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Measuring and enhancing food safety culture in the workplace:
Quantifying the human influence

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Abstract in English

While food safety is one of the main concerns in the food industry, maintaining high hygiene standards and preventing foodborne outbreaks depends on having a strong food safety culture (FSC). The key objective of this thesis is to examine, measure and enhance FSC of a mid-sized food company in Austria, while focusing on the role of the human factor in food safety management. This thesis uses a mixed-method approach, which combines a quantitative survey and qualitative interviews in order to assess employee perceptions of the five fundamental dimensions of food safety culture: leadership, communication, commitment, resources and risk awareness.

A Food Safety Climate Tool developed by De Boeck et al. (2015) served as basis for the quantitative part of the analysis. This self-assessment questionnaire was completed by all available employees, providing insights into strengths and areas of improvement of the company. The resulting food safety climate score of 3.60 indicates a moderately positive perception of food safety practices in the company and it serves as a benchmark for evaluating the organization's food safety culture and its alignment with industry standards. Semi-structured interviews were conducted with both leaders and employees without leadership responsibilities as part of the qualitative component of the assessment. The interviews gave deeper understanding of the results from the survey and highlighted gaps between management's and employees' perception.

Significant differences in the perception of food safety among different departments, hierarchy levels and employment types highlighted the need for tailored improvement strategies. The main identified challenges include leadership commitment, resource allocation and communication gaps, all of which have a direct impact on employees' motivation and compliance, consequently, on food safety culture as a whole.

The results of the assessment provided the base for the improvement strategies proposed in this thesis, which focused on enhancing leadership commitment, improving communication, proper distribution of resources etc., in order to strengthen the company's food safety culture. The research addressed human behavioral aspects, adding to the growing understanding of food safety culture and providing a way forward towards continuous improvement. The emphasis of the research falls on the importance of FSC in guaranteeing product safety, while also proposing a sustainable and proactive approach, rather than one solely based on regulatory compliance.

Abstract in German

Einer der wichtigsten Aspekte in der Lebensmittelindustrie ist die Lebensmittelsicherheit. Eine starke Lebensmittelsicherheitskultur (FSC) ist Voraussetzung für die Aufrechterhaltung hoher Hygienestandards und die Verhinderung lebensmittelbedingter Krankheitsausbrüche. Diese Arbeit hat als Hauptziel, die FSC eines mittelgroßen österreichischen Lebensmittelunternehmens zu untersuchen, messen und verbessern, mit Fokus auf den menschlichen Faktor. Ein Mixed-Method Forschungsansatz wurde verwendet, indem eine quantitative Umfrage und qualitative Interviews kombiniert wurden, um die Wahrnehmung der Mitarbeiter hinsichtlich der fünf grundlegenden Elemente der FSC (Führung, Kommunikation, Engagement, Ressourcen und Risikobewusstsein) zu bewerten.

Das Food Safety Climate Tool von De Boeck et al. (2015) diente als Grundlage für die quantitative Analyse. Dieser Selbstbewertungsfragebogen wurde von insgesamt 104 Mitarbeitern ausgefüllt. Die Ergebnisse zeigten die Stärken und auch die verbesserungsbedürftigen Bereiche des Unternehmens. Der erhobene Mittelwert des Lebensmittelsicherheitsklimas von 3,60 weist auf eine mäßig positive Wahrnehmung der Lebensmittelsicherheit im Unternehmen hin und dient als Bezugspunkt für die Bewertung der Lebensmittelsicherheitskultur sowie deren Übereinstimmung mit den Standards der Industrie. Im Rahmen der qualitativen Analyse wurden semi-strukturierte Interviews mit Führungskräften und Nicht-Führungskräften durchgeführt. Diese ermöglichten ein tieferes Verständnis der Ergebnisse aus der Umfrage und zeigten die unterschiedliche Wahrnehmung von dem Management und den Mitarbeitern auf.

Die Analyse ergab signifikante Unterschiede in der Wahrnehmung der Lebensmittelsicherheit zwischen den verschiedenen Abteilungen, Hierarchieebenen und Anstellungsarten, was die Notwendigkeit von konkreten Verbesserungsstrategien zeigt. Führungsengagement, Ressourcenverteilung und Probleme in der Kommunikation sind unter den aus der Analyse identifizierten Herausforderungen, die einen direkten Einfluss auf die Motivation und Compliance der Mitarbeiter und somit auf die Lebensmittelsicherheitskultur haben.

Die Ergebnisse dienten als Grundlage für die Entwicklung konkreter Optimierungsstrategien, die als Ziel ein stärkeres Engagement der Führungskräfte, eine effektivere Kommunikation und eine bessere Verteilung der Ressourcen hat, um die Lebensmittelsicherheitskultur des Unternehmens zu verbessern. Diese Arbeit untersucht die menschlichen verhaltensbezogenen Aspekte der FSC, dient zur Erweiterung des Verständnisses dieses Themas und liefert praxisnahe Ansätze zur kontinuierlichen Optimierung, während sie sich für einen proaktiven Ansatz ausspricht, der über die reine Erfüllung der Vorgaben hinausgeht.

