

Food Safety Culture

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Promotors:

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Introduction

Research focus last decades:
development and implementation of analytical capacity,
technology and FSMS



a well elaborated and 'fit for purpose' FSMS → not always
stable or high level of food safety and hygiene



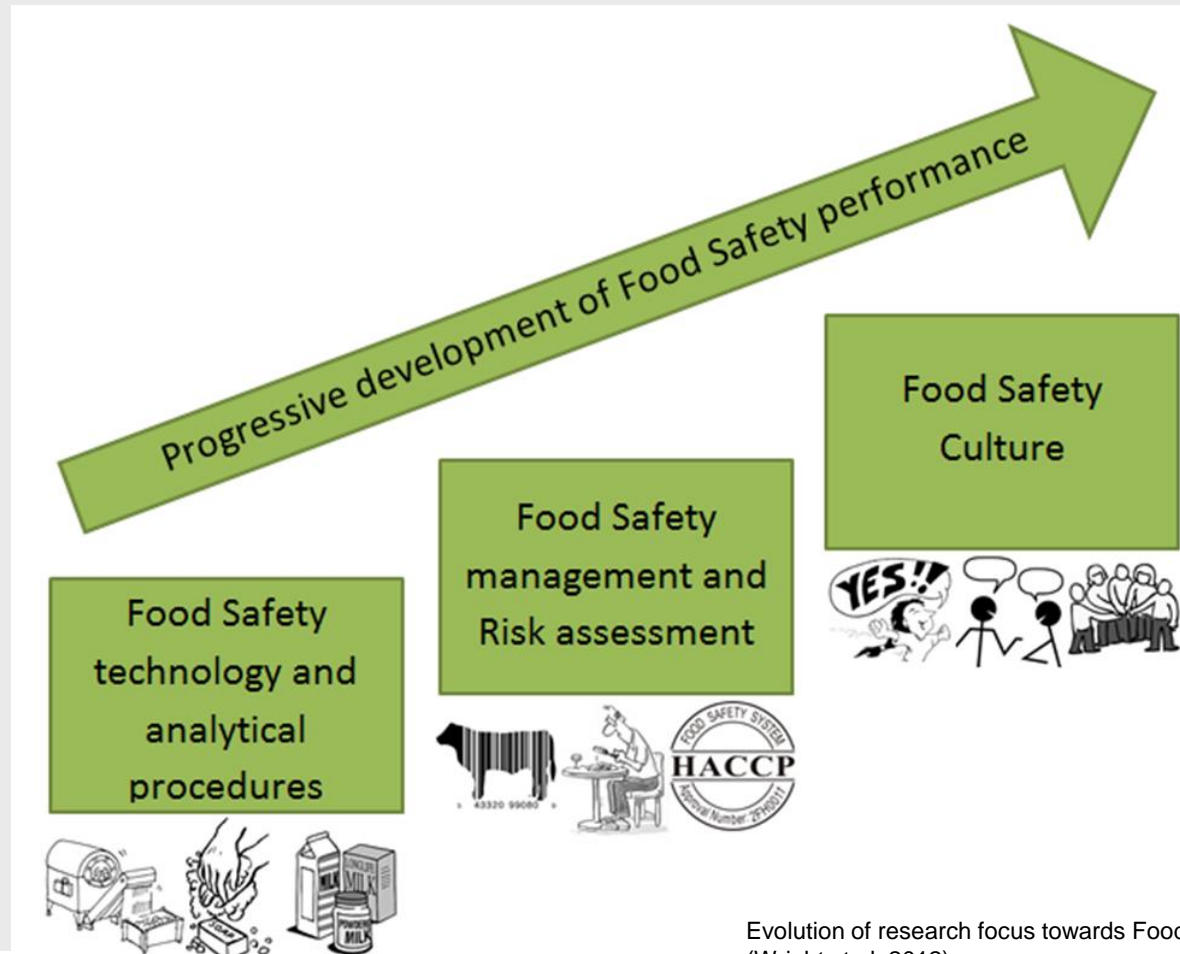
Human behavior → the actual execution of procedures
and decision making



Influenced by the
Food Safety Culture



Introduction



Evolution of research focus towards Food Safety Climate (Wright et al. 2012)



