technical manager. No monetary  
7 incentives were provided for participation in the study.

### 8 *Data collection.*

9 All participants were provided with a participant information sheet and the opportunity to ask  
10 questions before participation in the two elements of the study. Consent for participation in the group  
11 discussions were obtained by completion of a participant consent form. Each group discussion was  
12 conducted in English with a facilitator and two moderators who acted as note takers. Focus groups  
13 were digitally audio recorded using two Dictaphones (Olympus VN-733PC Digital Voice Recorder,  
14 Tokyo, Japan) and completion took up to 60 minutes.

15 Group discussions ( $n=2$ ) were conducted at the ZERO2FIVE Food Industry Centre in Cardiff  
16 (south Wales) and the Welsh Government office in Llandudno Junction (north Wales) to enable the  
17 involvement of food manufacturers pan Wales ( $n=37$ ). The south Wales group discussion included  
18 20 manufacturers, of which 50% had third-party certification, the north Wales discussion group  
19 included 17 manufacturers, of which 64% had third-party certification. Representation from 10  
20 product categories were included in the discussion groups. A breakdown of focus group participants  
21 is illustrated in **Table 1**.

22 Following the completion of the group discussions, findings were analysed to identify  
23 potential support mechanisms to enable certification, findings of which informed the creation of a  
24 questionnaire to obtain additional insight to the perceptions and attitudes of manufacturers towards  
25 potential support mechanisms. An online self-complete questionnaire was designed, developed and  
26 piloted using Qualtrics (Qualtrics 2017, Provo, UT, USA). The questionnaire consisted of multiple

1 choice questions, including five-point Likert type scales to determined perceived usefulness of  
2 support mechanisms and agreement with attitudinal statements. A link to the questionnaire was sent  
3 to all food manufacturers that participated in the group discussions ( $n=37$ ). An electronic consent  
4 form was completed before filling out the online questionnaire. Manufacturers were able complete  
5 the questionnaire in Welsh or English. Twenty-nine of those that participated in the preceding group  
6 discussions completed the questionnaire, giving a 74% response rate.

### 7 *Data analysis.*

8 Audio files of the group discussions were transcribed into a word processor document (Microsoft  
9 Word, 2010; Microsoft Corporation, Redmond WA), and thematic analysis was conducted using  
10 NVivo 10 (QSR International, Cambridge, MA) to determine common trends relating to potential  
11 support mechanisms. Coding was based on the previously identified barriers, and was conducted by  
12 one researcher, a second researcher reviewed to ensure agreement. Similar codes were aggregated to  
13 form major themes. Identified themes were discussed with the facilitators of the discussion groups.

14 Questionnaire responses detailing the attitudes and perceptions of manufacturers towards  
15 support mechanisms were exported from the online Qualtrics database. Descriptive statistics were  
16 conducted using SPSS Statistics 20 (IBM® Software Group; Chicago, IL, USA) and Microsoft Excel  
17 2010 (Microsoft; Redmond, WA, USA). Qualitative responses were analysed using NVivo 10 (QSR  
18 International, Cambridge, MA).

### 19 *Ethical approval.*

20 Ethical approval for the project and all associated documentation was sought and obtained from the  
21 School Research and Ethics Committee at Cardiff Metropolitan University (SREC reference number:  
22 7720). Consent was obtained from each group discussion participant and questionnaire respondent.

### 24 **Results and discussion.**

25 Food and drink manufacturers based in Wales ( $n=37$ ) participated in the group discussions and

1 completed the online questionnaire ( $n=29$ ). As indicated in Table 1, 38% of participants represented  
2 micro businesses (fewer than 10 staff) and 35% were from small businesses (up to 50 staff). A third  
3 (32%) of the manufacturing participants had BRC GS certification (ranging between AA+ to grade  
4 B) and a further 24% had SALSA certification (Safe and Local Supplier Approval, a UK based food  
5 safety assurance certification for small and micro businesses). The qualitative findings from the  
6 discussion groups and the quantitative findings from the questionnaire are discussed in terms of  
7 addressing previously identified barriers (Evans and Taylor 2019). Table 2 provides examples of  
8 quotes from various participants of the group discussions, this compliments the findings outlined  
9 below whereby potential support mechanisms are discussed in relation to addressing identified  
10 barriers (i) knowledge, skills and development; (ii) information and communication; and (iii)  
11 financial support. Findings are also support with quantitative questionnaire findings in Tables 3, 4  
12 and 5. Table 3, Table 4 and Table 5.

13 As discussed in previous research (Evans and Taylor 2019), barriers are often interrelated,  
14 consequently, several identified support mechanisms address multiple barriers. During the group  
15 discussions it was established that support requirements may vary between manufacturers due to  
16 multiple business variables and according to specific food safety schemes, a participant stated: *“the*  
17 *support depends upon which scheme they go for though doesn’t it, it all depends on that”*. It was also  
18 discussed that the types of support required by businesses wanting to obtain certification or maintain  
19 certification may differ.