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Abbreviations

Abbreviation	Definition
FAO	Food and Agriculture Organization
FDA	Food and Drug Administration
FSC	Food Safety Culture
FS	Food Safety
FSMS	Food Safety Management System
GFSI	Global Food Safety Initiative
GMP	Good Manufacturing Pratices
HACCP	Hazard Analysis and Critical Control Points
IFS	International Featured Standards
SMEs	Small- and Medium-Sized Enterprises
WHO	World Health Organization

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1. Introduction

The term “safety culture” was first used after the 1986 disaster in Chernobyl in which the International Nuclear Safety Advisory Group (INSAG) identified poor safety culture as one of the main contributors to the event (INSAG, 1992). Since then, safety culture has gained recognition and attention in all different types of industries and has become a topic of a collaborative research (Fleming et al., 2018). In recent years, the food industry has become more focused on the concept of safety culture, with growing research and application by companies striving to meet increasingly demanding safety standards (Griffith, 2010).

There are many different definitions of food safety culture in the literature. However, most sources all describe the same factors as elements of FSC, which is defined as the shared attitudes, beliefs, and practices that influence how food safety is prioritized and managed within an organization (Griffith, 2010; Sharman et al., 2020). As a ground rule, food safety culture is described with statements such as “This is the right thing to do” and “We would never do this” (Global Food Safety Initiative, 2018). Furthermore, a robust food safety culture includes both individual responsibility and collective organizational accountability in order to ensure that food safety becomes a continuous priority (Yiannas, 2009).

In recent years, food safety culture has been integrated into legislation, which reflects its increasing importance. New EU Regulations make food safety culture a legal requirement for all food operators in the European Union, requiring leadership commitment, employee engagement, and effective communication as critical elements of compliance (European Commission, Directorate-General for Health and Food Safety, 2021). These changes demonstrate a shift in a perceptive - from viewing food safety just as a list of mandatory everyday practices to highlighting its value as an organizational priority within all levels.

The importance of food safety culture is even more apparent in relation to public health and the economy. World Health Organization (WHO) describes food safety as being an important link between nutrition and food security. Unsafe food, however, can bring serious risks to public health. According to WHO statistics, annually 600 million people become ill from foodborne diseases, with 420 000 of these being fatal. Foodborne illnesses that were caused by different pathogens can lead to critical health outcomes, such as long-lasting diseases and disabilities. Economically, foodborne diseases cause global productively losses of $95.2 billion annually, $15 billion of them associated with just to healthcare costs. Robust food safety measures are particularly important to protect vulnerable populations, since mostly low- and middle-income countries are affected (WHO, 2024). Beyond public health, the maturity of an organization’s food safety culture has a direct impact on operational efficiency,

which is seen in its influence of costs of poor quality (COPQ). They can be reduced to as low as 2.5% of sales in companies with well established food safety culture, while those with less mature practices have significantly higher costs, often even more than 20% of sales (Jespersen et al., 2019).

1.1 Motivation and research aim

The purpose of this research is to assess the food safety culture of a mid-sized (approximately 130 employees) food company in Austria using a mixed-methods approach. The main focus of the company is producing instant or powdered dry products like coffee and cocoa mixes, sugars, flours etc. This study redirects the attention from the formal, technical aspects of Food Safety Management Systems (FSMS) to the human aspect of food safety by considering the employees' perceptions and behaviors. This human aspect is often referred to as food safety climate and offers valuable insights into employees' views on the company's current operational practices. Measuring food safety climate, as a core element of food safety culture, can uncover important characteristics of the overall culture and identify areas for improvement (Neal et al., 2000).

A self-assessment tool was developed by De Boeck et al. (2015) to evaluate food safety climate. The tool includes 28 indicator statements across five categories: leadership, communication, commitment, resources and risk awareness. Respondents were asked to rate these food safety indicators by using a five-point Likert scale, with a higher score reflecting a stronger food safety climate. This scoring was used to turn subjective data from the survey, in which participants chose how much they agreed with a statement, to a numerical objective score, that described how well-established the food safety climate is in the company. The scores that emerged were intended to offer a benchmark for the organization, that acted as a basis for enhancing food safety culture and overall performance.

Semi-structured interviews were also conducted, along with the questionnaire, involving both management and employees without leadership responsibilities to elaborate on potential gaps in viewpoints, particularly in areas where lower ratings were measured across the categories. This qualitative component aimed to explore differences between hierarchical levels and to identify whether these differences were significant.

The mixed quantitative and qualitative findings serve as a meaning to provide a comprehensive understanding of the company's food safety culture. The results provide a snapshot of the barriers standing between the organization and a robust food safety culture

and can serve as a benchmark score to compare future assessments. The resulting score can help the organization in the next steps of improving food safety performance at the site.

1.2 Research question

The research conducted for this thesis addresses key questions both through literature review and practical assessment. These questions aim to explore the human role in the food safety culture and to evaluate its implementation within the workplace.

Questions answered through literature research: How are food safety culture and climate defined and measured? What is the role of food safety culture in product safety? What are the key factors that influence food safety in the workplace?

Questions answered through practical qualitative and quantitative assessment: How does the food safety climate in this company compare to industry benchmarks? Are there differences between departments in their perception of the organization's food safety culture? Do employees and management have a different perception of the organization's food safety culture? Do the different employment types differ in perception of the organization's food safety culture? Do the results highlight barriers affecting the organization's food safety culture?

2. Literature review

2.1 Food safety definition

Food safety encompasses the condition of food products throughout every stage of their lifecycle (from production and processing to distribution) to ensure the protection of consumer health. This definition includes considerations for the typical circumstances under which food is consumed and the information available about the specific food items. The focus is on the systematic approach to identifying and controlling risks that could result in foodborne illnesses and meeting high standards of safety as well (Baert et al., 2011).

