

FROM FOOD SAFETY MANAGEMENT TO FOOD INTEGRITY MANAGEMENT SYSTEMS

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CURRENT FOOD SAFETY MANAGEMENT SYSTEM → SILO/FRAGMENTED

Food Management System

FOOD SAFETY	FOOD DEFENSE	FOOD FRAUD
HACCP	TACCP	VACCP
HAZARDS Analysis and Critical Control Points	THREATS Assessment and Critical Control Points	VULNERABILITIES Assessment and Critical Control Points
Prevention of unintentional adulteration	Prevention of intentional adulteration	Prevention of intentional adulteration
Science based	Ideologically motivated	Economically motivated

Food safety culture assessment

PRINCIPLES OF THE FOOD FRAUD VULNERABILITY ASSESSMENT (FFVA) TOOL

- Food fraud components
- Multi-layered food system
- Vulnerability assessment principle
- Fraud risk indicators

Food fraud vulnerability assessment concept



FOOD FRAUD COMPONENTS ENABLERS, DRIVERS, AND MEASURES

Enablers



Opportunities to commit fraud

- Technically
- In time and place/ space

Drivers



Situations that **motivate** people to commit fraud

- Economic drivers
- Cultural behaviours

Measures



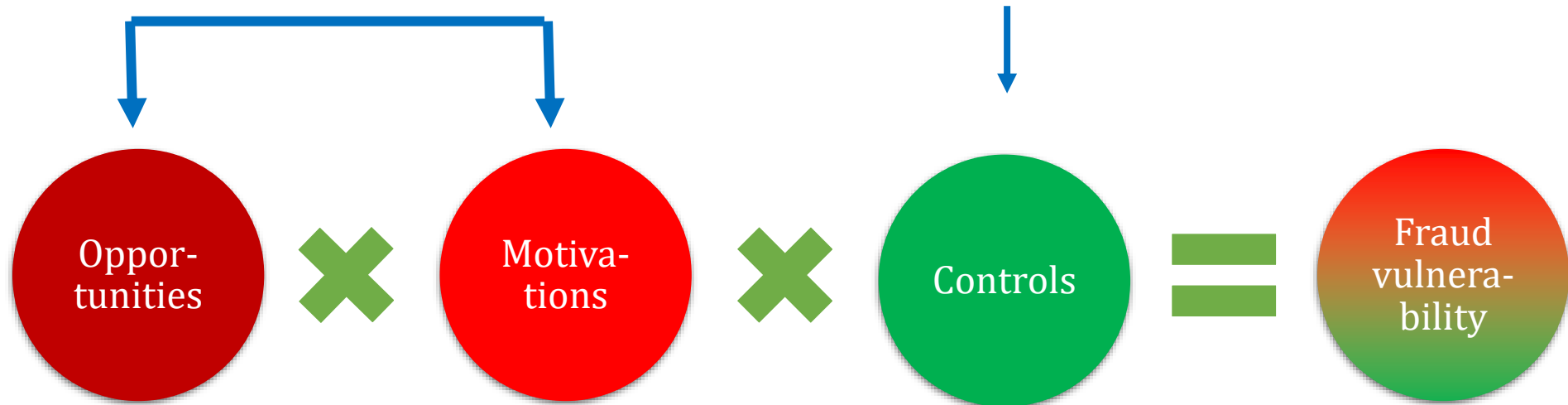
Measures or actions that can be taken to mitigate initial fraud risks

- Hard (technical)
- Soft (people)

FRAUD VULNERABILITY PRINCIPLE

Create initial risk on fraud

Risk-mitigation



Risk-based approach

- Humans (fraudsters) are part of the risks
- Controls can mitigate initial risks – prevention and detection

MULTI-LAYERED FOOD SYSTEM



FRAUD RISK INDICATORS- EXAMPLES

	Opportunities	Motives	Control measures
Technical	<ul style="list-style-type: none"> • Simplicity or complexity of adulteration • Availability technology and knowledge to adulterate 	<ul style="list-style-type: none"> • Supply & pricing of materials • Level of competition in sector • Economic health business 	<ul style="list-style-type: none"> • Specificity and accuracy of monitoring • Verification of fraud monitoring system • Contingency plan
In time in space	<ul style="list-style-type: none"> • Accessibility to materials in production/processing • Complexity and transparency supply chain network 	<ul style="list-style-type: none"> • Ethical business culture • Previous criminal offences • National corruption level • Victimisation 	<ul style="list-style-type: none"> • Strictness of ethical code of conduct • Support whistle blowing system • Strictness enforcement fraud regulation

The tool contains **50 indicators** to assess the fraud risks in the multi-layered food system

How would you describe the financial strains imposed by your company on your direct suppliers

