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| Food Safety Culture - Part 1 of 6: How to get Buy-In, Develop Metrics, and Properly Implement | May 26, 11:00am (EST) |
| Food Safety Culture - Part 2 of 6: Food Safety Culture & Communication - It's about People | June 8, 11:00am (EST) |
| Food Safety Culture - Part 3 of 6: Latest Food Safety Culture Research From Four Doctoral Researchers | June 22, 11:00am (EST) |
| Food Safety Culture - Part 4 of 6: SQF and Culture Improvements - Hear Practical Learnings From Two Companies | July 6, 11:00am (EST) |
| Food Safety Culture - Part 5 of 6: Evolving the Retailer Stand on Food Safety Audits; Culture and Behavioral Assessments | July 13, 11:00am (EST) |
| Food Safety Culture - Part 6 of 6: Dynamic Leadership by Supervisors = Strong Organizational Cultures | July 22, 11:00am (EST) |

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Food Safety Culture - Part 3 of 6: Latest Food Safety Culture Research From Four Doctoral Researchers

Moderator: Lone Jespersen Cultivate, Switzerland

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Today's Presenters



Emma Samuel

Emma is assessing hand hygiene compliance and food safety culture influences in food manufacturing. Only mid-way into her PhD, this novel project facilitates access to an operational multi-site business for the entire project duration.



Rounaq Nayak

Dr. Rounaq Nayak is a Lecturer in Food Policy at Harper Adams University, Shropshire, UK. His research interests lie in the areas of modern slavery (within local and global food systems), food safety culture, food system resilience, and applying human factors methods to investigate the above areas. He was admitted to the degree of Doctor of Philosophy at Loughborough University (2018) in Human Factors and Complex Systems, and his thesis was titled, "Food Safety Culture: A Systems Approach".



Sophie Tongyu Wu

Sophie Tongyu Wu just graduated with her PhD from Purdue University USA, her research interest being food safety behavior, climate, and culture in *Listeria monocytogenes* control in retail environments. She is active in advocating health sciences in the realm of human rights, which is reflected in her concurrent study with the Human Rights Program and a summer study abroad program in Central European University in Budapest, Hungary.



Shingai Nyarugwe

Shingai recently obtained her PhD from Wageningen University where she researched the influence of food safety culture on food safety behavior and food safety performance, including the role of the company environment. She is a member of the food safety culture science group (SALUS)

APPLYING THE GFSI FOOD SAFETY CULTURE FRAMEWORK TO HAND HYGIENE COMPLIANCE IN FOOD MANUFACTURING

Emma Samuel, KESS2 PhD Candidate (Year 2)

Supervisors: Dr Elizabeth C. Redmond and Dr Ellen W. Evans

ZERO2FIVE Food Industry Centre, Cardiff Metropolitan University



Ysgoloriaethau Sgiliau Economi Gwybodaeth
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Prifysgol Metropolitan Caerdydd

MY PROJECT: Hand hygiene compliance in food manufacturing



- 3 Year PhD Scholarship
- Supported by the European Social Fund through Welsh Government and the business partner
- Administered by the pan-Wales Knowledge Economy Skills Scholarship (KESS2) from Bangor University
- **Purpose: To partner industry with higher education academic skills**



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PROBLEM AND AIMS



*“Hand hygiene practices were carried out **adequately on 31%** of required occasions and were **not even attempted on 55%** of occasions..” Clayton and Griffiths (2004)*

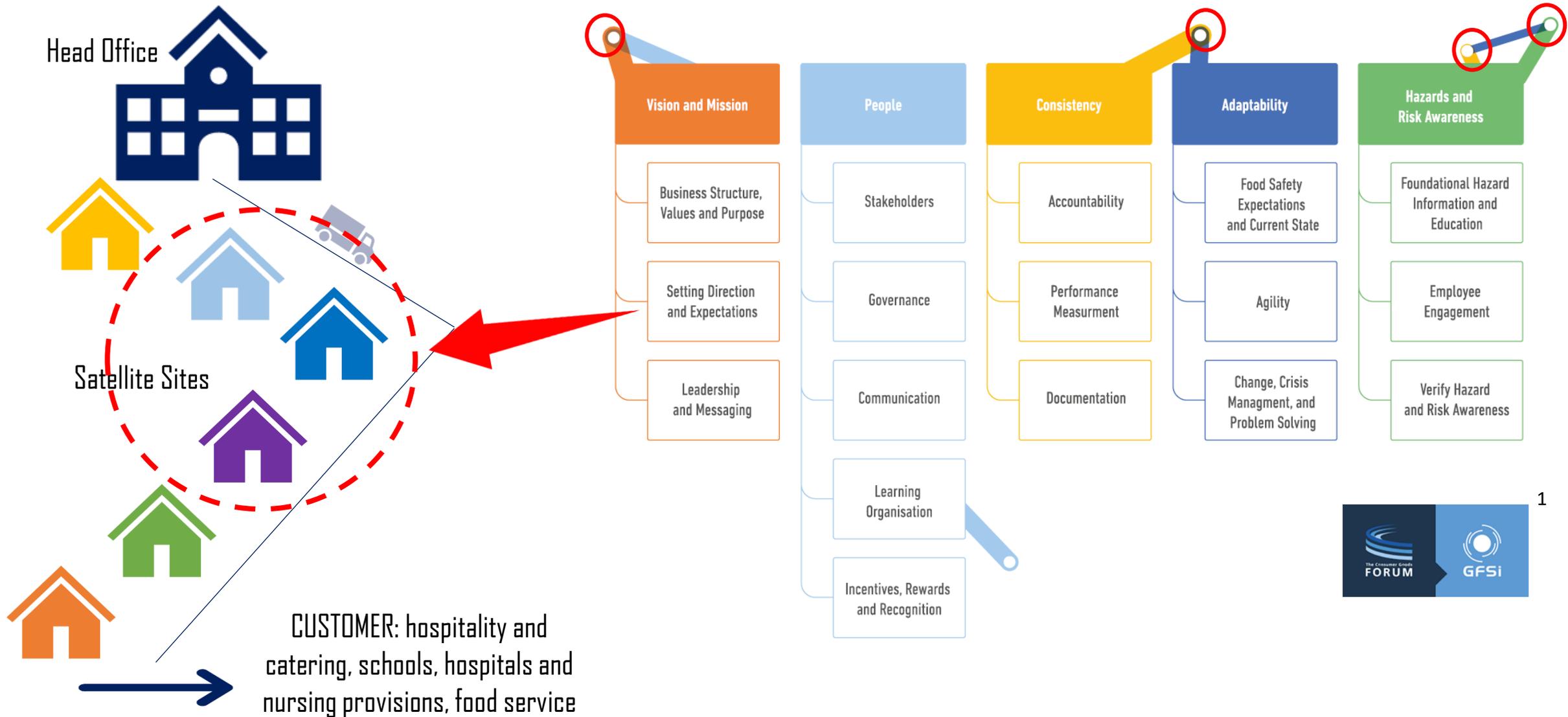
*“...out of **494 (48.1%)** actions categorized as behaviors to be followed by hand sanitation, only **four (0.8%)** were followed by hand sanitation practices.” Her et al (2019)*

*“...**604** attempts... only **2.2%** (13 attempts) were determined to be compliant with the company protocol” Evans and Redmond (2019)*

“...knowledge-based training alone was not enough to improve employees’ handwashing performance...” Yu et al (2018)

- AIMS:**
- Assess hand hygiene compliance before production entry and inside production departments.
 - Assess the food safety culture dimensions influencing hand hygiene behaviour.