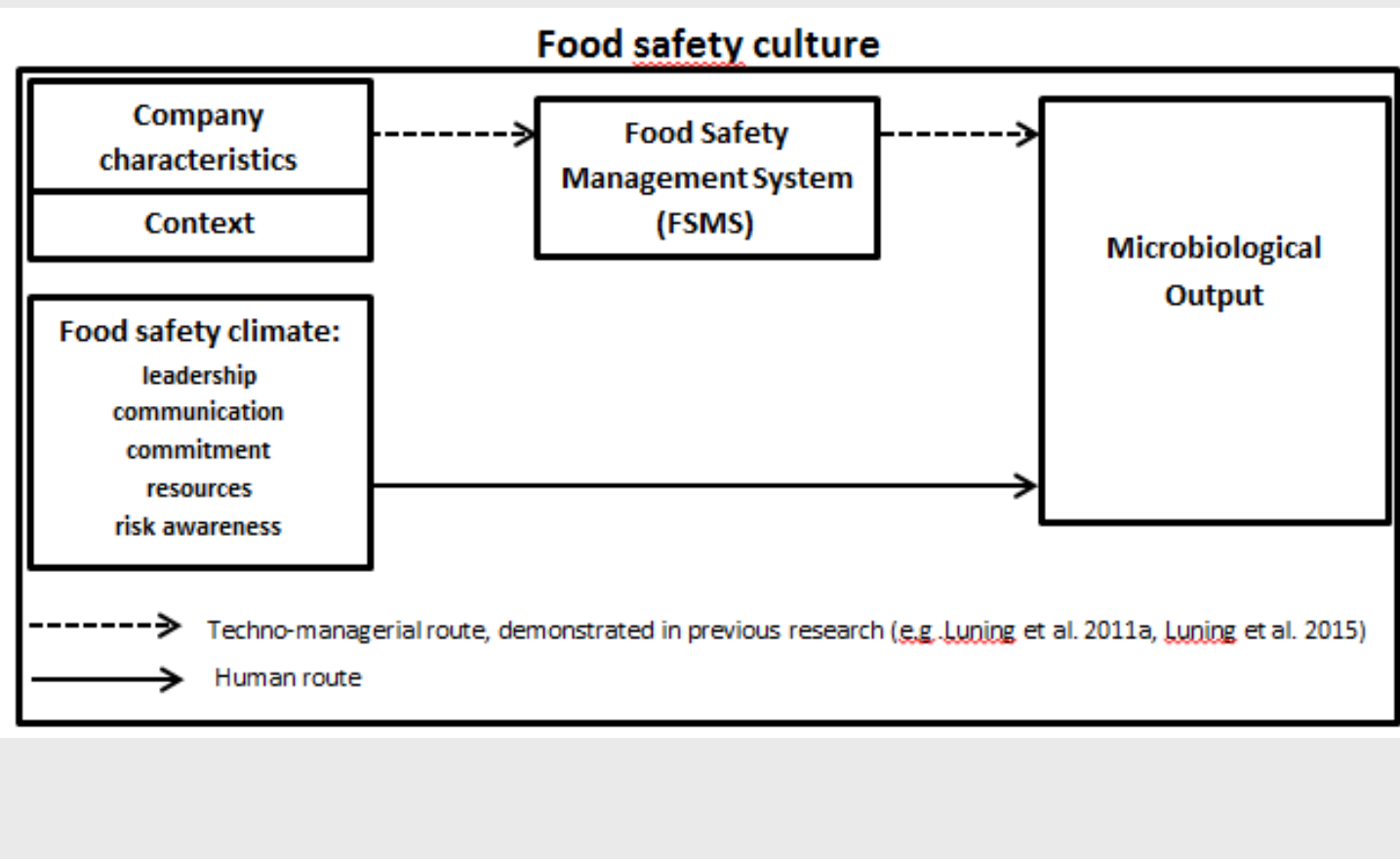
Aim research 2013-2014

- Development and validation a tool to measure the food safety culture/ climate
 - Definition of Food Safety Climate/Culture
 - Define components of FSClimate and develop tool
 - Expert validation

- Case study: Interplay between food safety climate, food safety management system and microbiological output in small scale farm butchereries and affiliated butcher shops
 - Applicability in practice
 - Hypothesis : small scale companies can have a good output, despite the less elaborated/advanced FSMS, because the Food Safety Climate in these companies is better.