1. The company sets fixed price(s) for direct suppliers in line with market prices, and supplier(s) have more customers

2. The company typically buys from suppliers that offer lowest prices

3. The company always buys from suppliers that offer the lowest prices and suppliers are completely dependent on the company for their financial survival

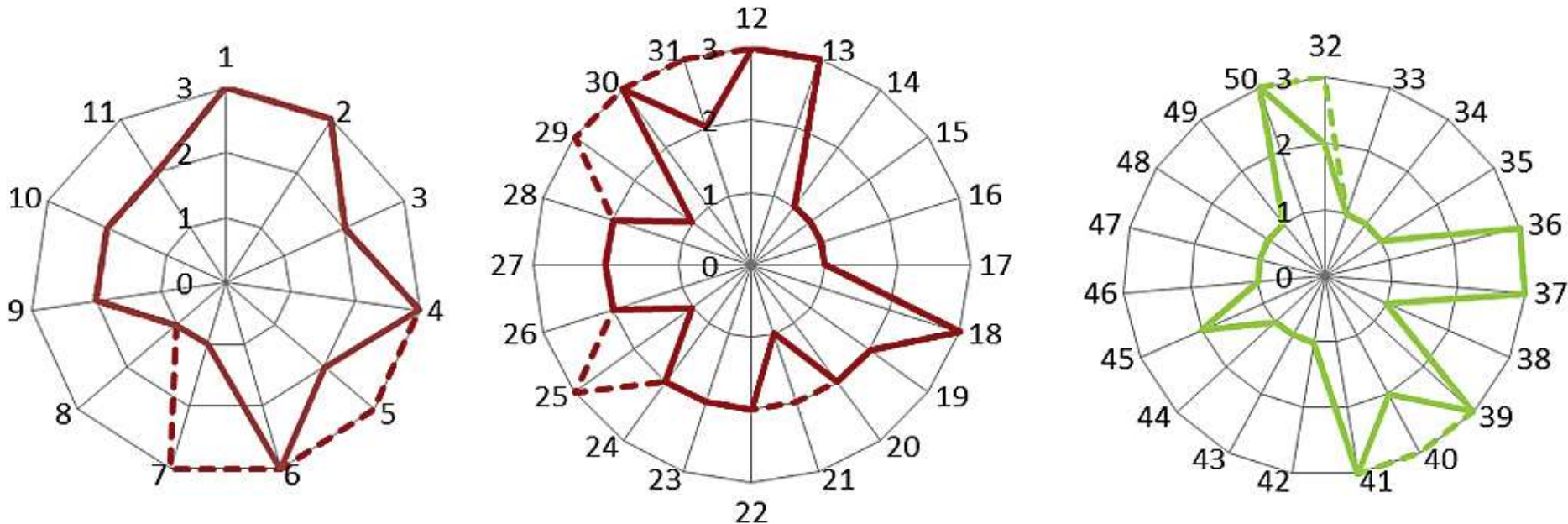
Information sources

Expertise required:
Management
&
Procurement

FOOD FRAUD RESEARCH- SPICE CHAIN

Exploration spice chain using FFVA tool; trader, importers, B2B and B2C enterprises