20 Discussion group participants were aware of the barriers and issues businesses faced in  
21 obtaining certification; however, many participants found it difficult to identify ‘specific’ support  
22 mechanisms that could be implemented. Businesses were able to pinpoint elements that would be  
23 beneficial to them to overcome identified barriers. Group discussions indicated the need for a  
24 combined multi-phased intervention approach to support food manufacturers to obtain food safety  
25 certification, a participant stated: *“A cohesive approach to encourage food businesses to get*  
26 *appropriate accreditation. There is currently support for trade fairs, packaging, food testing,*



1 accreditation should be another 'given' for the best, aspiring food and drink producers, and to help  
2 achieve accreditation should be mentoring, advice and training in one package." Potential support  
3 mechanisms are discussed in relation to addressing identified barriers.

4 (i) ***Knowledge and skills development to overcome barriers to certification.***

5 **a. Internal systems review:** The 'time consuming' elements of obtaining certification  
6 are related to documentation processes such as design, implementation, verification,  
7 and review of FSMS (Evans and Taylor 2019). Although perceived to be onerous  
8 during discussion groups, businesses discussed the importance of documentation.  
9 Consequently, as indicated in Table 2, suggestions were made regarding the need  
10 for on-site support with paperwork requirements and guidance to set-up and  
11 maintain documentation to obtain certification was needed. The potential benefit of  
12 an internal systems review focusing on paperwork was recognised among  
13 discussion group participants, support to ensure the provision of appropriate  
14 paperwork was perceived to be more valuable than funding for business  
15 development in other areas. It was widely discussed that this type of intervention  
16 needed on-site coaching for it to be bespoke (designed for the specific business),  
17 effective and beneficial.

18 Given the desire for on-site support relating to paperwork requirements, an internal  
19 system review, to facilitate a gap analysis, would assess company documentation against  
20 clauses of a specific food safety scheme, bespoke on-site coaching may improve  
21 understanding of documentation requirements, but completing an internal systems review  
22 is also a mandatory requirement for some food safety scheme standards. Second only to  
23 funding, questionnaire respondents confirmed that an internal systems review and support  
24 with the implementation of documentation were perceived to be some of the most

1 beneficial support mechanisms for manufacturing businesses to implement systems to  
2 obtain and maintain food safety scheme certification.

3 Indeed, the majority of questionnaire respondents (72%) believed that an internal systems  
4 review to support with the implementation of food safety documentation and systems,  
5 would be 'extremely useful' for their business (Table 3). Despite 20% believing that  
6 support with the implementation of food safety documentation may not speed up the  
7 process of achieving food safety scheme certification, the vast majority saw potential  
8 value in such support, with 36% agreeing and 50% strongly agreeing that support with  
9 food safety documentation is essential for maintaining a food safety scheme (Table 4).  
10 Consequently 62% of questionnaire respondents perceived that a support mechanisms  
11 incorporating an internal systems review would be beneficial for their business (Table 5).

12 **b. On-site mentoring and coaching:** Technical expertise is essential for  
13 manufacturers to obtain and maintain food safety certification. Previous research  
14 with Welsh food manufacturers established the knowledge and skills of employees  
15 were perceived to be a barrier to obtaining certification against a food safety  
16 scheme, whereby businesses are unable to recruit skilled staff with relevant  
17 experience, knowledge and skills required to operate effectively which leads to  
18 increased training costs (Evans and Taylor 2019). In this study, numerous internal  
19 and external issues relating to overcoming knowledge and skill barriers were  
20 explored in the group discussions. Support mechanisms relating to education and  
21 training to achieve certification were discussed. Education and training needs were  
22 identified within all levels of a food and drink business, and across all departments  
23 (including operators, technical, procurement, maintenance, engineering, hygiene).  
24 Support to facilitate training related to the cost of training. Many training  
25 programmes already exist but may be costly for businesses. It may be argued that

1 willingness to spend on training of employees can indicate the senior management  
2 commitment in working towards certification.

3 Technical support was deemed to be necessary by discussion group participants to  
4 enhance the food safety-related practices of employees. Technical support was considered  
5 to be very costly, particularly for smaller companies. It was also discussed that despite the  
6 desire for the technical expertise, small businesses may not require a full-time technical  
7 person. As indicated in Table 2, a support mechanism that enabled assistance from an  
8 independent technical person was believed to be useful among discussion group  
9 participants. Indeed, technical support via mentoring or coaching by an experienced  
10 technologist was perceived to be potentially beneficial, particularly for businesses that  
11 may not be aware of what they need. It was discussed that this type of support would  
12 instil confidence. Onsite mentoring was perceived to lever the knowledge and skills into  
13 the business.

14 Given several of the desired support mechanisms discussed during the discussion groups  
15 require on-site intervention by a technical expert, coaching and mentoring should be an  
16 integral part of a future support package. On-site coaching and mentoring enable the  
17 delivery of bespoke and highly focused support for businesses to enable food and drink  
18 manufacturers to make meaningful changes to achieve their full potential.