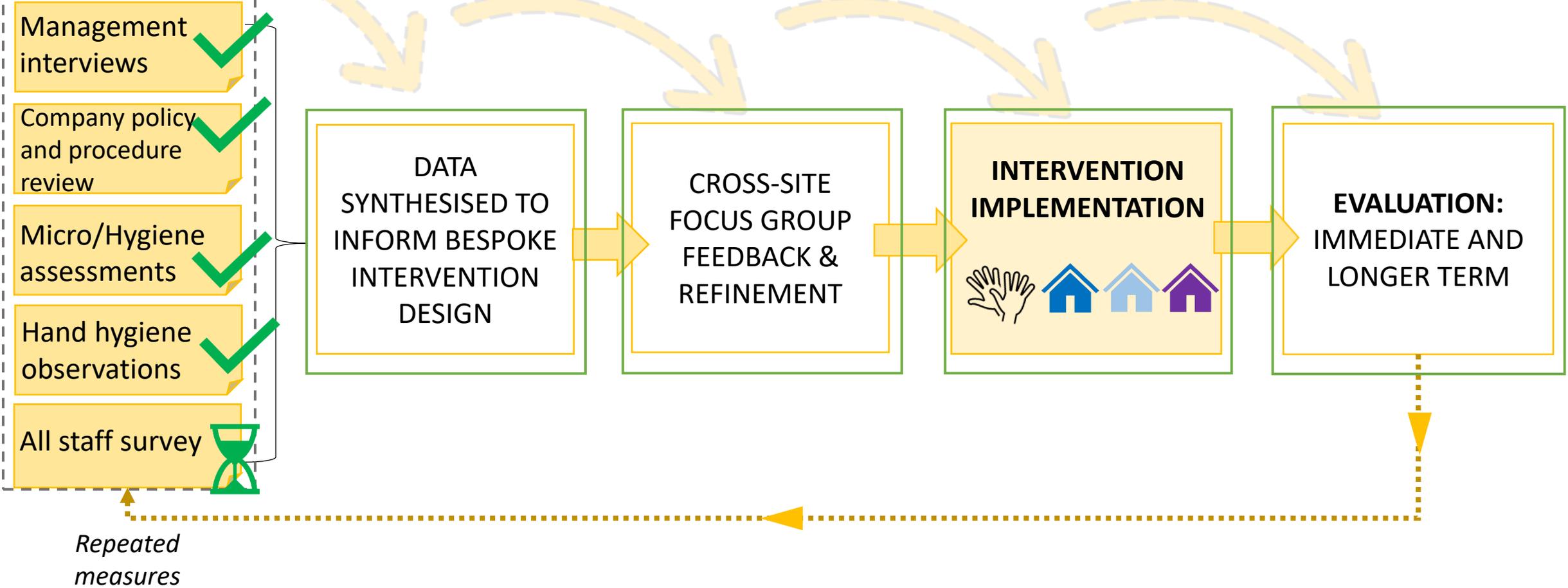
BUSINESS PARTNER AND GFSI FRAMEWORK



1 Global Food Safety Initiative (2018) A culture of food safety. A position paper from the Global Food Safety Initiative (GFSI)

PROJECT DESIGN

Preliminary:



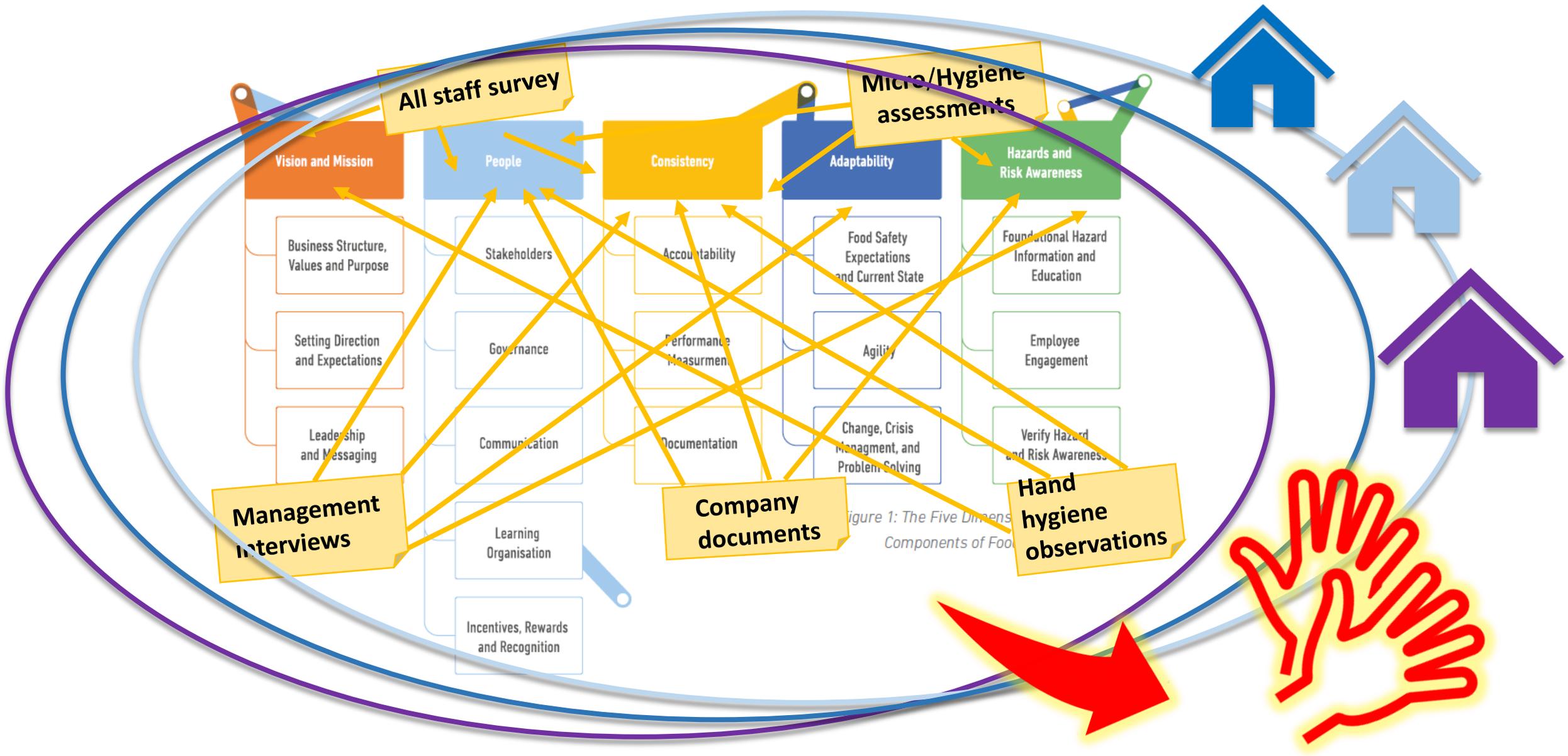


Figure 1: The Five Dimensions Components of Food Safety Culture

MANAGEMENT INTERVIEWS

SENIOR MANAGEMENT

"...we've developed a business around a culture of looking after the customer.

Because we want their order tomorrow. And the day after. And next week and so on."

P004, Board Member

"...customer care is paramount. That probably is the number one priority."

P003, Board Member

"It's not a mission statement or set of goals which are written down ... But they're embedded and ingrained into everyone that works here."

P005, Board Member

SITE MANAGEMENT

"...biggest driver is customer service. And its all about getting the product to the customer in a timely manner..."

P002, Site 3

"...fundamentally customer service. I think that's what they see as being above everything else ... fulfilling a customer's needs ..."