In most European countries, terminology like “quality control”, “quality department” or “quality team” is much more common in the food industry than terms like “food safety control” or “food safety team”. While “food quality” is primarily associated with the sensory attributes of food like taste, texture and appearance, the aspects related to ensuring safety and hygiene standards should be emphasized. The interdependence of food quality and food safety underlines the importance of embedding food safety in the quality management systems and procedures, in order to ensure sufficient consumer protection (De Boeck et al., 2018).

In order for food safety to be a core feature of a company’s success, it must be integrated into the strategic goals of the organization. By connecting food safety efforts with company’s goals, it is assured that they are prioritized throughout all levels of the organization, thus highlighting their importance in daily tasks and the overall organizational culture. Discussing food safety regularly and having a constant line of communication can be a way to engage employees and ensure they understand and value it’s importance, thus actively supporting high standards. A strategic plan can help the organization achieve its set food safety objectives. The steps that can improve FSMS and support ongoing improvement should be well defined in this plan. By doing so, the organization builds a greater food safety culture and individual employees understand their importance in contributing to overall food safety objectives. When employees acknowledge their roles in a clear and well-structured plan, they are encouraged to be proactive and dedicated to deliver high food safety standards (Ades et al., 2016).

2.2 Food safety culture definition

Food safety culture is defined as a long-lasting element of the organization, that is built on set of beliefs, behaviors and assumption deeply rooted in all employees. Such shared values will, therefore, directly impact the ability of the organization to sustain and enhance food safety performance. Food safety is a long-standing dimension of an organization’s identity and a mirror of its dedication to the conformance of continuously high standards, not only temporary programs or policies (Sharman et al., 2020).

Food safety culture is an attempt to shift the focus from just implementing a food safety program to actually embedding those beliefs and practices that shape employees' knowledge of and control over food safety within an organization. Companies should not treat food safety as an isolated initiative. It needs to be integrated into the core values and practices to ensure this becomes a sustaining part of the operations and not a temporary focus. This cultural approach assures that food safety is not only a set of rules to which to conform to but a collective responsibility embraced by everyone in the organization (Yiannas, 2009).

Culture, generally speaking, refers to the patterns of thought and behavior that define a social group. These are acquired through interaction and tend to stay over time, shaping the way both individuals and groups function. Within the context of food safety, culture refers to the shared attitudes, behaviors and beliefs of the workforce that define how food safety will be conducted. A strong FSC ensures that these attitudes are consistent, widespread and long-lasting throughout the organization (Yiannas, 2009).

Food safety culture relies on both individual and collective responsibility. Each employee has a personal contribution to the outcome of food safety, while the organization as a whole is accountable for maintaining high standards. This means that the outcome of the efforts of all employees combined is greater than the sum of the contributions made by each worker separately. A good food safety culture reflects a harmonious commitment to protecting the health of consumers and the quality of the product (Yiannas, 2009).

What makes food safety culture so complex is it’s interdisciplinary nature including concepts from food science, behavioral science and organizational culture. FSC is an investigation into the deeper set of beliefs, attitudes and behaviors forming the foundation of traditional food safety management systems, which predominantly focus on compliance with regulations and adherence to procedures. It underscores the critical roles of leadership, communication, employee expertise, accountability, and risk awareness in cultivating a workforce that is not only informed but also actively engaged in promoting proactive food safety practices. (Sharman et al., 2020; Johnson et al., 2022).

Various ways to evaluate food safety culture and its impact on organizational performance have been studied over the years, from surveys and interviews to document reviews and microbial analysis, showing a wider view of an organization’s strengths and areas of improvement. Such assessment activities may prove particularly useful in identifying certain gaps and presenting strategies targeting particular improvements in the way food safety is conducted within organizations (De Boeck et al., 2019; Jespersen et al., 2019; Zanin et al., 2021a).

The difference between food safety culture and food safety climate lies in their scope and timeframe. Food safety culture reflects the deeply embedded organizational values and practices, while food safety climate captures the immediate perceptions and attitudes of employees concerning food safety. Both concepts are very important for understanding and improving food safety outcomes (Bautista-Bernal et al., 2024).

2.3 Legal framework

2.3.1 Key EU Regulations

From a regulatory perspective, the legislation on food safety has developed over time to include the aspect of food safety culture within the already existing frameworks. This change intends to ensure that food businesses comply with their duties to consumers by ensuring that safety is always maintained in all production and handling processes (Cavelius et al., 2023).

In 2020, for the first time, the Codex Alimentarius Commission included food safety culture in its General Principles of Food Hygiene document, CXC 1-1969. The emphasis has now been placed on human behavior, organizational commitment, leadership and for the workplace to demonstrate a dedication to food safety overall. A strong food safety culture depends on active leadership involvement, where managers are visibly supporting food safety initiatives, and on employee awareness, to ensure all staff understand their roles and responsibilities. Clear communication sets expectations, enables the reporting of deviations, and ensures uniformity of safety practices. It also assures that there are adequate resources available like tools, training, and systems necessary to maintain food safety. This concept emphasizes the fact that food safety relies on technical measures but also collective action of the organization to reduce risks and guarantee consumer health protection (Codex Alimentarius, 2022).