19 All questionnaire respondents believed such support to be necessary, with 54% agreeing,  
20 and 46% strongly agreeing that on-site support would enable site-specific problems to be  
21 addressed and 93% believing that such support would not be a waste of time for  
22 businesses (Table 4). It was believed that on-site support would be extremely useful (72%)  
23 or useful (24%) for businesses to obtain and maintain food safety scheme certification  
24 (Table 3).

1           **c. Pre-audit inspections:** During the discussion groups, it was established that  
2 knowing what to expect during an official audit was important for food and drink  
3 manufacturing businesses without previous experience of having food safety  
4 certification. It was of particular importance to smaller and less technically mature  
5 businesses.

6           As indicated in Table 2, a pre-audit inspection would build upon the coaching and  
7 mentoring provided via on-site support by a technical expert. As discussed during the  
8 discussion groups, a pre-audit inspection would provide an opportunity to ‘mock’ the real  
9 audit. This would enable businesses to understand what the process involves, and to  
10 determine what is needed for a successful audit. This was perceived to be a useful tool in  
11 preparing for the official audit, but could also identify potential non-conformances that  
12 can be addressed before the official audit. As discussed in the groups, a food  
13 manufacturing business may wrongfully perceive themselves to be ready for an official  
14 food safety scheme audit. A pre-audit factory inspection by an experienced food  
15 technologist auditor/mentor, can save a business money by identifying if a business is  
16 ready for an audit, this may prevent wasting money on what could be a failed audit as it  
17 benchmarks how a business is performing against a third-party standard. A pre-audit  
18 inspection could be the final step in a support package, enabling food and drink  
19 manufacturing businesses in becoming ‘audit-ready’ to gain confidence and reduce the  
20 anxiety of formal audits.

21           The questionnaire determined that businesses were aware of the time commitment  
22 required to conduct a pre-audit inspection, 35% disagreed and 59% strongly disagreed  
23 that such activity would be too time consuming for their business. The most positive  
24 attitudes were expressed towards pre-audits aiding businesses to know what to expect  
25 during an official audit (69% strongly agreed) (Table 4), 76% perceived pre-audit  
26 inspections to be extremely useful (Table 3).

1           **d. Post-audit support:** The need for support may not end when a business becomes  
2           ‘audit-ready’. As previously discussed, support requirements for businesses wishing  
3           to obtain and maintain certification may differ, as barriers can differ between  
4           businesses (Taylor 2001). Similarly, as seen in Table 2, participants of the group  
5           discussions felt there was a need for advice and support to address post-audit non-  
6           conformities to ensure the certification is awarded. It was suggested that such  
7           support to close non-conformities should be separate from the auditing body. With  
8           regards to closing post-audit non-conformities, there is a need for research to  
9           determine the most frequent non-conformities to aid the design and development of  
10          post-audit support. Delivery of post-audit support as part of a future support  
11          package could build upon the rapport developed during previous pre-audit coaching  
12          and mentoring support and should be bespoke to meet specific business needs and  
13          be delivered on-site. Utilising the coaching and mentoring approach would be  
14          beneficial to enable the business to recognise and implement actions to close non-  
15          conformities, it was discussed that being advised how to comply was more valuable  
16          than being told they are not compliant.

17  
18       (ii)    ***Improving information and communication to overcome barriers to certification.***

19           **a. Online-support:** It was identified by discussion group participants that as a starting  
20           point (before individual bespoke support), there is a need to enable businesses to  
21           determine if they are in a position to start working towards a food safety scheme  
22           standard. It was suggested in discussion groups that an online self-assessment tool  
23           utilising understandable language based upon the requirements of the food safety  
24           scheme, would act as a valuable tool to determine the technical and cultural  
25           maturity of businesses to engage with more time-consuming and costly  
26           interventions to work towards certification. As indicated in ***Table 2*** **Error!**

1 **Reference source not found.**, online support such as a self-assessment tool was  
2 perceived to be low cost in terms of resource and time and can be a flexible method  
3 to access information. Similarly, an online self-assessment tool would be a  
4 beneficial starting point for a multi-resource approach, to enable support facilitators  
5 to identify suitable businesses to support. Online support can also facilitate  
6 improved communication to businesses and facilitate provision of information  
7 regarding food safety schemes, the potential benefits of small businesses interacting  
8 with online information sources has been documented in previous literature (Kuhn  
9 et al. 2016).

10 Although 26% of questionnaire respondents believed that online support may not help  
11 with addressing specific food safety scheme difficulties or concerns, 64% agreed or  
12 strongly agreed that such online support could make it easier for food and drink  
13 manufacturing businesses to select and work towards appropriate food safety schemes  
14 (Table 4). Among questionnaire respondents, online support (including self-assessments,  
15 webinars and problem-based forums), was perceived to be useful (52%) or extremely  
16 useful (41%) to support food and drink businesses to work towards certification (Table 3).