Development of a definition for Food Safety Culture



Development of a Food Safety Climate assessment tool: components



Development of a Food Safety Climate assessment tool: indicators

Likert Scale:
1→5 ,
totally disagree
→ totally agree

Component	Example indicator
Leadership	In my organization, the leaders are able to motivate their employees to work in a hygienic and food safe way.
Communication	In my organization, the leaders communicate in a clear way with the operators about hygiene and food safety.
Commitment	In my organization, employees are actively involved by the leaders in hygiene and food safety related matters.
Resources	In my organization, employees get sufficient time to work in a hygienic and food safe way.
Risk awareness	My colleagues are alert and attentive to potential problems and risks related to hygiene and food safety.



Validation of the Food Safety Climate assessment tool

Twenty experts (Belgium and the Netherlands)

- governmental agencies (n=4)
- third party certification bodies (n=3)
- sector associations (n=3)
- universities (n=1)
- Industry (big companies: n=6, small companies: n=3)

➤ Method: Kirezieva et al. (2013)

- Relevant (yes/no)
 - 50% or less (n=10) relevant → considered for deletion
- Importance score (not important -> very important; 0 -> 3)
- Open suggestions



Validation of the Food Safety Climate assessment tool

Indicator	Relevance ^a	Importance rating (0→3, not to very important) ^b	Indicator	Relevance ^a	Importance rating (0→3, not to very important) ^b
LEADERSHIP			RESOURCES		
L1	20 (20)	2.5 (1)	M1	19 (20)	2 (1)
L2	20 (20)	3 (1)	M2	20 (20)	2 (1)
L3	20 (20)	2 (1)	M3	20 (20)	2 (1)
L4	20 (20)	2 (1)	M4	20 (20)	2 (1)
L5	19 (19)	2.5 (1)	M5	19 (20)	3 (1)
L6	^c	^c	M6	19 (20)	3 (1)
COMMUNICATION			RISK AWARENESS		
C1	20 (20)	3 (1)	R1	20 (20)	3 (0.75)
C2	19 (20)	2 (1)	R2	16 (19)	2 (1)
C3	19 (20)	2 (1)	R3	19 (20)	2 (2)
C4	19 (20)	2 (1)	R4	18 (19)	3 (1)
C5	20 (20)	3 (1)	R5	20 (20)	2 (1)
COMMITMENT			^a number of experts considering the indicator relevant (total number of respondents for the indicator) ^b median of the importance rating (interquartile distance) ^c indicator added after expert validation		
E1	20 (20)	2.5 (1)			
E2	19 (19)	2 (1)			
E3	19 (19)	2 (0)			
E4	20 (20)	3 (0)			
E5	20 (20)	3 (1)			
E6	19 (19)	2 (0.75)			



Case study: Interplay between food safety climate, food safety management system and microbiological output in farm butcheries and affiliated butcher shops

Set-up :

- 4 micro scale farm butcheries (FB1-FB4)
 - <10 employees (EC., 2003) = micro scale
 - Less elaborated FSMS (expected)
- 4 affiliated butcher shops (AB1-AB4)
 - affiliates of a large scale central coordinated meat distribution company
 - >250 employees (EC., 2003) = large scale
 - Elaborated/fit-for-purpose FSMS (expected)
- Hypothesis
 - The micro scale farm butcheries can have a good microbiological output, despite a less elaborated/fit-for-purpose FSMS, if their food safety climate is good



Case study: Interplay between food safety climate, food safety management system and microbiological output in farm butcheries and affiliated butcher shops

Materials & Methods :

- Assessment of context riskiness and FSMS
 - FSMS Diagnostic instrument (questionnaire with 58 indicators)
 - Demonstrated in previous research (e.g. Luning et al. 2011)
- Assessment of Food Safety Climate
 - The Food Safety Climate assessment survey (total n=44):
 - owners and every employee of butcheries FB1-FB4,
 - director, quality manager, two sales managers and overall responsible of the four affiliates and every employee in affiliates AB1-AB4