Overall vulnerability profiles



Spiderwebs based on modes, dotted lines when two modes

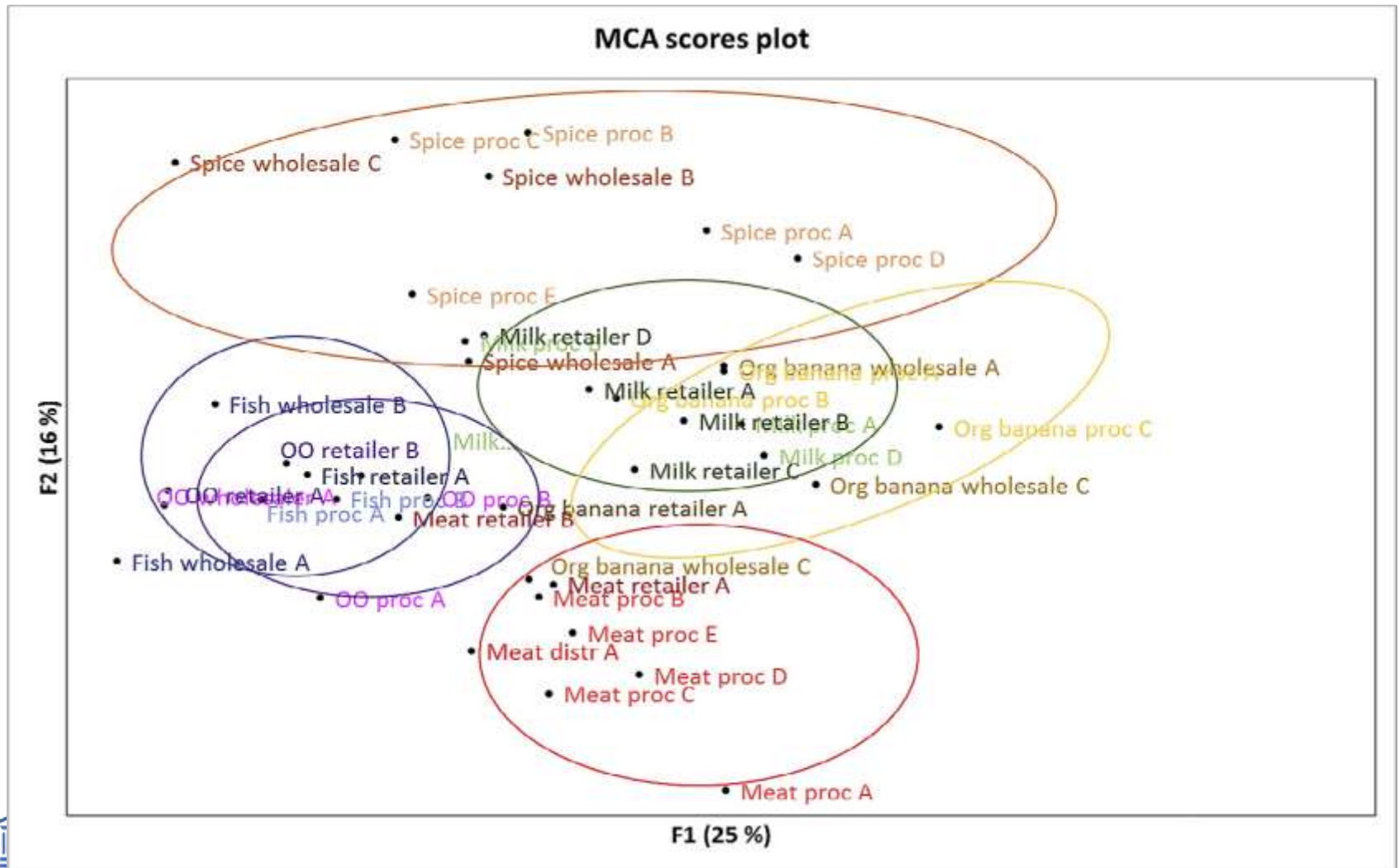
FINDINGS SPICE CHAIN



- Ease to adulterate spices and complexity fraud detection → create considerable opportunities to commit fraud (**high vulnerability**)
- High competition level and high added value → most important economic drivers for fraud (**high vulnerability**)
- Implementation of hard and soft control measures varied widely among actors (**low-moderate measures**)
 - Fraud specific control are merely lacking in spice chain (particularly MSE's)
 - “Fraud control industry”, “Specificity national food policy” and “Law enforcement chain network” scored 1= high vulnerability



RESEARCH FRAUD VULNERABILITY IN VARIOUS CHAINS



OVERALL VULNERABILITY PROFILES

	Vulnerability due to Opp + Motiv	Vulnerability due to Controls
Fish	Medium	High
Meat	High	Low
Milk	Low	Medium
Olive oil	High	Medium
Organic banana	Low	Low
Spice	High	High

- Fraud vulnerability appeared spice > olive oil > meat > fish, milk > organic banana chains
- Wholesale/traders group appeared most vulnerable, followed by retailers and processors.

OVERALL FINDINGS IN FRAUD RESEARCH

- ~70% of all businesses interviewed had any form of a fraud monitoring system (control measures)
- Control **measures varied** considerably across supply chains and actor groups
- Technical (**hard**) **controls** generally being **more in place** than managerial (**soft**) **controls**.



FOOD FRAUD VERSUS FOOD INTEGRITY



FOOD INTEGRITY ASPECTS

PRODUCT

Safe, quality and authentic ingredients

PROCESS

Compliance with labor, health and food assurance standards, regular processing and distribution

PEOPLE

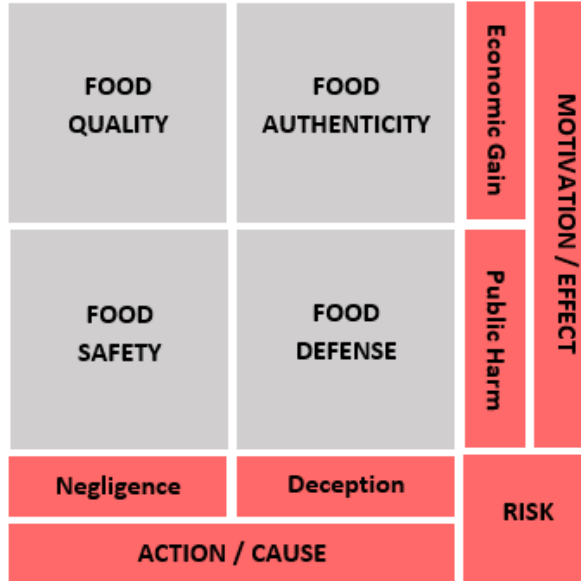
Managers and operators' ethical behavior