17 **b. Networking:** The discussion groups identified the need for networking events to  
18 connect businesses. It was perceived that bringing unexperienced businesses  
19 together with experienced businesses would be beneficial for peer-to-peer learning.  
20 Some businesses discussed how talking to other businesses had aided them when  
21 preparing for an audit in terms of addressing technical issues and knowing what to  
22 expect during the audit experience and suggested it as a suitable support mechanism  
23 (Table 2**Error! Reference source not found.**). Indeed, learning from other

1 businesses that had been through the processes of obtaining certification was  
2 perceived to be a valuable source of support.

3 It was also suggested during the discussion groups that workshops would also assist  
4 businesses in knowing what to expect during the audit by disseminating information  
5 regarding scheme requirements and what the audit would involve. Workshops enable a  
6 group of businesses to engage in intensive discussion and activity that will enable them to  
7 know what to expect during the audit and assist them in becoming 'audit-ready'. Peer-  
8 learning and shared-learning can be beneficial for businesses. Entrepreneurial research  
9 indicates the importance of peer advice as a potential resource for small business owners  
10 to learn and obtain advice (Kuhn et al. 2016). Therefore, networking and workshop  
11 activities could be combined to improve information dissemination regarding scheme  
12 requirements and to enable peer-to-peer advice and communication. This can also be a  
13 mechanism to signpost funding that is currently available to support food businesses in  
14 Wales, as it was discussed that businesses may not be aware of where funding  
15 opportunities exist.

16 The majority of questionnaire respondents believed networking opportunities with other  
17 businesses and scheme holders to be useful or extremely useful (89%) (Table 3), it was  
18 perceived that networking opportunities with other businesses would give insight to  
19 addressing food safety scheme problems (34% strongly agree, 52% agree) (Table 4).

20 *(iii) Financial support to overcome barriers to certification.*

21 **a. Funding for training:** Finance can be a major barrier for many food manufacturing  
22 businesses as investment is required in people, processes, products, equipment and  
23 the manufacturing environment to ensure safe food production in order to achieve  
24 certification (Panisello and Quantick 2001; Baş et al. 2007; Karaman et al. 2012;  
25 Qijun and Batt 2016). 'Money' concerns among Welsh manufacturers relate to

1 changes to structure, investment in equipment, and external resource for technical  
2 knowledge and support, recruitment, training and education (Evans and Taylor  
3 2019).

4 As illustrated in Table 2, the discussion groups identified the need for funding to  
5 pay for training to enhance staff skill and to undertake compliance audits. It was of  
6 particular importance for smaller manufacturers who cannot support a full-time  
7 technical person to enable the financing of qualified technical expertise to ensure  
8 compliance. As discussed in relation to on-site mentoring and coaching, many  
9 training programmes already exist, but are costly for businesses. It may be argued  
10 that willingness to spend on training of employees can indicate the level of senior  
11 management commitment to continuous improvement and in working towards  
12 certification. Some of the costly factors associated with working towards food  
13 safety scheme certification such as employing a technical manager, may be  
14 overcome via on-site mentoring. As funding is available in Wales for Small and  
15 medium-sized enterprises to train staff in key areas relating to food safety and  
16 compliance for certification, improved signposting to funding may be required.

17 All questionnaire respondents believed that support with funding would be useful,  
18 with 86% believing it to be extremely useful (Table 3), two-thirds (66%) also  
19 believed it to be one of the most beneficial of the suggested support mechanisms  
20 (Table 5). Respondents indicated the potential impact of funding, as 61% strongly  
21 agreed that funding for training would result in more capable workforce (Table 4).

22 **b. Audit fee contribution:** It was deliberated in the discussion groups (Table 2) that  
23 the availability of funding would prevent businesses from being deterred by the  
24 costs of schemes. The cost of audits were perceived to be prohibitive in obtaining  
25 certification. Finding suggests that the associated cost of implementing and



1 maintaining a food safety scheme is high and is a significant reason why some  
2 businesses do not obtain certification. Small scale funding could motivate  
3 businesses to work towards certification. A future support mechanism should enable  
4 manufacturers to access financial support and provide manufacturers financial  
5 support towards the costs associated with implementing certification such as an  
6 audit-fee contribution.

7  
8 ***The identified need for a multi-resource food safety scheme certification support package***  
9 ***pathway.***

10 Given that previously identified barriers relate to three distinct areas and are often interconnected,  
11 there needs to be combined, multi-resource intervention to enable food and drink manufacturing  
12 businesses to cumulatively address all three areas through; (i) knowledge and skills development, (ii)  
13 improve information and (iii) access to funding and financial support. Cumulatively, from  
14 completion of the discussion groups and questionnaires in this study, there is an identified need for  
15 the creation of a six-step food safety scheme certification support package pathway to incorporate  
16 online, off-site, on-site and financial support mechanisms to assist food and drink manufacturing  
17 businesses obtain third-party food safety certification (Figure 1);

- 18 1. **Online support:** This would be the first step of a support package to improve information  
19 and communication and determine business suitability. This would be accessed by food  
20 manufacturing business without third party food safety certification. The online support could  
21 outline scheme requirements, provide peer-to-peer forums, and signpost sources of funding  
22 for training. An online self-assessment tool as part of step one, would enable self-reflection  
23 regarding compliance, establish baseline compliance to a specified food safety scheme  
24 standard and determine technical maturity to ascertain business suitability to engage with a  
25 support package.