Case study: Interplay between food safety climate, food safety management system and microbiological output in farm butcheries and affiliated butcher shops

➤ Assessment of the Output (Food Safety, hygiene, quality)

THREE VISITS

- 2 samples raw beef meat
 - Hygiene indicators: *E. coli*, coliforms, *Enterobacteriaceae*
 - Spoilage: Total Aerobic Count, Lactic acid bacteria
 - Pathogens: *Salmonella*, *E.coli* O157:H7, *L.monocytogenes*
 - Quality: % Dry matter ,% fat, %salt
 - Registration: Temperature, time since preparation

- 5 Swabs of knives, cutting board, mincer
 - Total Aerobic Count, *Enterobacteriaceae*
 - Registration: In use or not

- 5 *L.monocytogenes* swabs

- Hands (present staff)
 - *E. coli*, Total Aerobic Count
 - Registration: task of the person



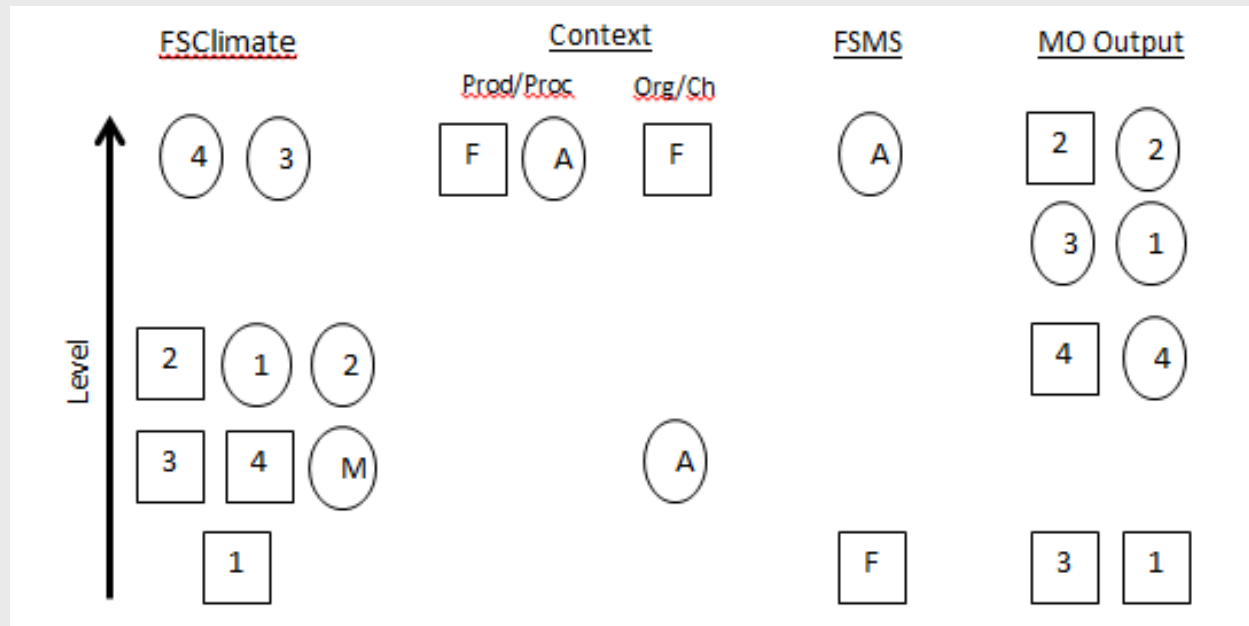
Case study: Interplay between food safety climate, food safety management system and microbiological output in farm butcheries and affiliated butcher shops

Results case study

- Qualitative ranking was made for the different variables:
 - Food Safety Climate
 - Context
 - Level of FSMS
 - Microbiological output