In 2021, the European Union introduced Regulation (EU) 2021/382, that makes food safety culture compulsory for all food operators. The regulation states the key elements in the development of an excellent food safety culture, including leadership commitment, defined roles and responsibilities, regular updating of hygiene systems, and thorough training and supervision. It also focuses on staff engagement, ensuring that the employees are aware of the potential risks and their responsibility in maintaining hygiene, as well as clear communication of deviations and expectations. The regulation includes food safety culture into law to enhance safer practices, reduce risks, and raise industry-wide awareness (European Commission, Directorate-General for Health and Food Safety, 2021).

Environmental health inspections and private audit reports commonly reveal varying degrees of non-compliance among organizations, from small quality issues to serious safety hazards. These may easily escalate into disastrous results such as food-borne illness outbreaks, financial loss, brand reputation damage, and even bankruptcy. Food safety is not solely a microbiological problem, it is also greatly influenced by behavioral factors. These behavioral components should be surrounded by a strong food safety culture in order to maintain compliance and effectively guarantee public safety (Griffith et al., 2010a).

2.3.2 Industry standards

Since 2021, the establishment and maintenance of a robust food safety culture have been compulsory for any food company in the European Union. The requirement is embedded in both the regulatory framework and food safety certification standards. While such advancement has been achieved, the food industry still faces certain challenges in the common understanding of how to interpret and implement these requirements effectively (Cavelius et al., 2023).

IFS Version 8

The International Featured Standards (IFS) are globally recognized frameworks designed to ensure food safety, quality, and legal compliance across the food supply chain. Their inclusion in this thesis is due to their relevance to the company where the practical component was conducted. IFS define food safety culture as the collective values, beliefs, and norms that influence the mindset and behavior regarding food safety within an organization (IFS Food, 2023).

The IFS framework emphasizes the fact that food safety culture should not exist in isolation but must be anchored into the organization's goals. This is important since it aligns the food safety culture to the requirements of IFS, thus ensuring the consistent application and integration of safety practices into daily operations and proactiveness in the prevention of food safety risks. This also helps in meeting the law’s requirements and expectations of the customers to further increase confidence and credibility in the food sector (IFS Food, 2023).

2.4. Organizational and food safety culture

The terms and categorizations may change frequently, but most of them will still bring across the same underlying message. In using organizational and safety culture frameworks in food safety, there are six indicators that stand out as most relevant for the assessment of FSC and its effect on food safety performance. These include management systems, leadership, communication, commitment, environmental factors, and risk awareness. All these together

build the base for the practices and attitudes that are important for the food safety in an organization (Griffith et al., 2010a).

Food safety culture combines ideas from three key areas: organizational culture, food science, and social cognitive science. Organizational culture looks at shared values, beliefs, and assumptions that shape employee behavior. Food science brings a technical view by identifying, assessing, and controlling food safety risks. Social cognitive science explains how to understand and predict human behavior, enabling organizations to develop strategies that lead individual actions toward shared safety goals. For instance, if an organization really values transparency, this might encourage employees to address unsafe practices, supporting a culture of improvement and accountability (Jespersen et al., 2016).

Food safety culture within a company is cultivated through the integration of two key routes or processes. The first of these, the 'techno-managerial route', places emphasis on the significance of food safety management systems in the mitigation of risks. This path takes into consideration the elements that shape FSMS as well as characteristics of the organization such as hazard analysis, control measures, and compliance with procedures. It uses structured frameworks like HACCP in order to protect against a variety of hazards such as biological, chemical, and physical, throughout the production cycle. It also enhances the consistency and quality of the system's output by employing structured approaches that improve risk anticipation and management (Luning and Marcelis, 2009; Schein and Schein, 2017).

The second process, referred to as the 'human route', examines the impact that the organizational food safety climate has on workers. This route includes the employees' perceptions, attitudes and behaviors, which are critical in determining food safety outcomes. Core components such as communication, involvement of the top management and adequate provision of resources are crucial to the maintenance of a good food safety climate. Whereas the techno-managerial route is a process-oriented approach, the human route allows for a real-time understanding of how employees perceive and comply with food safety protocols and practices (De Boeck et al., 2015).

As a combination, these two aspects give a multidimensional view of food safety culture by incorporating technical aspects and the human component. The integration of an effective FSMS with an organizational culture that values trust and shared accountability is a prerequisite towards more effective food safety management outcomes. Strong food safety culture does not solely rely on having effective systems but also on creating an environment where employees are willing to do their best in promoting and advocating for food safety (Luning and Marcelis, 2009; De Boeck et al., 2015; Schein and Schein, 2017).

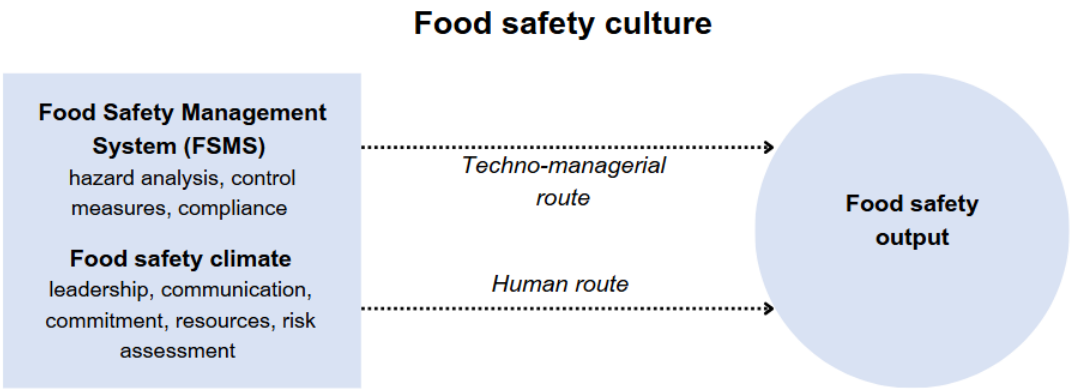

Fig. 1 Conceptual framework of FSC and its influence on food safety output. (Adapted from De Boeck et al., 2015)

2.4.1 FSMS Food Safety Management System – techno-managerial route

The perishable food products coupled with the unpredictive behavior of each individual engaged in the preparation of food makes the aspect of controlling food product quality highly complicated. To address these issues, a techno-managerial approach has been developed, which integrates the practical and managerial aspects to enhance the food systems and human behavior in production chains (Luning and Marcelis, 2007).