- 1       2. **Off-site support:** Step two would involve attending an off-site audit preparation workshop  
2           would facilitate information exchange, interactive group activities and peer group learnings.  
3           This would also improve information and communication which may help to ensure that all  
4           businesses understand audit requirements and would also enable valuable networking.
- 5       3. **On-site support:** Provision of on-site support in step three would ensure that delivery of  
6           support is bespoke to meet business needs to facilitate knowledge and skills development,  
7           which would include:
  - 8               a. An internal systems review, a qualified, independent and experienced technologist  
9                   would determine compliance of the premises, production processes and company  
10                   documentation to requirements of a specified standard. This would facilitate bespoke  
11                   coaching and mentoring to support the implementation of food safety protocols and  
12                   practices and action areas of non-conformances to enable improved performance and  
13                   compliance.
  - 14               b. A pre-audit factory inspection would provide insight on how an audit is conducted  
15                   and would verify closure of actions from the prior internal systems review.
- 16       4. **Financial support:** Step four, would focus on funding and financial support. Funding for  
17           training would help to ensure an appropriately trained workforce. An audit-fee contribution  
18           may be an initial motivator for businesses to engage with the support package and would  
19           enable food and drink manufacturers to book the third-party audit.
- 20       5. **Official third-party audit:** Following engagement with the suggested online, off-site, on-site  
21           and financial support mechanisms as outlined in steps 1-4, it would be expected that a  
22           business would be classed as being 'audit-ready'. During step five, the business would book  
23           and undergo an official third-party audit.
- 24       6. **Post-audit support:** After completion of the third-party food safety scheme audit in step  
25           five, post-audit support would be the sixth and final step. This would include coaching and  
26           mentoring activity to implement improvements to close non-conformities and enable

1 certification. Following engagement with the six steps of the suggested food safety scheme  
2 certification support package pathway, food manufacturing business would have obtained  
3 third party food safety certification.

4  
5 There is a need to utilise the findings of this study to design and develop a food safety  
6 scheme certification support package for specific food safety schemes. It would be essential to pilot  
7 and evaluate the suggested mechanisms of the support package to establish the impact, effectiveness  
8 and acceptability of a multi-resource food safety scheme certification support package pathway in  
9 enabling food and drink manufacturing businesses to overcome barriers, and obtain third-party food  
10 safety scheme compliance.

### 11 *Limitations*

12 Potential limitations of the study must be acknowledged. The data presented may not be indicative or  
13 representative of the entire food manufacturing sector, this study gives a novel snapshot of the  
14 perceptions of food manufacturers in Wales regarding their preferences and desires for support  
15 mechanisms. To facilitate effective support to obtain food safety certification, there is a need to  
16 explore the food safety scheme clauses that businesses most frequently are unable to comply with.

### 18 **Conclusion.**

19 Although information detailing the barriers faced by Welsh food manufacturing businesses to obtain  
20 food safety certification exist (Evans and Taylor 2019), prior to this study data detailing the support  
21 requirements of manufacturers in Wales were lacking. Consequently, completion of this study has  
22 facilitated identification of valuable data to inform the development of support mechanisms.

23 Completion of this study has identified that to enable Welsh food manufacturing businesses  
24 to overcome barriers to obtain food safety certification, there is a need for a multi-resource food  
25 safety scheme certification support package. Such a support package would facilitate knowledge and  
26 skills development through bespoke coaching and mentoring; improve information and

1 communication regarding scheme requirements and audit process through online and networking  
2 opportunities; and enable access to funding.

3 Individual support mechanisms may have limited impact, as multiple interrelated barriers  
4 may exist in a business. There is a need for a prescribed support package consisting of multiple  
5 support mechanisms as detailed above, to facilitate optimal support to assist businesses to overcome  
6 commonly identified barriers. Therefore, there is an identified need to design, develop and pilot a  
7 bespoke certification support package for manufacturers in Wales to obtain certification to specific  
8 third-party food safety schemes. Creation and adoption of such a support mechanism may enable  
9 increased uptake of food safety certification and accelerate food sector growth in line with Welsh  
10 Government aspirations.

11 This study identifies the mechanisms that are perceived to be most appropriate and acceptable  
12 by food and drink manufacturers to assist with the development of skills and knowledge; to improve  
13 information and communication, and facilitate access to financial support. There is a need to explore  
14 how effective and successful such mechanisms would be in enabling food manufacturers overcome  
15 barriers to obtain third-party food safety scheme certification.