P001, Site 1

*"The focus is the customer. **The customer is, is king.** Supply the customer. Do whatever we can, bend over backwards, to make sure you supply the customers, keep the customer's happy. **That is the main priority.**"*

P004, Site 1



Vision and
Mission

People

Consistency

COMPANY POLICY (Hand Hygiene)

... when do I wash my hands ...?

GLOVE POLICY

Hands are to be washed and sanitized **before putting on blue gloves.**

Gloves must be changed **in-between every product** produced, but **can be changed sooner** than this if required.

PERSONAL HYGIENE POLICY

Hands should be washed **frequently** before especially:

Before handling food in the food production areas.

Between food handling operations.

After using the toilet and before leaving the washroom.

After handling waste food or refuse.

ALLERGEN POLICY

Staff must change disposable PPE (gloves, sleeves, aprons) and wash their hands **before** changing to the **next activity.**

STAFF HYGIENE RULES

- Hands must be washed **regularly as procedure**, and **in addition, after** handling waste products, rubbish bags, picking items up from the floor, etc.
- Avoid touching your face, nose and mouth with your hands, if you do so, wash and sanitise your hands **immediately** afterwards.
- If you need to cough or sneeze, please push your mouth into your shoulder before you cough/sneeze. **Do not use your hands.**
- If you blow your nose, please do so outside of the production area. Wash and sanitise your hands **immediately** afterwards.



People

Consistency

Hazard &
Risk Aware

COMPANY PROCEDURE

A FOOD HANDLER JOB DESCRIPTION (Extract)

- Preparing and producing products in a controlled environment, in line with the high standards required by ourselves, our customers and our audit partners.
- Responsible for maintaining a high standard of Personal Hygiene and Food Hygiene practices
- Report all hazards to supervisors

The job will also include all other reasonable related and administrative duties / tasks as may be required from time to time.



Q: Why should outdoor clothing be kept out of the food preparation area?

Q: The principal role of a supervisor in a catering business is to...

Q: An adequate handwashing duration is...

Q: Hands should be washed [*choose*]...

Q: The correct procedure for washing hands is ...



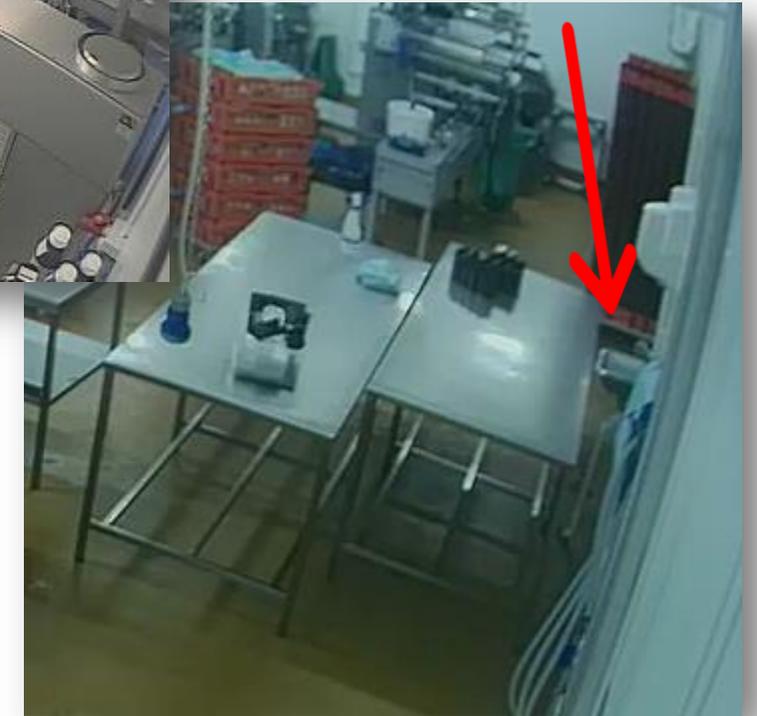
People

Consistency

Hazard &
Risk Aware

Adaptability

COMPANY ARTEFACTS



"...it's a move in the right direction. I do think in order for us to improve our food safety culture then it is going to require a hell of a lot more effort than a notice board!"

P002, Site 3



People

Consistency

Hazard & Risk Aware

Adaptability

MANAGEMENT INTERVIEWS

SENIOR
MANAGEMENT

“Well we don't have a mission statement which is something that I have been trying to push for.”

“I think it's something that we need...I think it sets a focus for all of our employees to know where the company's heading and where we want to be.”

P006, Head Office

“...they will have pages of stuff about their processes, the culture, the mission statement but actually what I felt was that they were just bits of paper.”

P005, Board Member

SITE
MANAGEMENT

“Food safety culture is ... to me, what is actually happening... It's kind of, people's opinions and actions surrounding food safety culture which is important... you can, you can have all the procedures and processes and theory you like, but if, if it's not actually being applied and understood then it won't be effective.”

P002, Site 3



Vision and
Mission

People

Consistency

Adaptability

TAKE HOME MESSAGES

- Food safety culture dimensional aspects weave their way through *all* organisational characteristics.
- Developing and documenting the business vision and mission would establish food safety expectations company-wide.
- Food safety culture is not a lone warrior endeavour! Working together is key and the GFSI position paper provides a comprehensive framework to guide the way.

Thank you!



ACKNOWLEDGEMENTS

- The project business partner for their continued support and involvement in this study.
- KESS2 Knowledge Economy Skill Scholarships for enabling this collaborative project.
- International Association for Food Protection and Dr Lone Jespersen for the opportunity to present today.
- Audience.

REFERENCES

Clayton, D. A. and Griffith, C. J. (2004) 'Observation of food safety practices in catering using notational analysis'.

Evans, E. W. and Redmond, E. C. (2019) 'Video observation of hand-hygiene compliance in a manufacturer of ready-to-eat pie and pastry products'.

Her, E. *et al.* (2019) 'Assessment of food safety at university food courts using surveys, observations, and microbial testing'.

Yu, H. *et al.* (2018) 'Implementation of Behavior-Based Training Can Improve Food Service Employees' Handwashing Frequencies, Duration, and Effectiveness'.

Global Food Safety Initiative (2018) 'A culture of food safety. A position paper from the Global Food Safety Initiative (GFSI)'

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Knowledge Economy Skills Scholarships



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Food Safety Culture Assessment: The Regulators' Perspective