A Food Safety Management System contains all key aspects needed to run a safe food business, including components like prerequisite programs, Good Manufacturing Practices, Hazard Analysis and Critical Control Points, Recall procedures among others. These systems are mainly process oriented and address issues like sterilization, control of temperature and other principles of food science. The traditional way of managing food safety is training and inspections with the expectation that if the procedures are followed then food safety is guaranteed. This is, however, rather simplistic and seems to have a linear cause-and-effect outlook in respect to ensuring food safety, neglecting the fact that food safety requires multi-dimensional and behavioral strategies. As a result, it may focus on

compliance while ignoring more fundamental system and behavioral complexities (Yiannas, 2009).

The techno-managerial approach acknowledges that human behavior and the dynamics of food systems both affect food quality. Under this framework, technological activities include monitoring duties like sampling, analysis, and measurement, as well as producing procedures like heating, storing, and transporting. In order to make sure that operations are in line with corporate goals and customer demands, managerial activities concentrate on decision-making procedures, such as quality assurance, policy creation, and strategic planning (Luning and Marcelis, 2007).

a) Audits as measurement tools

A key element of FSMS are audits, which are used to evaluate compliance with food safety protocols and help identify areas of improvement. There are three main types: internal audits by quality teams, second-party audits by customers and third-party audits by external firms. The first type makes sure the organization follows internal standards and helps to improve processes. The second-party audits address customer-driven quality requirements beyond compliance. Third-party audits verify the maintenance of external standards. However, they all have limitations like narrow scopes, conflicts of interest and insufficient risk assessment, which are often influenced by budget and expertise of auditors (Powell et al., 2013; Jespersen et al., 2016).

Audits may assess implementation and compliance of FSMS, but they often miss cultural elements that can influence food safety outcomes. There is a lack of continuous improvement, due to over-reliance on checklists and absence of follow-up mechanisms. To balance this, studies suggest integrating assessments of culture and behavior into auditing frameworks to provide a better understanding of food safety performance (Powell et al., 2013).

b) Limitations of FSMS implementation

Companies of small and medium sizes often face numerous challenges in implementing FSMS, due to financial constraints, limited managerial commitment, insufficient technical expertise, inadequate infrastructure, and resistance to change among employees. They see these systems as too complicated, which results in the implementation to be incomplete or ineffective. Technical assistance, focused training and resource allocation play the role of support mechanisms for the successful adaptions of FSMS (Macheka et al., 2013; Ball et al., 2009).

The lack of specialized personnel, due to financial limitations, like a food safety champion, who has the necessary technical skills and operational knowledge, poses as an obstacle for smaller organizations. Another barrier for the adoption of new safety practices is the resistance to change among employees. Additionally, insufficient time management can often lead to the FSMS implementation being more superficial than robust and functional (Wilcock et al., 2011).

Important point is, that foodborne hazards cannot be prevented only by FSMS. Organizations with implemented and verified FSMS also have repeated food recalls, which further underlines the critical role of cultural and behavioral factors in food safety. In order for companies to achieve effective food safety, their systems need to go beyond regulatory compliance and technical processes, and address the human dimensions (Yiannas, 2009; Powell et al., 2011).

c) Integrating culture and behavior into FSMS

The implementation of FSMS in small- and medium-sized enterprises (SMEs) faces numerous challenges. SMEs often view FSMS as overly burdensome, leading to incomplete or ineffective implementation. Tailored support, including technical assistance, training, and resource allocation, is critical to overcoming these barriers (Macheka et al., 2013; Ball et al., 2009).

A major obstacle for smaller organizations is the lack of specialized personnel with the technical skills required for effective FSMS implementation. Financial limitations often prevent hiring such individuals, while resistance to change and ingrained habits further hinder progress. Managers and food safety coordinators frequently face time constraints, resulting in superficial FSMS adoption, focused more on compliance documentation than functional risk management (Wilcock et al., 2011).

FSMS alone cannot guarantee foodborne hazard prevention. Repeated recalls in organizations with verified FSMS demonstrate the importance of cultural and behavioral factors. Effective food safety requires addressing human and organizational dimensions, ensuring practices are sustained through shared values, behaviors, and accountability, beyond regulatory compliance and technical measures (Yiannas, 2009; Powell et al., 2011).

2.4.2 Human route

The focus of scientific research in food safety has been on technological and managerial activities, that include developing advanced analytical methods, food processing innovations, and specific product formulations. The managerial tools for optimizing hygiene

and safety standards of food products across the supply chain were mainly traditional food safety management systems. Despite these advancements, research shows that implementation of a well-crafted FSMS does not always lead to consistently high food safety outcomes. This discrepancy often arises from the human factor, like how thoroughly procedures are executed or what decisions were made, which can be influenced by the employees' perception of the food safety climate in the organization (De Boeck et al., 2015).