16

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22

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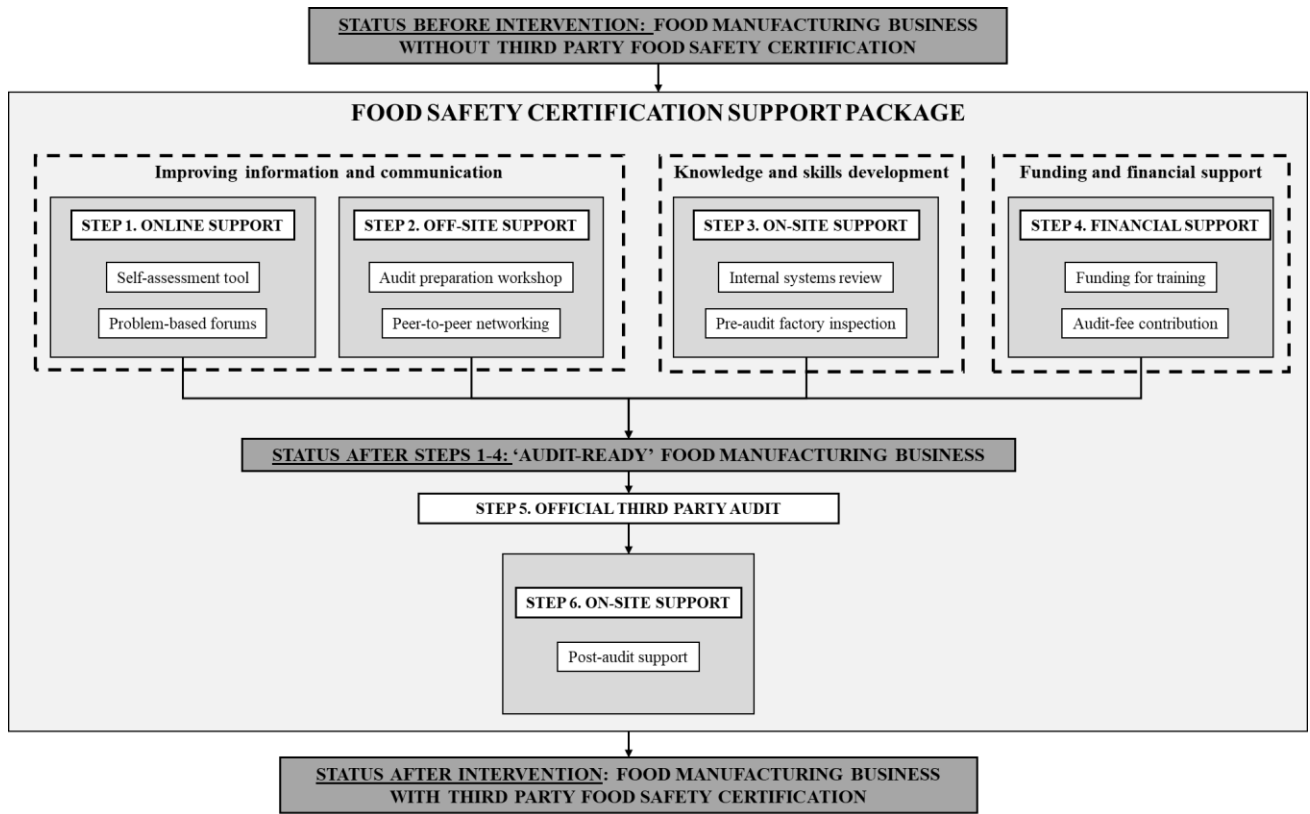
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- 13

1 **Figure headings**

2 Figure 1 Proposed food safety scheme certification support package pathway incorporating online,  
3 off-site, on-site and financial support to assist food and drink manufacturing businesses obtain third-  
4 party food safety certification.

1 **FIGURE 1**

2  
3



4



1 **Table 1 Demographic characteristics of discussion group participants (n=37)**

Demographic characteristics of discussion group participants	South Wales group (n=20)		North Wales group (n=17)		Total (n=37)	
	n	%	n	%	n	%
<i>Gender</i>						
Female	13	65	11	65	24	65
Male	7	35	6	35	13	35
<i>Participant job role</i>						
Manager	5	25	0	0	5	14
Owner	4	20	12	71	16	43
Technical	11	55	5	29	16	43
<i>Business size</i>						
Large (>250 employees)	2	10	0	0	2	5
Medium (<250 employees)	6	30	2	12	8	22
Small (<50 employees)	7	35	6	35	13	35
Micro (<10 employees)	5	25	9	53	14	38
<i>Certification held by business</i>						
SALSA	3	15	6	35	9	24
BRC GS	7	35	5	29	12	32
<i>BRC GS grade awarded to business</i>						
AA+	1	5	0	0	1	3
AA	4	20	3	18	7	19
A	1	5	2	12	3	8
B	1	5	0	0	1	3
<i>Businesses according to product categories</i>						
Ambient stable food	0	0	3	18	3	8
Bakery Products	7	35	8	47	15	41
Confectionery	1	5	1	6	2	5
Dairy, liquid egg	0	0	2	12	2	5
Dried foods and ingredients	2	10	0	0	2	5
Fruits, vegetables and nuts	2	10	0	0	2	5
Low/high acid in cans/glass	0	0	1	6	1	3
Raw prepared products (meat and vegetarian)	3	15	1	6	4	11
Ready to Eat or Heat - Chilled or frozen	6	30	0	0	6	16
Storage and distribution	0	0	1	6	1	3