Dr Rounaq Nayak MCIEH

Lecturer in Food Policy

Overview

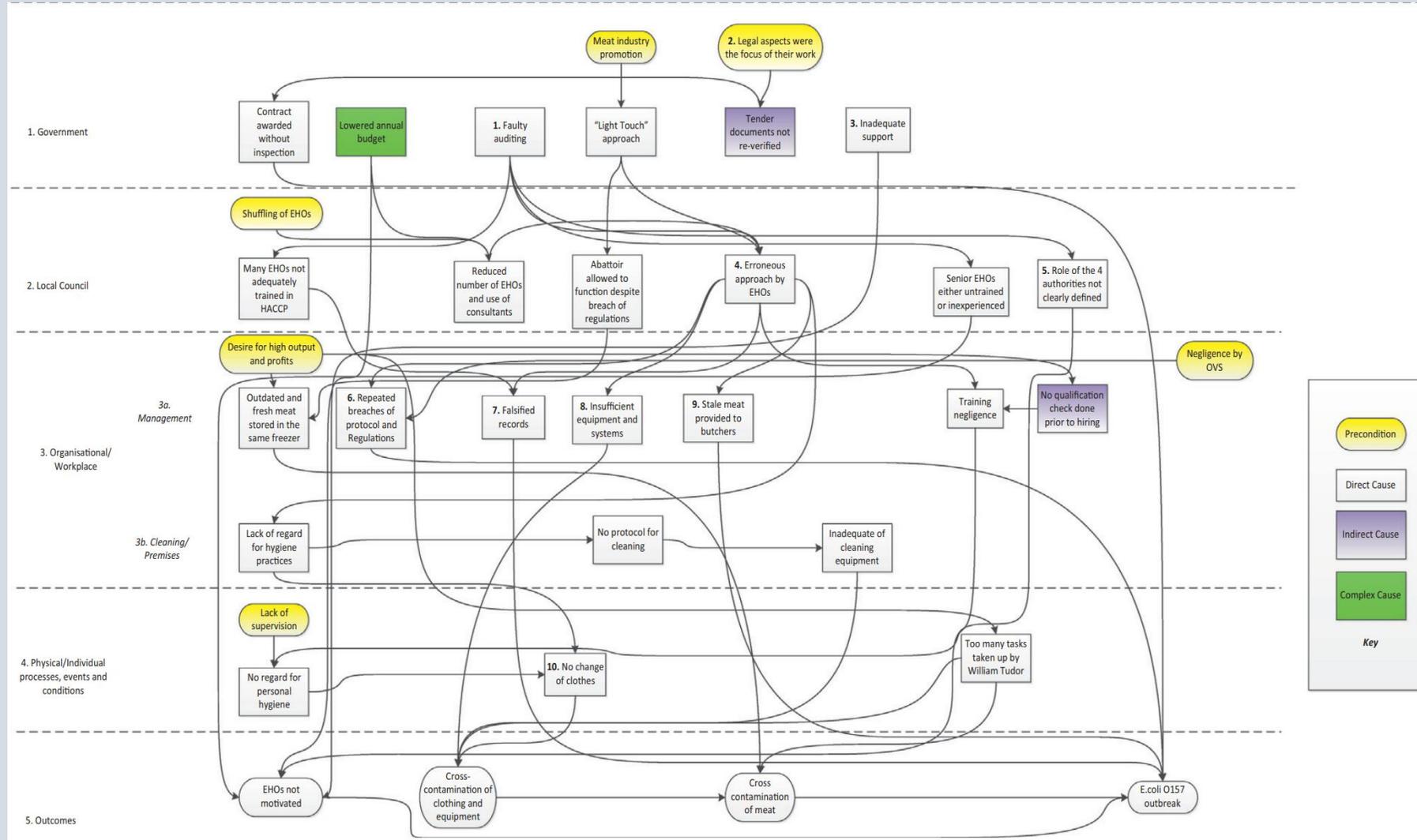
Aim:

- To examine the **utility of the concept** of food safety culture (FSC) as a means of **improving food safety** in the UK by identifying regulators' perspectives towards the construct of FSC.
- The secondary aim was to assess the novelty of applying a **human factors and complex systems** approach to food safety.

“A range of **attitudes, values, perceptions** and **behaviours** which food safety stakeholders...**share** with regards to **risks and hazards** associated with food safety and its impact on the wider general public.”

- Nayak & Waterson, 2018

Study 1 – Exploring the complexity



Source: Nayak & Waterson, 2016

Study 2 – Regulators' Perspectives

Changes in the industry

- Emphasis used to be on **basic hygiene, cleanliness & structural conditions.**

Food Safety Culture

- Appropriate concept.
- Everybody (Food Business Operator) has a different approach.
- Sometimes receives far less attention.
- Small businesses have opportunity for owners to be involved (but doesn't happen).

Tools used

- FSA toolkit just adds on to existing tools.
- Various attempts to provide food safety awards have mixed successes.
 - Scoring is crude
- Boosts food safety practices

Study 2 – Perception of existing FSA toolkit

“Too wordy”

“No time to do this”

“33 pages is too much!”

“Might be something for private auditors”

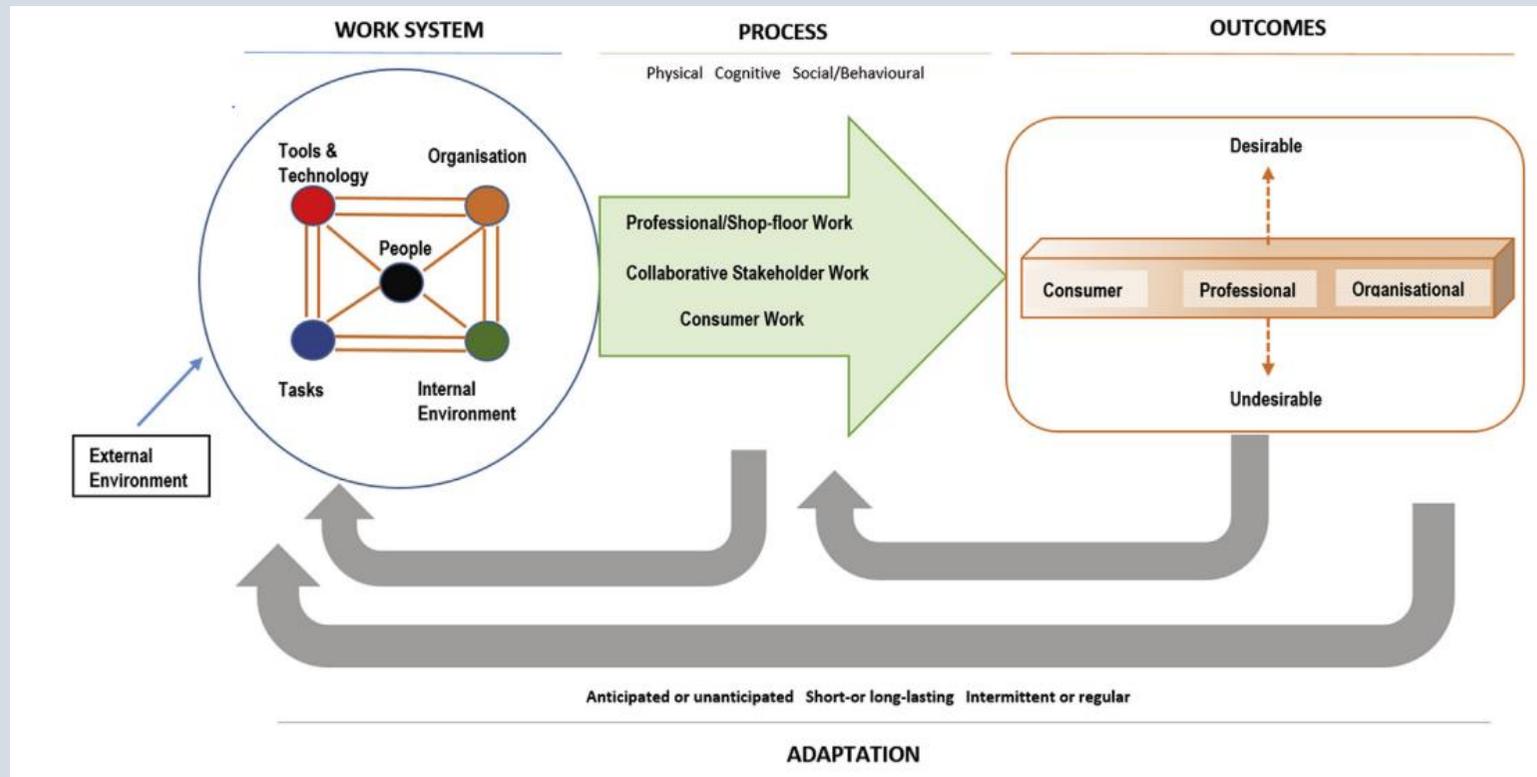
“Repetitive levels”

“Looks fairly complicated!”