Behavior-based food safety management is an innovative approach, that addresses the complex sides of FSC. It prioritizes understanding and influencing human behaviors, unlike traditional FSMS, which focuses predominantly on processes. This type of management highlights the fact that achieving a superior food safety outcome can affect meaningful changes in behavior across all organizational levels. Behavior-based food safety management systems offer a holistic framework, by using principles from food and behavioral sciences, and organizational culture. They require addressing performance issues (such as lack of skills, ineffective work systems, or low motivation) and have well-informed strategies rather than simplistic solutions (Yiannas, 2009).

The approach of a behavior-based food safety management includes more elements and is broader than traditional methods that rely mainly on training and inspections. These activities are still important, but they cannot fully address food safety challenges alone. Other factors included in this approach are physical conditions, organizational support and personal motivation, which affect employee performance. Ongoing improvement can be promoted, by using strategies like observation, constructive feedback, coaching, and encouragement. Importantly, this type of management aims for employees to follow safety practices not just because they have to, but because they truly believe in their value, thus building a genuine commitment to food safety. By focusing on human behavior, organizational culture and not merely on following procedures this approach paves the way for a strong food safety culture. Environment where food safety is a natural and consistent part of daily routines across all levels of the company is the goal of this system (Yiannas, 2009).

As previously mentioned in order to achieve high food quality, there should be a balance between technical systems and the human factors that influence them. Variables like ingredient composition, enzyme activity or contamination risks and technological factors like equipment design and process setting play a role in shaping food behavior. On the other hand, attitudes, perceptions, decision-making processes, organizational procedures and information tools influence human behavior. In simpler terms, food quality depends on the interaction between how food reacts to its environment and how people manage processes, with both technical and human aspects working together (Luning and Marcelis, 2007).

Management plays a crucial role in fostering a good food safety environment. Direct participation of leaders in training, maintaining awareness of operational challenges and overall engaging in food safety initiatives influence the efficacy of the management. In order for any FSMS to be implemented successfully, leadership should be proactive and prioritize hands-on involvement and responsiveness. When managers demonstrate a personal commitment to food safety objectives, a culture of accountability is established, thus improving food safety outcomes across the organization (Griffith et al., 2010b; Wiegmann et al., 2002).

By incorporating these principles, organizations can move toward a more comprehensive and effective approach to food safety, which includes both technical solutions and the essential human factors influencing food safety culture.

Aspect	Traditional food safety management (Techno-managerial route)	Behavior-based food safety management (human route)
Focus	Processes and systems	Processes and people
Core basis	Food science and FSMS	Food science, behavioral science and organizational culture
Behavioral perspective	Simplistic view of behavioral change, focused on compliance and processes	Emphasizes complex behavior change and intrinsic motivation
Methodology	Linear cause-and-effect thinking, focusing on measurable control mechanisms	Systems thinking, addressing interrelated factors like personal, organizational, and physical dynamics
Outcome	Creates a food safety program	Develops a food safety culture
Key activities	Ensuring control measures such as HACCP, monitoring, and audits	Observing behaviors, providing feedback, coaching, and fostering continuous improvement
Managerial role	Focused on procedural adherence and regulatory compliance	Engages in hands-on leadership and day-to-day food safety activities

Table 1: Differences between traditional FSMS and behavior (based on Yiannas, 2009)

2.4.3 Food safety climate

Food safety climate refers to how food safety is perceived and responded to by the employees within their organization. Their attitudes, experiences and observations about food safety practices and their practical application in day-to-day operations are the base of this concept. It acts as a temporary, real-time snapshot of how food safety is viewed at a particular point in time. Food safety climate directly influences how employees follow food safety management systems and implement these practices at the individual level in their roles (Sharman et al., 2020).

Food safety climate is a part of a larger framework that works together with FSMS and it's components like hazard analysis and control measures towards achieving good food safety outcomes. Food safety climate and culture are different concepts, while also closely related. Climate captures employees' views on food safety policies and leadership at a specific moment. On the other hand, FSC includes the long-term values, beliefs, and practices ingrained within an organization that also shape its continuous approach to food safety (De Boeck et al., 2015). In other words, food safety climate provides a view of current attitudes, while food safety culture offers the deeper foundation that guides decision-making and behavior long-term (Sharman et al., 2020).

The idea of safety climate originated from studies, which researched workplace safety and employee perception and prioritization of safety practices (Zohar, 2004). This approach captures employees' view on the quality of the safety protocols in the organization. As an example, when food safety is visibly prioritized and consistently reinforced in a company, employees are more likely to adopt and follow safety practices, which can significantly enhance overall food safety performance (De Boeck et al., 2015; Fruhen et al., 2013).

Another difference between FS climate and culture is the dynamic and flexible nature of food safety climate. While food safety culture develops slowly and is deeply rooted in organizational values, food safety climate can change quickly in response to new initiatives, leadership changes, or operational adjustments. This characteristic makes it an important tool for companies that seek to evaluate their current food safety practices. Companies can identify strengths and weaknesses, understand employee perceptions and implement targeted improvements, when food safety climate is measured regularly. The feedback from the assessment can help managers address gaps in communication, training, resource allocation etc., and if employees feel unsupported or unsure about their roles (De Boeck et al., 2015; Bautista-Bernal et al., 2024).