DATA

Accurate product information, authentic certificates and documentation

FOOD INTEGRITY

Control
Prevention



Incident
Vulnerability

FOOD FRAUD

FOOD FRAUD ASPECTS

PRODUCT

Ingredients tampering and adulteration

PROCESS

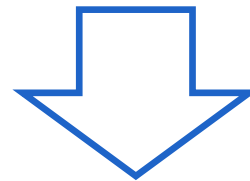
Illegal importation, theft, unauthorized methods of production

PEOPLE

Managers and operators' unethical behavior

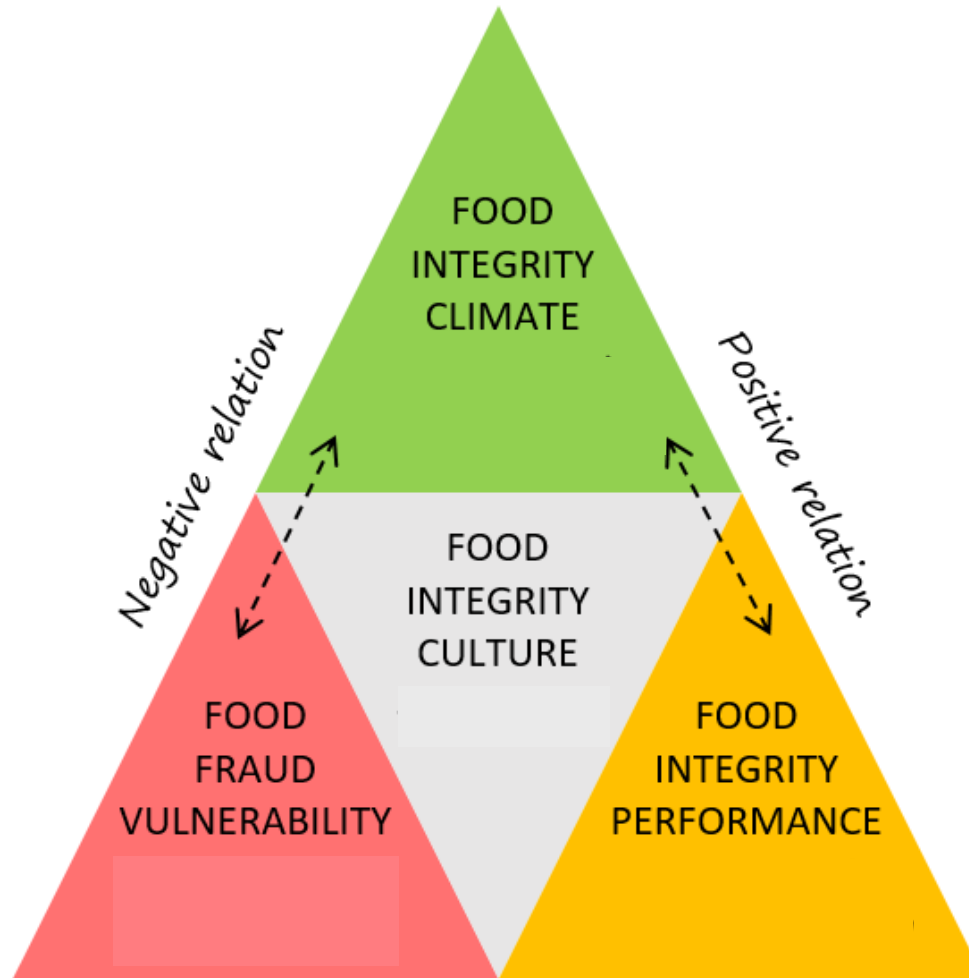
DATA

Fraudulent or missing certificates, expired documents, illegal import declarations and mislabeling