“Did not have the time to read this...sorry!”

“This is so subjective!”

Future work – Efficacy of managing change within local food systems



Take-home points

- Unless stakeholders take **ownership**, and are **involved** in the design of a toolkit, improving FCS will never be a serious goal within food systems.
- Think about the **complex system** and **practicality** before designing interventions.
- Food systems are **people-centred** systems.
 - Non-technical skills are key for enabling positive food safety behaviours.

References

- Nayak, R. (2018). *Food Safety Culture: A Systems Approach* [Loughborough University]. <https://doi.org/https://dspace.lboro.ac.uk/2134/32563>
- Nayak, R., & Waterson, P. (2016). 'When Food Kills': A socio-technical systems analysis of the UK Pennington 1996 and 2005 E.coli O157 Outbreak reports. *Safety Science*, 86, 36–47. <https://doi.org/10.1016/j.ssci.2016.02.007>
- 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. <https://doi.org/10.1016/j.foodcont.2016.10.061>
- Nayak, R., & Waterson, P. (2019). Global Food Safety as a Complex Adaptive System: Key Concepts and Future Prospects. *Trends in Food Science & Technology*, 91, 409–425.

Exploring food safety management and socioeconomic dynamics of *Listeria monocytogenes* control at retail

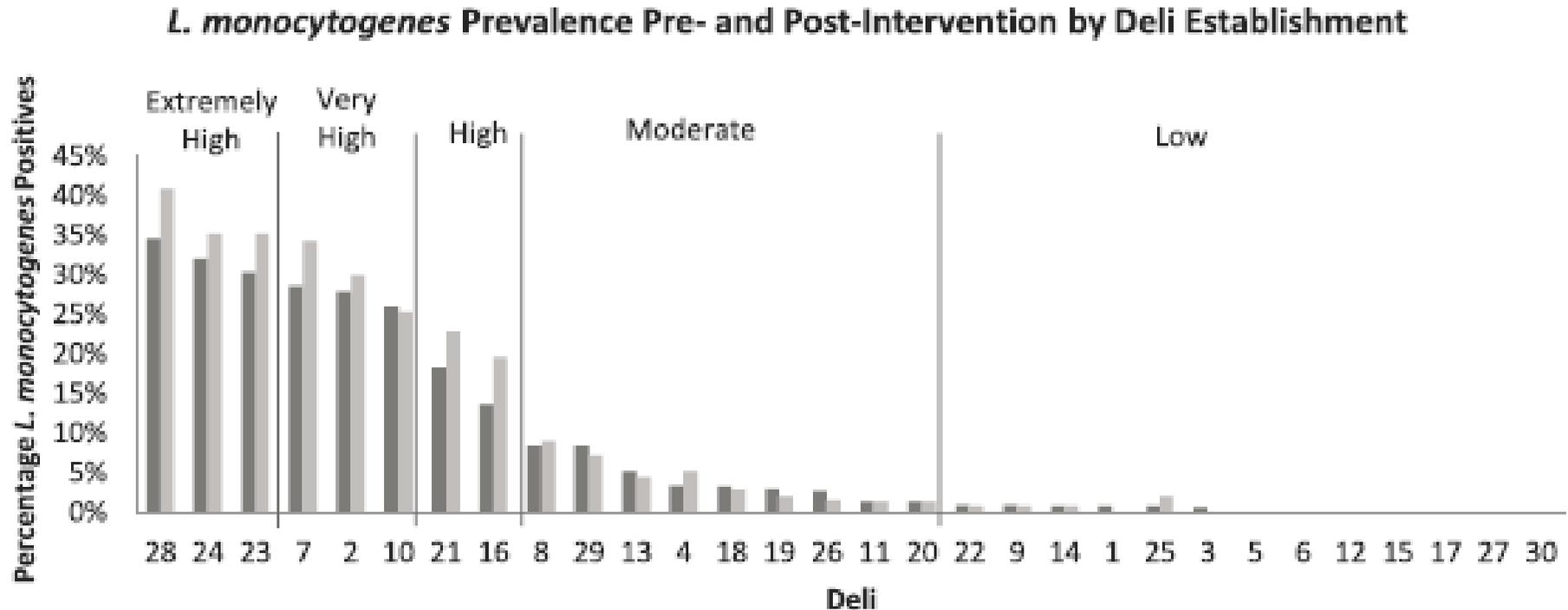
Sophie Tongyu Wu

PI: Dr. Haley F. Oliver

June 22, 2020



Listeria monocytogenes at retail (Etter et al., 2017)



- 3 U.S. states, 30 retail delis
- Monthly environmental sampling for 6 months
- Deep clean intervention did not reduce *L. monocytogenes* prevalence in retail delis

Handwashing compliance

- Measured against *Food Code* recommendations...
- **Study I (2008)**: in 9 retail delis
 - Ranging from **5% to 33%** (Strohbehn et al., 2008)
- **Study II (2010)**: in 16 retail food service facilities
 - Chain store employees: compliance rate was **17%**
 - Individual store employees: compliance rate was **2%** (Lubran et al., 2010)



Socioeconomics of health

Socioeconomics is correlated with health status

- Education (Gathmann et al., 2015)
- Income (van Kippersluis et al., 2009; van Kippersluis et al., 2010)
- Wealth indices (Suk, 2009)

Lower socioeconomic status → more prone to *L. monocytogenes* infection

- Among pregnant women in England and Wales (Mook et al., 2010)
- Among listeriosis patients in England (Gillespie et al., 2010)

Knowledge gaps



Part I. Why does deep clean intervention have limited effect on controlling *L. monocytogenes* prevalence?



Part II. What human behaviors and socioeconomic factors strongly associate with *L. monocytogenes* prevalence and contamination risk?



Conclusions: How could these behaviors be mitigated and improved?

Part I.
Retail studies:
produce & deli

Hypothesis: management strategies, infrastructure designs, and food safety climate impact L. monocytogenes prevalence in retail produce & deli environments.

Approach



Retail Produce (30 stores, 7 U.S. states)

L. monocytogenes prevalence
Survey: management, infrastructure, sanitation



Retail Deli (50 stores, 6 U.S. states)

L. monocytogenes risk
Food safety climate & culture survey

L. monocytogenes control at retail

- Retail deli managers and associates have better food safety culture in stores with lower *Listeria monocytogenes* contamination. *Food Control*, 110.
- Infrastructure, sanitation, and management practices impact *Listeria monocytogenes* prevalence in retail grocery produce environments. *Food Control*, 109.



Part II.
Socioeconomics
and *L.*
monocytogenes

Hypothesis: Lower socioeconomic status is correlated with greater *L. monocytogenes* contamination at retail.

Approach



Longitudinal *L. monocytogenes* environmental data from 100 retail delis in 9 U.S. states (Jul 2010 – Jan 2013)



Correlated environmental *L. monocytogenes* prevalence to demographic data from 2010 US Census Bureau at tract level (e.g. education, employment status, race, income per capita, etc.)