Leadership, communication, commitment, resources, and risk awareness are among the key dimensions that have an influence over food safety climate. The importance of food

safety is highlighted by proactive leadership, clear communication, which can ensure that employee understand their roles and responsibilities, fostering trust and accountability, while adequate resource allocation (such as time, tools, and training) supports safe practices. Promoting risk awareness is also a key factor in identifying and addressing potential hazards. Together, these dimensions create a positive food safety climate with safety standards being a collective responsibility and an integral part of the organizational culture (Neal et al., 2000; Griffith et al., 2010a; De Boeck et al., 2015).

Organizations can gain valuable insights of their current food safety practices and identify areas for improvement, by regularly monitoring food safety climate. Companies remain adaptable, responsive and ensuring that their food safety systems align with employee views and organizational goals, by conducting regular assessments. Measuring food safety climate can optimize training programs, communication strategies, or resource allocations to better support their workforce. Employees' motivation to prioritize safety and the organization's commitment to maintain high safety standards is proof of a strong food safety climate. This intrinsic motivation should come from a genuine belief how important food safety is and not only to reflect following rules or avoiding penalties. Employees are more proactive in maintaining safety standards, when they feel supported and engaged in their roles, which also contributes to better food safety outcomes. Overall long-term success can be achieved by aligning technical systems with human behavior, thus creating a comprehensive approach to food safety (De Boeck et al., 2015; Bautista-Bernal et al., 2024).

2.5 Different strategies of measuring food safety culture

The first step of evaluating a business's food safety culture is identifying the specific components. FSC is multi-dimensional, which makes this stage critical in prioritizing the right aspects of the company's unique needs and operational context. Next step is selecting the appropriate assessment method, which should align with the organization's specific characteristics and goals, since no approach is universal. In general, there are two main categories of assessment methods: qualitative and quantitative, each with its own strengths and limitations. Tools of qualitative methods are often interviews, focus or discussion groups and narrative interviews, which require more time and resources, but bring deeper understanding. From the quantitative methods, questionnaires are the most popular choice by being simple, easy to administer and not very time consuming (Redmond and Griffith, 2003).

The next stage is determining which organizational levels should be included in the assessment, since FSC can vary significantly among different hierarchical levels in larger businesses with multiple sites or units. For example, frontline workers and employees in

managerial level can have big differences in perceptions and practices. To insure an accurate and comprehensive assessment of the organization's food safety culture, a representative sample from all levels is crucial. Proper planning at this stage ensures that the assessment aligns with the organization's objectives and facilitates meaningful communication of the results (Griffith et al., 2010b).

2.5.1 Quantitative

A study by De Boeck et al. (2018) developed and validated a self-assessment tool in order to measure the food safety climate in Belgian food processing companies. The tool comprises of 28 indicators with one section measuring organizational characteristics through multiple-choice questions, and the other assessing food safety climate dimensions such as leadership, communication, commitment, resources, and risk awareness. The study offers valuable insights into attitudes rather than actual behaviors, while focusing on employees' shared views. These perception-based results emphasize the incorporation of technical and behavioral aspects of FS management, by highlighting areas of improvement.

De Andrade et al. (2020) evaluated both techno-managerial and human routes of food safety culture in food services in São Paulo, Brazil. A validated checklist with 50 items like water supply, equipment, sanitation and food preparation was used to measure the traditional technical part. Based on compliance scores, this checklist classified organizations into risk categories, while also being embedded in the food safety regulations in Brazil. Self-administered questionnaires were used for the assessment of the human route. Demographic data, training, communication, organizational climate, and risk perceptions were gathered, allowing a comprehensive understanding of the influence of systemic factors and employee behaviors on food safety climate.

Ungku Fatimah et al. (2014) measured different FSC factors by conducting a cross-sectional survey of over 500 employees in healthcare and school foodservice operations in three US states. These elements include communication, self-commitment, management, coworker and environment support, risk judgment and work pressure. Using a seven-point Likert scale, the study gathered employee perceptions of food safety practices within their organizations.

Common factors like leadership, communication, organizational commitment and risk awareness, which influence food safety culture, were identified across these studies. Structured quantitative methods provide valuable insights, but they also have their challenges of relying solely on perception-based-data (Ungku Fatimah et al., 2014).

2.5.2 Qualitative

Semi-structured interviews, focus and discussion groups are among the qualitative tools, which provide deeper understanding of the perceptions, attitudes and behaviors towards food safety within organizations. Such methods offer flexibility and depth more than other traditional approaches like audits or surveys (Griffith et al., 2017; Nayak and Waterson, 2017).

A study by Griffith et al. (2017) used semi-structured interviews to assess FSC within an entertainment, hotel, and food service complex in South Africa. The interviews included key elements such as leadership, communication, training, commitment, and monitoring. This format allows for a more comprehensive evaluation than traditional audits by gathering detailed responses and analyses non-verbal cues, which can lead to identification of deeper cultural factors that influence food safety practices.

Nayak and Waterson (2017) conducted 30 semi-structured interviews with different food industry stakeholders like academics, environmental health officers and food managers. In the interviews participants' attitudes and awareness towards food safety culture, current assessment systems and views on the Food Standards Agency's toolkit were analyzed. By being flexible, the semi-structured interview format allows participants to freely share insights, which provides broad qualitative data. Recurring challenges and barriers in the implementation and assessment of FSC were identified.