2

1 **Table 2 Identification of potential support mechanisms in discussion groups for (i) knowledge and skills development, (ii) improving information and communication; and (iii) financial support, to**  
 2 **overcome barriers to certification.**

Support area	Support mechanisms	Summary	Discussion group comments:
(i) Knowledge and skills development to overcome barriers to certification.	a. Internal systems review	Given importance of documentation, on-site guidance to set-up and maintain documentation to obtain certification was identified. Such support was perceived to be more valuable than funding for business development in other areas.	<p><i>“Good documentation is key to accreditation and help in setting it up and then keeping up-to-date is vital.”</i></p> <p><i>“Many see the documentation as too onerous and time consuming. Clear guidance would help but not as much as actual on-site support.”</i></p> <p><i>“Most small companies can’t afford support and try and do it them self and end up missing important documents out. By giving them the support, they understand and improve.”</i></p> <p><i>“It would have been far more beneficial to have help to go through the paper work when you’re running a business rather than throwing money at things like branding. ... It’s the paperwork, the HACCP side and everything like that. And to know what you do need to put everything in place to make your business run properly.”</i></p>
	b. On-site mentoring and coaching	Technical support was deemed necessary to enhance food safety perceptions and practices of employees. However, technical support was considered to be costly for smaller companies that do not require a full time technical position. Therefore, periodical coaching and mentoring from a qualified technologist involving the delivery of training and education was perceived to be beneficial.	<p><i>“To ensure compliance to food safety schemes and for compliance to be maintained 24/7, requires a trained workforce. The level of training required can be too costly for small businesses.”</i></p> <p><i>“Money to pay for training on scheme, standard and staff skill to undertake compliance audits.”</i></p> <p><i>“High cost of Technical Manager resource can be too much for small to medium companies”</i></p> <p><i>“For a company of our size we wouldn’t be able to employ somebody full time, but maybe if we could have somebody one day a week in our business and the remainder elsewhere”,</i></p> <p><i>“Mentors to visit would be excellent.”</i></p> <p><i>“it could be that they just think they don’t know what they need, and that’s why they need “Advice and mentoring from someone to actually steer them a little bit more and say ‘what you’re doing is right and correct’ and again, give them confidence in what they are doing a little bit more”</i></p>

			<i>“Face to face will embed the knowledge”.</i>
	c. Pre-audit inspections:	Pre-audits would determine if a business is ready for an official audit, would enable businesses to know what to expect during an official audit and would potentially identify non-conformances that can be addressed before an official audit.	<p><i>“This would be a useful tool in preparing for the main audit, to focus, a ‘fresh pair of eyes’ approach and for coaching staff at the site.”</i></p> <p><i>“Pre-audits are essential by someone who is familiar with the standard requirements to establish an effective gap analysis and an action plan to support implementation to achieve compliance.”</i></p> <p><i>“Allows the company to fix any issues before real audit.”</i></p> <p><i>“Save wasting money on what could turn out to be a failed audit.”</i></p> <p><i>“Benchmarks where a company is in relation to compliance.”</i></p> <p><i>“Take away the fear of formal audits.”</i></p>
	d. Post-audit support:	The need for support does not end following the audit, support was necessary to address post-audit non-conformities to ensure certification is awarded	<p><i>“If I’m paying for someone to come and audit me and after auditing someone they are selling the services off the back of the non-conformances that they found during the audit, I personally think that the body should separate their role of the support and advice that they supply from the auditing.”</i></p> <p><i>“Confidential direct contact with a food technologist or an auditor.”</i></p> <p><i>“Being advised how to comply is more valuable than merely being told you don’t.”</i></p>
(ii) Improving information and communication to overcome barriers to certification.	a. Online support	Businesses need to identify if they are ready to work towards certification. An online self-assessment tool would be a cost effective method to determine if a business is in a position to work towards a certification standard. Online support can also improve communication regarding food safety schemes.	<p><i>“It ensures an inexperienced company is on the correct path and therefore are less likely to waste time and resources.”</i></p> <p><i>“Useful and cheap way of accessing information, can be very flexible.”</i></p>
	b. Networking	Networking opportunities would facilitate informal peer-to-peer learning and enable businesses to know how to approach certification and what to expect during the audit.	<p><i>“Fund networking opps.”</i></p> <p><i>“Bringing experienced and fledgling companies together is a huge benefit. This can be online as well as maybe quarterly networking events.”</i></p> <p><i>“So that those people who are looking to go that step further, can get hold of somebody that’s locally gone through the BRC audit or the SALSA audit have a</i></p>