Collaborated with School of Economic Sciences at Washington State University

Results



Increased *L. monocytogenes* prevalence was significantly correlated with decreased income of the area



Race, education, level of urbanization and population density were **not** significant

M. D. Amin, J. J. McCluskey, R. C. Mittelhammer, H. F. Oliver, and S. T. Wu. *Submitted*. **Census-tract incomes predict food safety risks in retail food environments.** *Sci Adv.*

Socioeconomic factors

Race

Education

Urbanization

Population density

Income



Take-home messages

1. **Verification:** hand hygiene + SSOP
2. **Infrastructure:** minimize cross-contamination + maximize cleanability
3. **Resources** should be directed to build / verify food safety behaviors and training programs, and assess investments in retail stores in lower income quartiles that may be at greater risk for high *L. monocytogenes* contamination



References

- Etter A, Hammons SR, Roof S, Simmons C, Wu T, Cook P, Katubig A, Stasiewicz M, Wright E, Warchocki S, Hollingworth J, Thesmar H, Ibrahim S, Wiedmann M, Oliver HF. 2017. Enhanced standard SSOPs have limited impact on *Listeria monocytogenes* prevalence in retail delis. *J Food Prot*, 80:11, 1903-1912. Doi: 10.4315/0362-028X.JFP-17-112.
- Strohbehn C., J. Sneed, P. Paez, J. Meyer. 2008. Hand washing frequencies and procedures used in retail food services. *J Food Prot*. 71 (8): 1641-50.
- Lubran, M. B., R. Pouillot, S. Bohm, E. M. Calvey, J. Meng, and S. Dennis. 2010. Observational study of food safety practices in retail deli departments. *J Food Prot*. 73(10): 1849-1857.
- Gathmann C, Jürges H, Reinhold S. 2015. Compulsory schooling reforms, education and mortality in twentieth century Europe. *Soc Sci & Med*, 127:74-82.
- van Kippersluis, van Ourti T, O'Donnell H, van Doorslaer E. 2009. Health and income across the life cycle and generations in Europe. *J Health Eco*, 28:818-830.
- van Kippersluis, H, O'Donnell O, van Doorslaer E, van Ourti T. 2010. Socioeconomic differences in health over the life cycle in an Egalitarian country. *Soc Sci & Med*, 70:4428-438.
- Suk JE, Manissero D, Büscher G, Semenza JC. 2009. Wealth inequality and Tuberculosis elimination in Europe. *Emerg Infect Dis*, 15(11):1812-1814.
- Mook, P., Grant, K. A., Little, C. L., Kafatos, G., & Gillespie, I. A. (2010). Emergence of pregnancy-related listeriosis amongst ethnic minorities in England and Wales. *Eurosurveillance*, 15, 17-23.
- Gillespie, I. A., Mook, P., Little, C. L., Grant, K. A., & McLauchlin, J. (2010). Human listeriosis in England, 2001–2007: association with neighbourhood deprivation. *Eurosurveillance*, 15, 7-16.

Further readings...

- **S. T. Wu**, S. R. Hammons, R. Silver, J. A. Neal, and H. F. Oliver. 2020. Retail deli managers and associates have better food safety culture in stores with lower *Listeria monocytogenes* contamination. *Food Control*, 110. Doi: 10.1016/j.foodcont.2019.106983.
- **S. T. Wu.**, J. Burnett, J. Wang, S. R. Hammons, D. R. Veenhuizen, and H. F. Oliver. 2020. Infrastructure, sanitation, and management practices impact *Listeria monocytogenes* prevalence in retail grocery produce environments. *Food Control*, 109. Doi: 10.1016/j.foodcont.2019.106911.
- M. D. Amin, J. J. McCluskey, R. C. Mittelhammer, H. F. Oliver, and **S. T. Wu**. *Submitted*. Census-tract incomes predict food safety risks in retail food environments. *Sci Adv*.

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Food safety culture and food handler behaviour

IAFP, 2020

Shingai Nyarugwe (PhD)

Introduction



Professional Interests

- Food safety culture
 - Food safety management systems
 - Behavior-based approaches to food safety
 - Food safety policy and regulation
-
- Aim- developing industry-based solutions for continuous improvement and for optimizing food safety performance

PhD - Food Safety Culture

MSc -Food quality management

Research Background

- Research objective: to investigate the influence of food safety culture on food handler behaviour, and ultimately food safety performance
- 29 companies in 5 countries (China, Greece, Tanzania, Zambia, Zimbabwe)
- Focus on food handlers

Research framework

EXTERNAL COMPANY ENVIRONMENT

National values

e.g. power distance,
individualism/collectivism,
long/short-term orientation

Food safety governance approach
e.g. legal framework, public/private standards,
enforcement practices

Setting boundaries

INTERNAL COMPANY ENVIRONMENT

Company characteristics e.g. size

Food safety vision

Setting priorities

Organisational conditions

e.g. vision, commitment,
communication style,
training

Technological conditions

e.g. equipment
maintenance,
sanitation program,
protective clothing,
hand-washing facilities