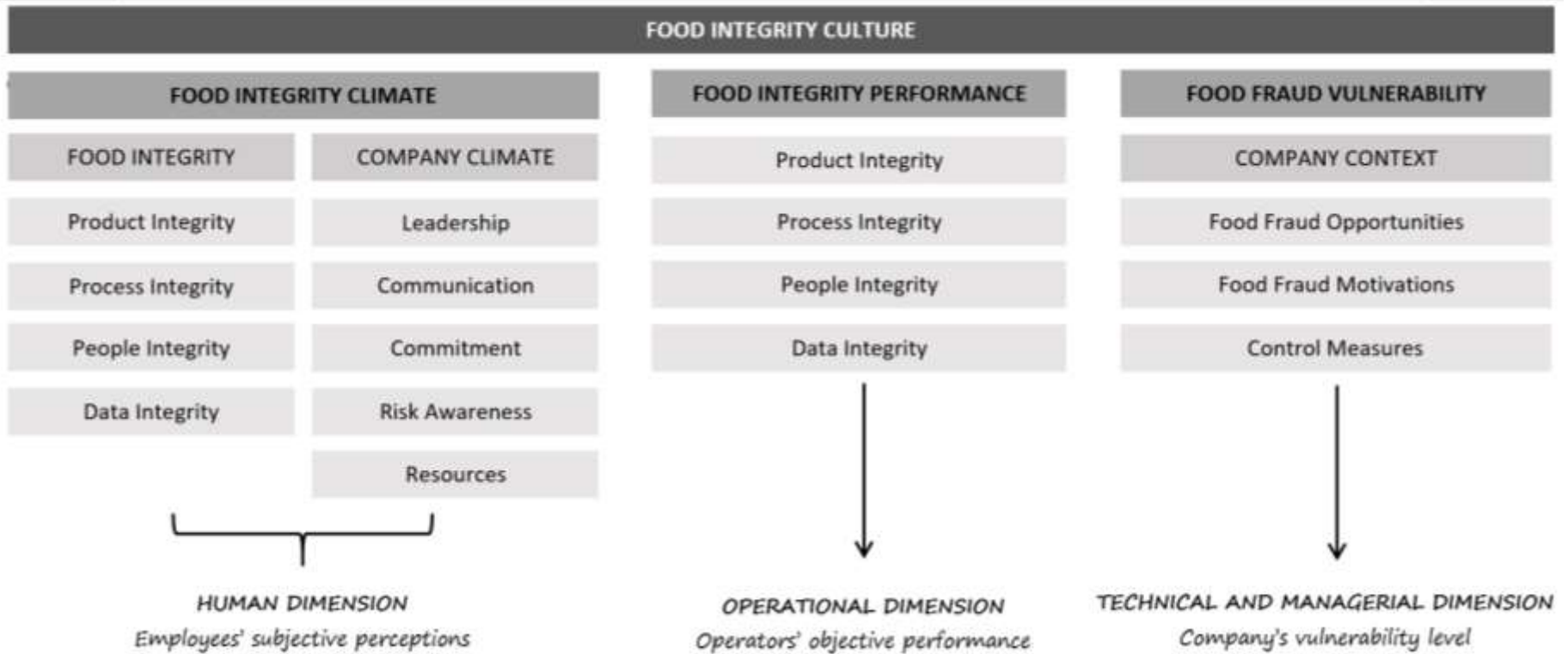


Towards food integrity culture

FOOD INTEGRITY CULTURE BUILDING BLOCKS

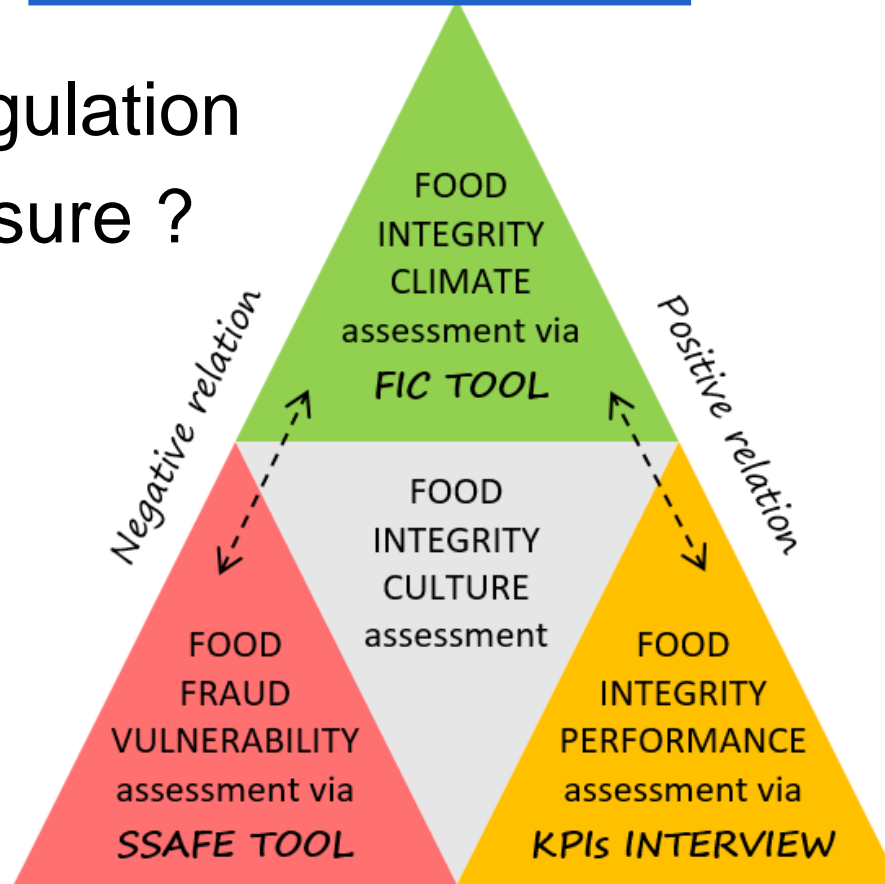


FOOD INTEGRITY CULTURE DIMENSIONS



FOOD INTEGRITY CULTURE MEASUREMENT

- Method triangulation
- Tools to measure ?