		Workshops can also assist businesses to know what schemes required and can signpost funding opportunities for businesses.	<p><i>chat, have a talk, because they know what they are feeling at the time of that audit, you are feeling all tight and tense and not knowing what to expect, and they could talk to someone that might put them at their ease.”</i></p> <p><i>“Sometimes I actually think that you can get the best support from someone who’s already been through something. So, it’d be good to have that option.”</i></p> <p><i>“Excellent for smaller businesses who don’t have a large team of experience.”</i></p> <p><i>“Networking with business representatives who have achieved or are working towards accreditation is useful to draw on experience and shared learning”.</i></p>
(iii) Financial support to overcome barriers to certification	a. Funding for training	Funding was most often perceived necessary to support training of staff or to access technical support.	<p><i>“To ensure compliance to food safety requires a trained workforce. The level of training required can be too costly for small businesses.”</i></p> <p><i>“Money to pay for training on scheme standard and staff skill to undertake compliance audits.”</i></p> <p><i>“Essential for growth of the small or medium business who cannot support a full-time technical person in-house.”</i></p>
	b. Audit fee contribution	Small scale funding such as an audit-fee contribution can act as motivation for businesses to work towards certification.	<p><i>“Schemes are expensive especially for micro businesses and this deters many from considering the schemes.”</i></p> <p><i>“Costs for small companies are prohibitive to initially get to the required standard.”</i></p> <p><i>“Any funding support would be beneficial.”</i></p> <p><i>“By funding companies to get better accreditation.”</i></p>

1 **Table 3 Perceived usefulness of potential support mechanisms (n=29)**

<b>Support mechanisms</b>	<b>Extremely useful</b>	<b>Useful</b>	<b>Neither useful nor useless</b>	<b>Useless</b>	<b>Extremely useless</b>
Internal systems review and support (e.g. support with the implementation of food safety documentation and systems)	72%	24%	4%	0%	0%
On-site support (e.g. coaching and mentoring)	72%	24%	4%	0%	0%
Pre-audit inspections	76%	24%	0%	0%	0%
Online support (e.g. self-assessment tools, tutorials, webinars, problem-based forums)	41%	52%	7%	0%	0%
Networking opportunities (e.g. with other food and drink businesses, scheme holders, food centres)	48%	41%	7%	4%	0%
Support with funding (e.g. for technical advice, audit fees and training)	86%	14%	0%	0%	0%

2

3

1 **Table 4 Attitudes towards suggested support mechanisms (n=29)**

2

<b>Statement</b>	<b>Strongly agree</b>	<b>Agree</b>	<b>Neither agree nor disagree</b>	<b>Disagree</b>	<b>Disagree strongly</b>
On-site support would enable site-specific problems to be addressed	46%	54%	0%	0%	0%
Networking opportunities with other food and drink businesses would give insight to addressing food safety scheme problems	34%	52%	10%	3%	0%
Online support could make it easier for food and drink businesses to select an appropriate food safety scheme	25%	39%	29%	7%	0%
Staff training can improve employee engagement in working towards a food safety scheme	59%	38%	3%	0%	0%
Support with the up-keep of food safety documentation is essential for maintaining a food safety scheme	50%	36%	14%	0%	0%
Funding for training would result in more capable workforce	61%	32%	7%	0%	0%
A pre-audit would aid businesses to know what to expect during an audit	69%	28%	0%	3%	0%
Online support would not help with addressing food safety scheme difficulties or concerns	0%	7%	19%	48%	26%
Support with the implementation of food safety documentation would not speed up the process of achieving a food safety scheme	3%	7%	10%	41%	38%
Networking opportunities are not beneficial for food and drink businesses	0%	4%	7%	46%	43%
Training and advice will not improve a business's ability to comply to a food safety scheme	4%	0%	4%	46%	46%
On-site coaching and mentoring would be a waste of time for businesses	3%	0%	3%	34%	59%
A pre-audit would be too time consuming	4%	0%	7%	54%	36%

3

4

1 **Table 5 Support mechanisms perceived to be beneficial to their food and drink manufacturing business (*n*=29, respondents**  
2 **were permitted to select as many mechanisms as they perceived beneficial)**

3

<b>Support mechanisms</b>	<b>%</b>
Support with funding (e.g. for technical advice, audit fees and training)	66%
Internal systems review and support (e.g. support with the implementation of food safety documentation and systems)	62%
On-site support (e.g. coaching and mentoring)	48%
Pre-audit inspections	45%
Networking opportunities (e.g. with other food and drink businesses, scheme holders, food centres)	28%
Online support (e.g. self-assessment tools, tutorials, webinars, problem-based forums)	10%

4