Employee characteristics

e.g. attitude, risk
perceptions

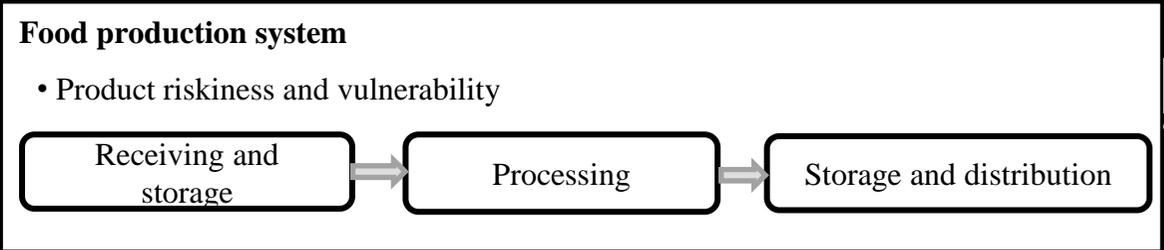
Formal food safety program

e.g. design,
implementation,
verification, modification,
improvement

Perceived Supportiveness ——— *Intended behaviour* — *Appropriateness*

Food safety and hygiene-related behaviour

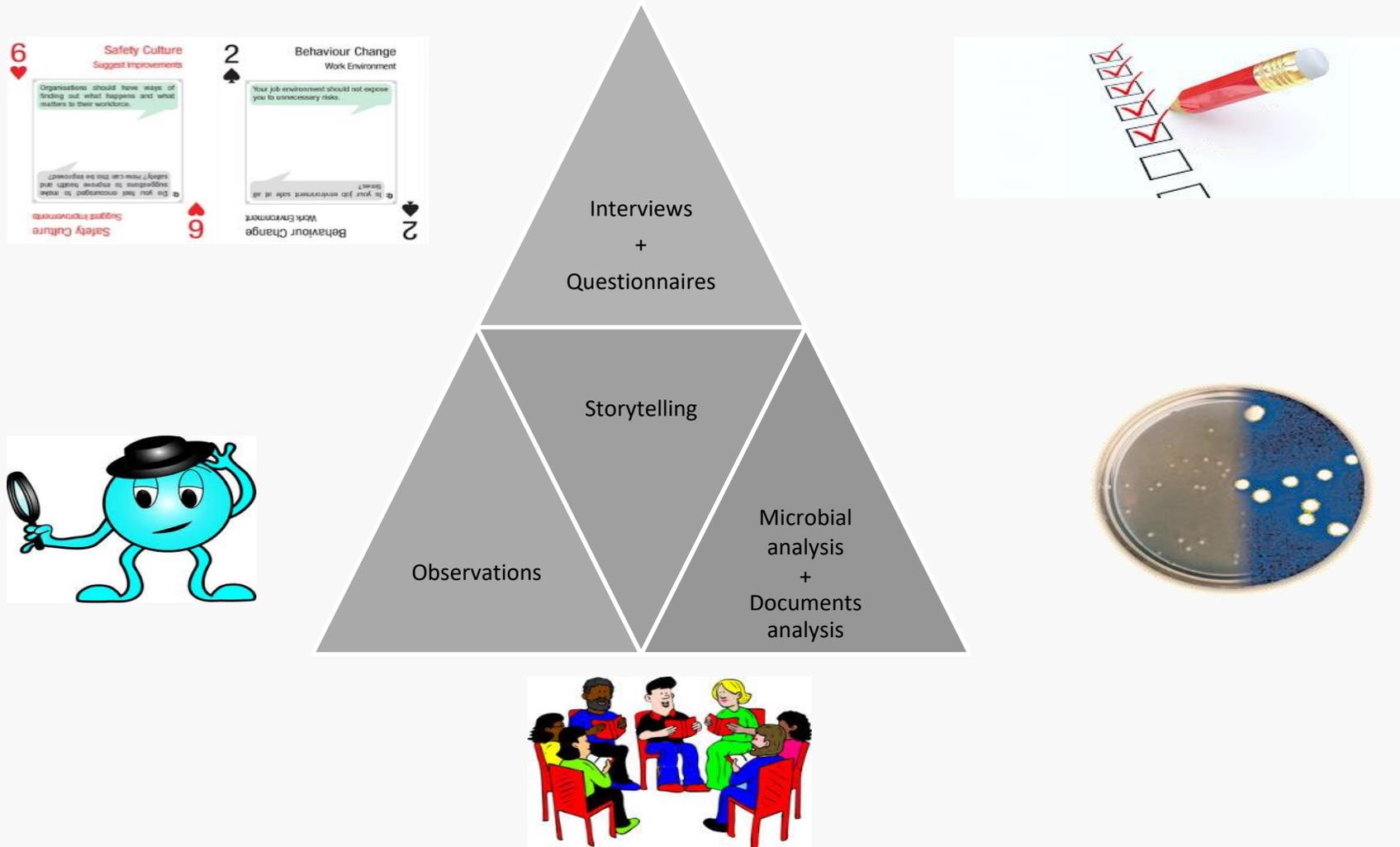
Degree of compliance



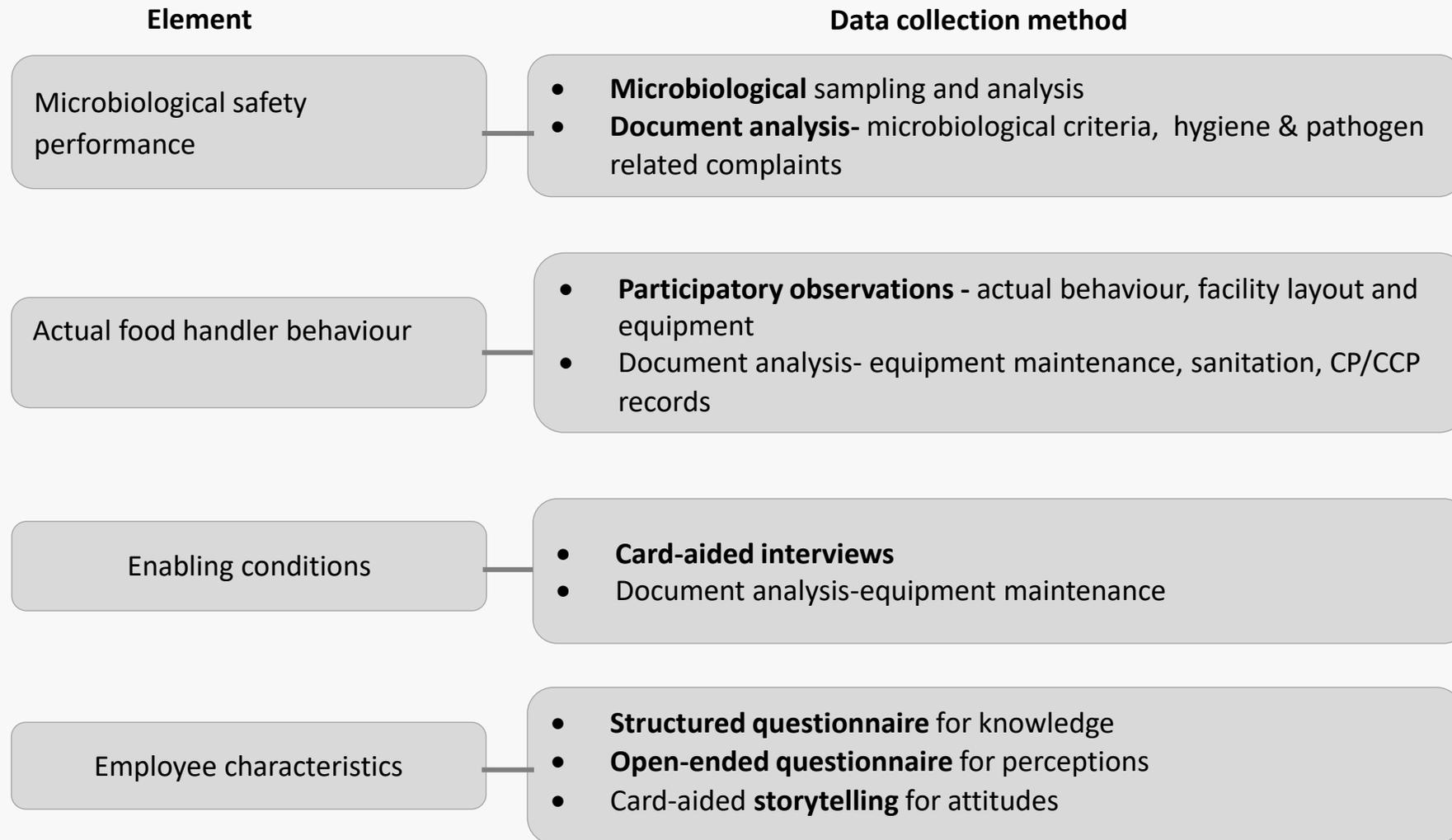
Performance



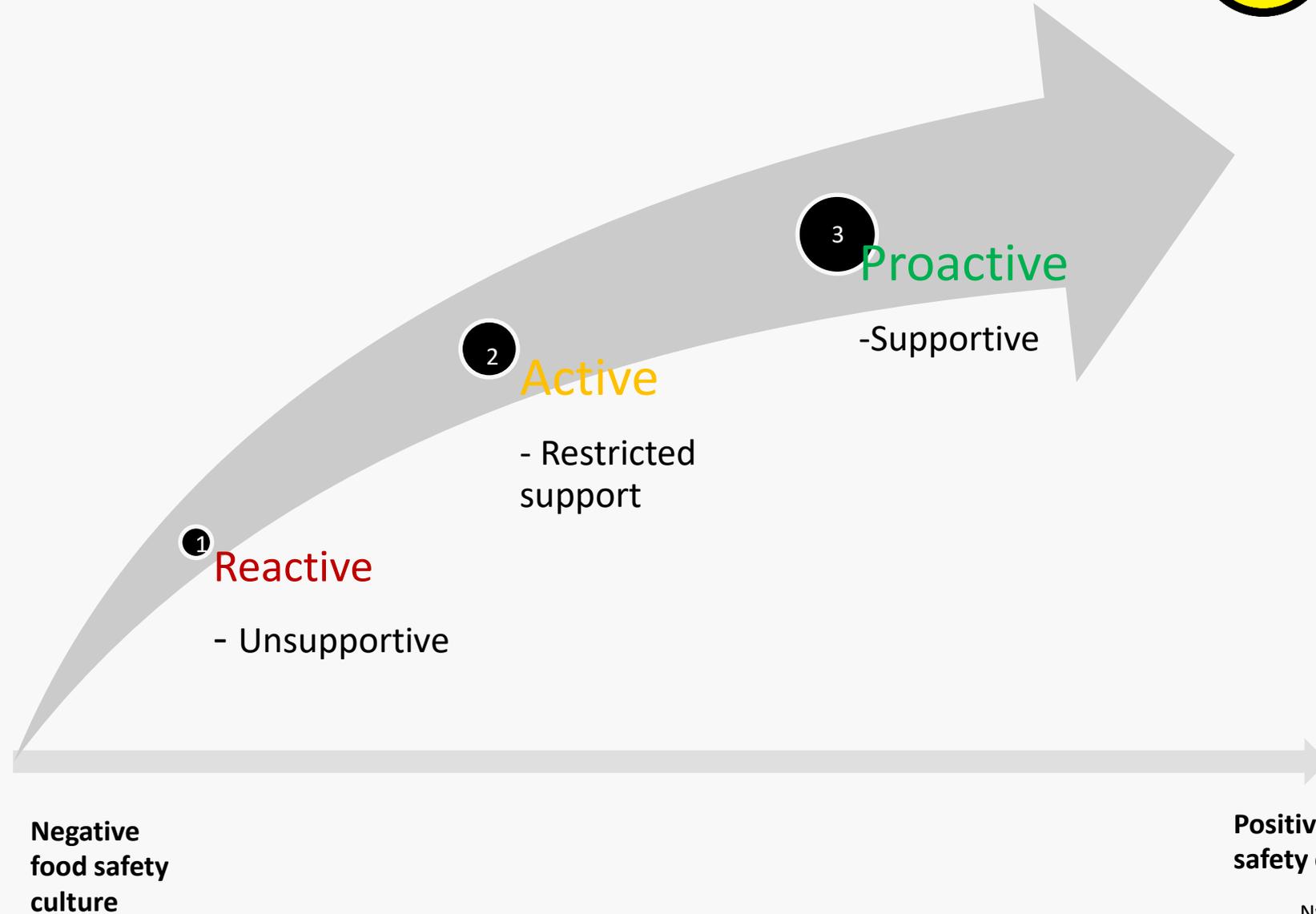
Mixed-method approach



Mixed-method approach



Interpretation of results



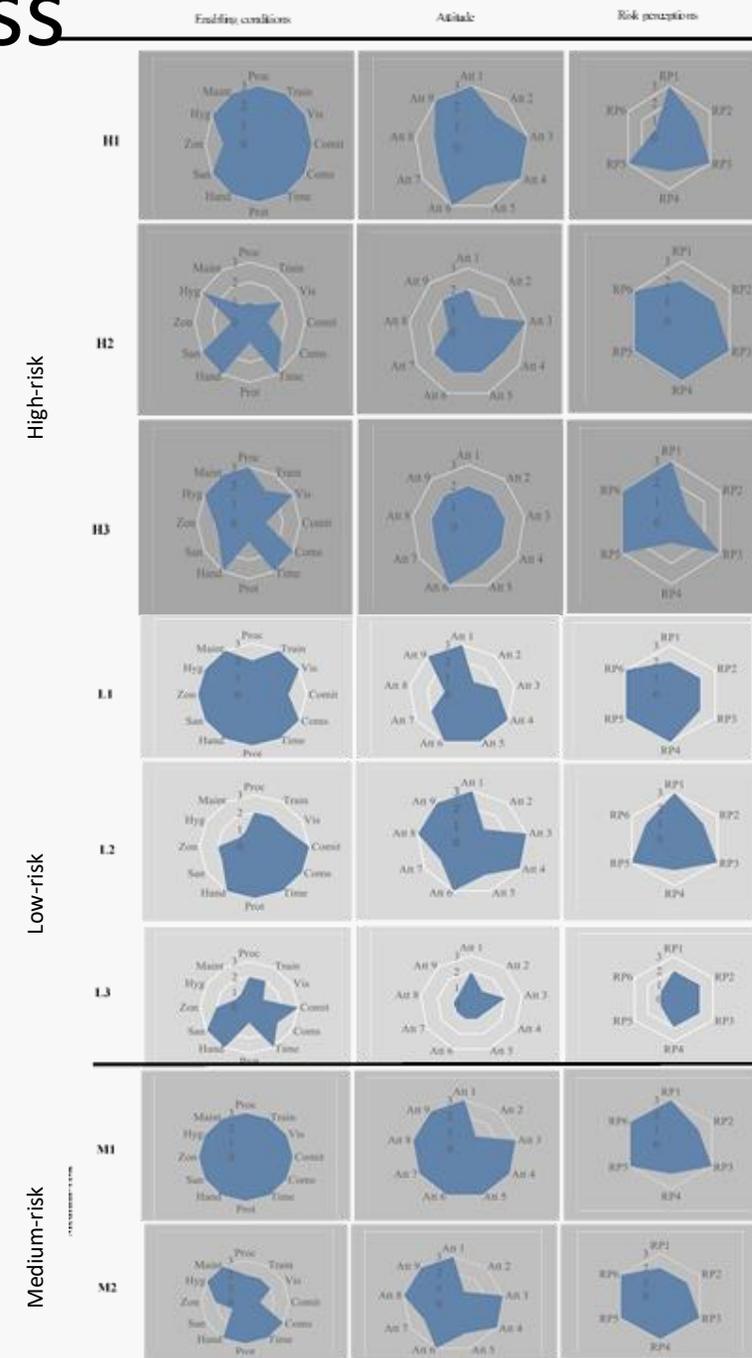
Study 1: Mixed-methods approach

- complexity and the multidimensionality of food safety culture necessitates method triangulation
- permits assessment of different aspects using different methods
- comprehensive evaluation
- elaborates findings
- uncovers underlying issues
- improves robustness
- internal consistency



Study 2: Does product riskiness matter?

- Companies exhibited different food safety cultures regardless of product riskiness
- Companies with less vulnerable production systems do not necessarily have a reactive food safety culture



Study 3: An intercontinental analysis

- Food safety governance and national values reflected in food safety priorities, food safety programs, prevailing food safety culture, and behaviour

Overall findings

- Inconsistencies in enforcement practices
- Complacency
- Subcultures
- Inadequate food handler support e.g. inadequate verification of understanding of food safety communication
 - Inadequate food handler practices e.g. poor hand washing practices
 - Temporary personnel did not get training, protective clothing, incentives

Food handler perspective