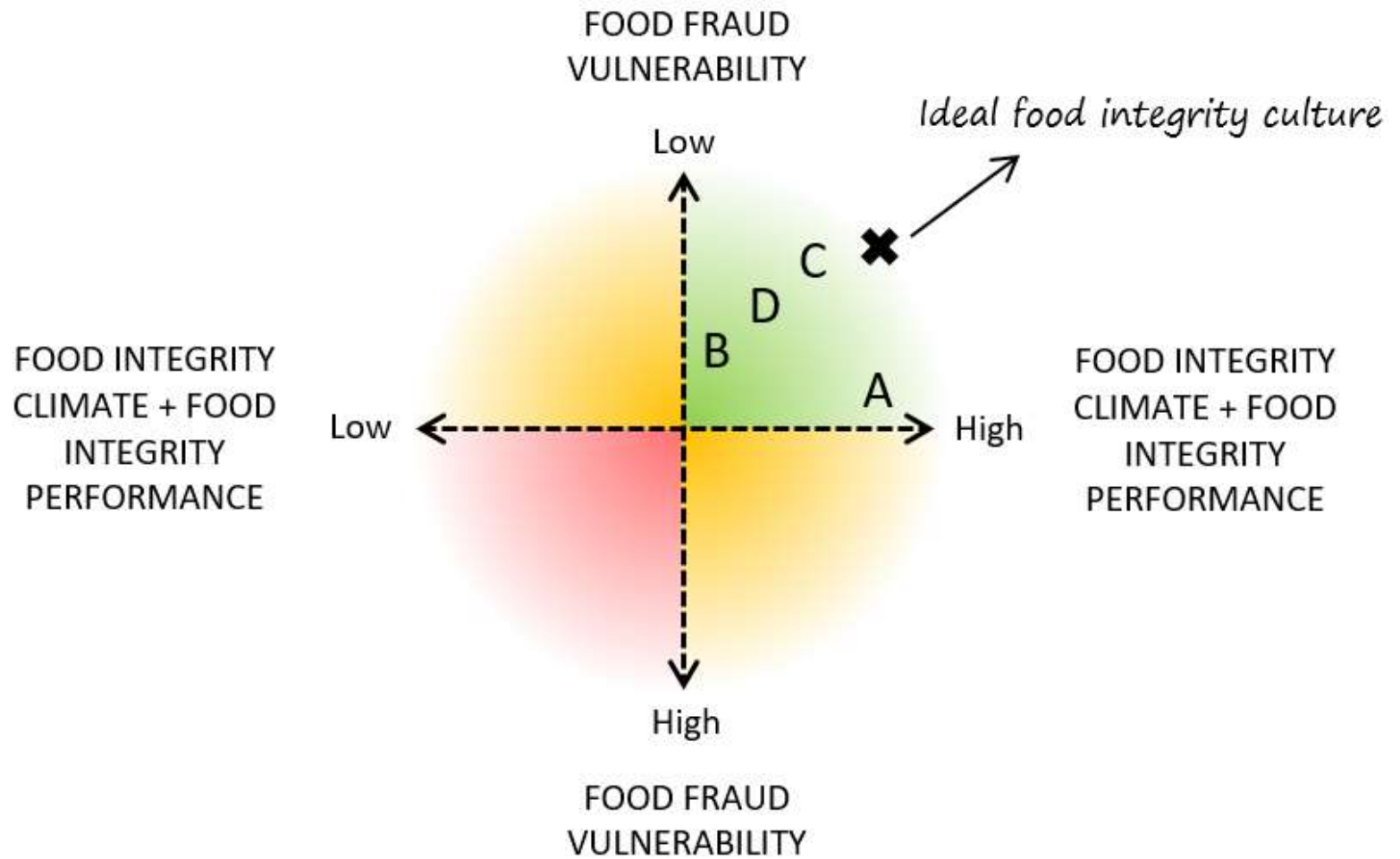


TOOL	DIMENSION	MEASUREMENT	LEVEL	RECIPIENT
FIC	Human	Subjective	Individual	All employees
KPIs	Operational	Objective	Affiliates/departments	Only operators
SSAFE	Technical/managerial	Diagnosis	Organizational	Quality manager