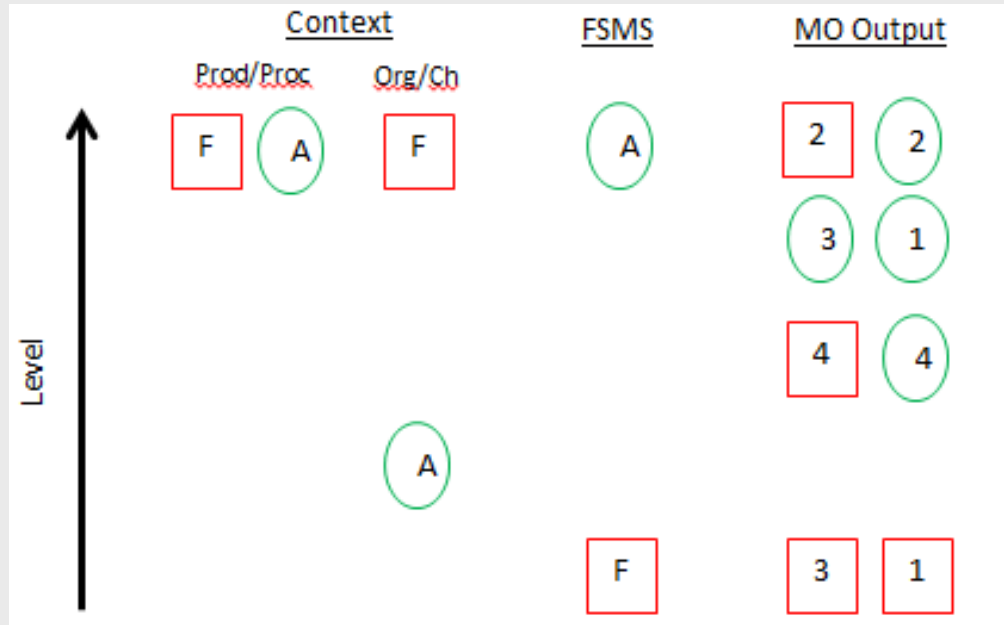
Results: Food Safety Culture



- : Farm butcheries
- : Affiliated butcher shops
- M: management of AB
- A: all AB
- F: all FB