Key takeaways

- Mixed-methods approach allows for a more solid insight into food safety culture.
- Food safety culture influences food handler behavior
- Understanding your food handlers could be beneficial for correct and appropriate interventions
- Regardless of product riskiness, all companies need to have a proactive food safety culture



*Unlocking your food safety
culture*

Thank you

List of publications

- **Nyarugwe, S. P.** (2020). Influence of food safety culture on food handler behaviour and food safety performance of food processing organisations. ISBN: 978-94-6395-184-5. (Doctoral dissertation, Wageningen University).
- **Nyarugwe, S. P.**, Linnemann, A. R., Ren, Y., Bakker, E. J., Kussaga, J. B., Watson, D., ... & Luning, P. A. (2020). An intercontinental analysis of food safety culture in view of food safety governance and national values. Food Control.
- **Nyarugwe, S. P.**, Linnemann, A., & Luning, P. A. (2020). Prevailing food safety culture in companies operating in a transition economy-Does product riskiness matter? Food Control.
- **Nyarugwe, S. P.**, Linnemann, A., Nyanga, L. K., Fogliano, V., & Luning, P. A. (2018). Food safety culture assessment using a comprehensive mixed-methods approach: A comparative study in dairy processing organisations in an emerging economy. Food Control, 84, 186-196
- **Nyarugwe, S. P.**, Linnemann, A., Hofstede, G. J., Fogliano, V., & Luning, P. A. (2016). Determinants for conducting food safety culture research. Trends in Food Science & Technology



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the **Questions section** at the right of the screen.



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