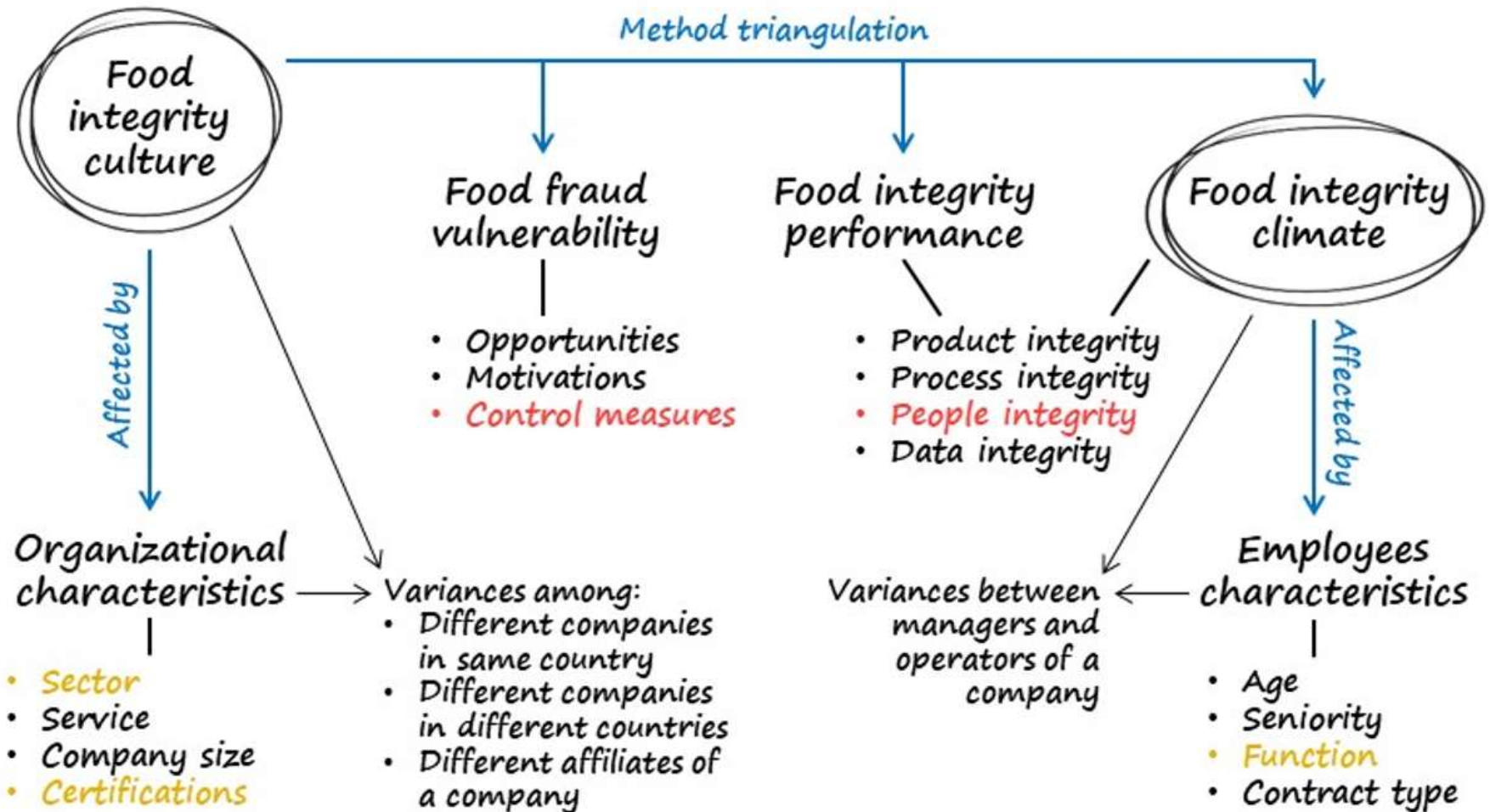
CASE STUDY: MULTISITE COMPANY

Shops Ranking based on FIC Results	FIC mean score*	Shops Ranking based on KPIs Results	KPIs mean score**	SSAFE Results for Overall Organization***
Shop 5	94.00	Shop 8	4.28	Opportunities mean → 2.18 medium vulnerability × Motivations mean → 1.50 low vulnerability × Control measures mean → 1.78 (reversed) low vulnerability = Overall fraud vulnerability → 5.82 / 27 = 0.64 / 3 low vulnerability
Shop 3	93.80	Shop 2	4.33	
Shop 8	91.20	Shop 6	4.83	
Shop 2	87.40	Shop 1	4.89	
Shop 6	84.67	Shop 4	5.00	
Shop 1	84.50	Shop 5	5.06	
Shop 4	80.75	Shop 3	5.11	
Shop 7	70.67	Shop 7	5.44	
Overall (managers + operators)	86.73	Overall (affiliates)	4.86	
Higher scores imply higher food integrity climate		Lower scores imply higher food integrity performance		Lower scores imply lower food fraud vulnerability

HYPOTHESIS ?