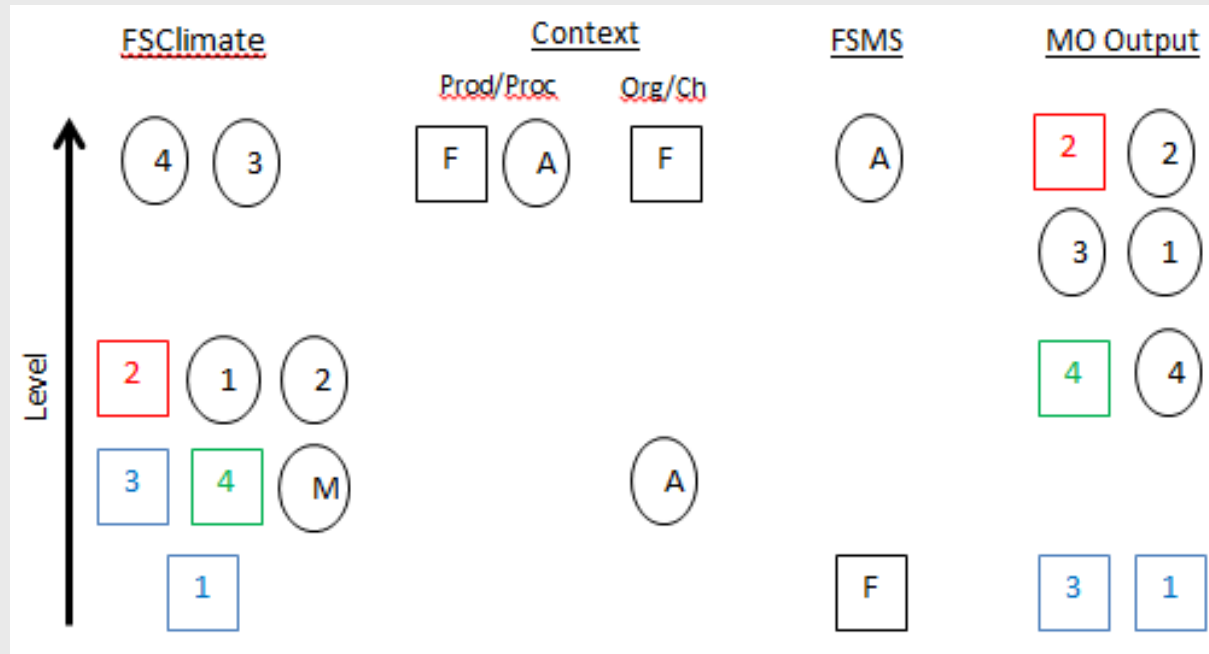
Results: Food Safety Culture



- AB counteract risky context by elaborated/fit-for-purpose FSMS
 - Results in medium to high output
- FB also risky context, but basic FSMS
 - Scattered output ⇒ Food safety Climate is relevant?

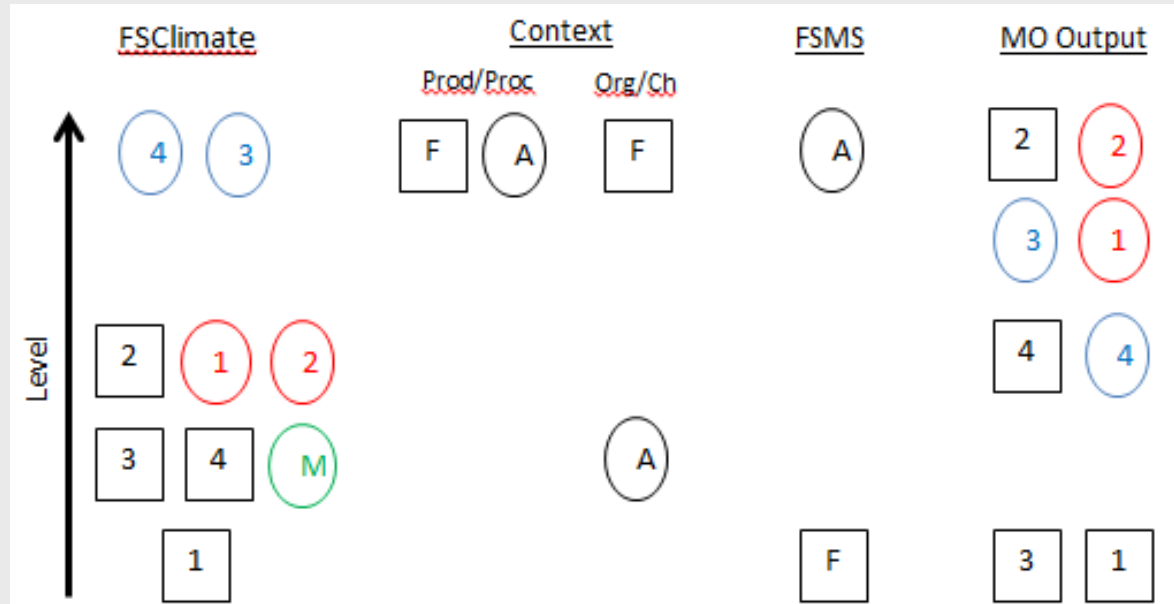


Results: Food Safety Culture: FB



- FB1 and FB3 low FSC score, also lower output
Perception in line with output
- FB4 moderate FSC score, also moderate output
Perception in line with output
- Hypothesis demonstrated for FB2:
 - Less elaborated FSMS counteracted by a higher FSClimate score (than other FB), which enables high output

Results: Food Safety Culture: AB



- Advanced FSMS ⇒ Food Safety Climate less relevant?
- **AB1 and AB2 underestimate own situation → more critical**
- **AB4 and AB3 overestimate own situation**
- **Management scored FSClimate lower than affiliates**
- Perceptions not in line with actual output ↔ FB



Conclusion

- New assessment tool to measure FSClimate developed and validated
- Case study:
 - FB: Despite a less elaborated FSMS, some butcheries are able to achieve a good microbiological output, if a good food safety climate is present in their organization.
 - Especially for FB is FSClimate important, for AB risky context counteracted by advanced FSMS
- Future perspectives:
 - More focus on individual level
 - Investigating the impact of employees' characteristics and employee behavior in the relation between FSClimate and microbiological output.



THANK YOU!



Faculty of
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