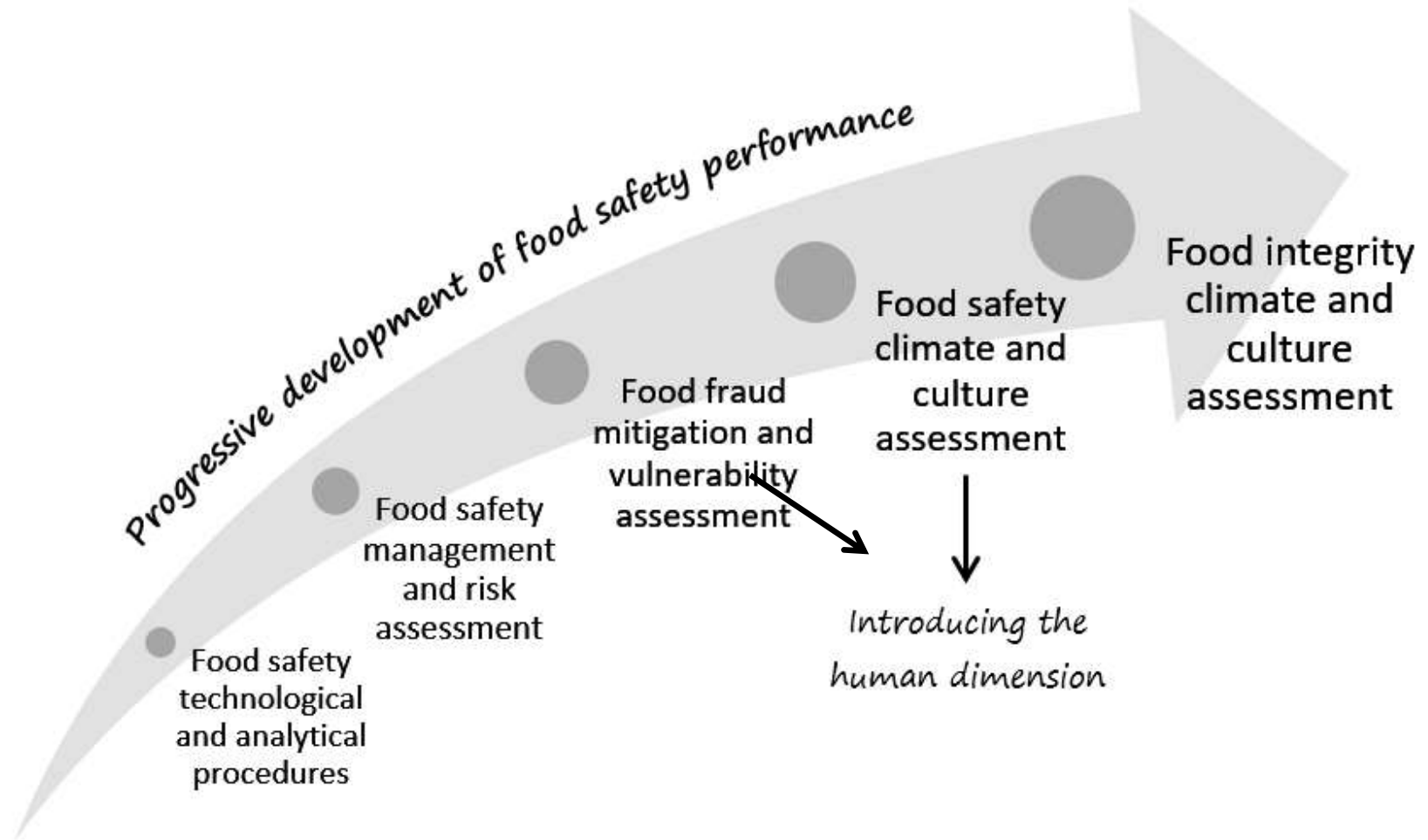
SUMMARY OF RESEARCH ON FICULTURE



Statistical significant relation
Weakest aspects detected

PhD research of Waeel Alrobaish

FUTURE PERSPECTIVE IN FOOD INTEGRITY MANAGEMENT SYSTEMS



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Further reading :

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