In their study Watson et al. (2018) conducted semi-structured interviews and focus groups in food manufacturing companies in the UK, which assessed the food safety compliance and Brexit's regulatory impact. Such interviews offer detailed insights into individual perspectives, while focus groups capture collective experiences and social dynamics. This qualitative method highlighted the complex fostering of a proactive food safety culture in a changing regulatory environment.

The studies demonstrate the elements of qualitative methods in measuring food safety culture like depth and flexibility. These approaches offer valuable measures for targeted and sustainable improvements, by revealing the behavioral and cultural factors that influence food safety practices (Griffith et al., 2017; Nayak and Waterson, 2017; Watson et al., 2018).

2.5.3 Mixed methods

Another method for assessing FSC is the use of mixed methods. In the reviewed literature three approaches to classifying the type of an organization's food safety culture using mixed methods were revealed: food safety culture as a numerical continuum, as a reactivity state and as a maturity state.

a) FSC as a numerical continuum

Food safety culture can be classified as a spectrum of a company's different degrees of maturity in their food safety behaviors and practices. FSC is described as a continuum, ranging from low to high levels of maturity. Poor FS practices, insufficient resources, weak leadership and limited employee awareness are all identified as factors of organizations with lower maturity levels. Companies at the higher end of the spectrum show strong leadership, proactive, communication, adequate resource allocation and high employee commitment (De Boeck et al., 2019; Nyarugwe et al., 2020a).

De Boeck et al. (2018) employed a mixed-method approach to assess FSC, highlighting its complex and multifaceted nature. The quantitative component involved structured surveys using Likert-scale items to measure employees' perceptions, attitudes, and behaviors toward food safety. These surveys provided numerical data, offering measurable insights into the maturity levels of FSC within organizations. Interviews and direct observations were chosen for the qualitative part of the research. These methods provided a deeper understanding of organizational and behavioral elements, that could not be captured in the surveys. Poor communication, inconsistent adherence to food safety protocols and weak leadership commitment were all factors of organizations with low FSC. In contrast, proactive leadership, strong communication networks and shared accountability across all levels were noted as elements of a high food safety culture (De Boeck et al., 2018).

The study of Nyarugwe et al. (2020a) used mixed methods like surveys and interviews to include measurable and contextual data, while expanding the assessment across different cultural and governance contexts. FSC was positioned on a continuum based on the scores from the quantitative surveys. The qualitative method deepened the analysis by examining external elements such as cultural dimensions (power distance and uncertainty avoidance) and regulatory frameworks. Organizations with a low FSC showed factors like insufficient resources, weak regulatory enforcement and minimal employee involvement in food safety processes. These with a high FSC exhibited effective communication, strong leadership and unified commitment to food safety (Nyarugwe et al., 2020a).

b) FSC and reactivity state

Food safety culture can also be categorized in three maturity levels: reactive, active and proactive, as shown in the studies of Nyarugwe et al. (2018) and Zanin et al. (2021b). The reactive FSC only responds to immediate problems or inspection findings, without focusing on preventing them. The active FSC meets food safety requirements to a certain extent, but doesn't show a deep commitment and comprehensive understanding of food safety. The highest level of maturity is the proactive food safety culture. Organizations prioritize

prevention, anticipate risks and include food safety in their organizational culture. Both studies employ a mixed-methods approach to assess FSC across these maturity levels, integrating quantitative tools, such as surveys and pre- and post-intervention questionnaires, with qualitative methods like interviews, focus groups, and observations. This combination provides measurable benchmarks alongside contextual insights into organizational behaviors, attitudes, and practices (Nyarugwe et al., 2018).

In the reactive state, organization respond to food safety issues only when problems arise by doing damage control rather than preventing them in the first place. Factors in this state include low leadership commitment, ineffective communication and poor employee engagement. Furthermore, processes are unstructured and blame culture is prevalent. Such companies act after an incident or a regulatory violation have occurred, which shows inconsistent practices and lo awareness (Nyarugwe et al., 2018).

Organizations begin to recognize the importance of food safety and start to implement more structured measures to meet external requirements in the active state. Protocol adherence, training participation and systematic implementation are also improved. Zanin et al. (2021b) noted, that after educational initiatives, there was an increase of engagement and compliance, while in the study of Nyarugwe et al. (2018) companies only reacted to external pressures despite the consistent system application.

Food safety becomes a valued factor in an organization in the proactive state. There is further emphasis on prevention, continuous improvement and shared responsibility with a high scoring of leadership engagement, communication and risk awareness. Proactive organizations also show ownership, open communication, no blame culture, advanced risk management, regular protocol updates and employee involvement in decision-making (Nyarugwe et al., 2018).

c) Measuring using maturity models

Another way to categorize food safety culture is to describe it as five distinct stages: doubt, react to, know of, predict, and internalize, that represent the progression from low to high prioritization of FSC (*See table 2*). Organizations with lower maturity stages are only responsive to problems that occur, without highlighting the importance of an established FSC. In contrast, organizations with higher maturity recognize food safety culture as a key component of the operation and prioritize the prediction of potential issues (Jespersen et al., 2016, 2017, 2019).

In their study, Jespersen et al. (2016) measured organizations' food safety culture by using mixed-methods approach. The combination of quantitative surveys and qualitative maturity profiling provides a multidimensional perspective on how FSC is reflected in daily operations,

helping organizations to understand their maturity level and the possible necessary improvements. For example, organizations in the “internalize” stage demonstrate strong leadership, effective and proactive measures, while companies in the “doubt” stage often lack structured processes and leadership engagement.

By integrating organizational culture, social cognitive and food science this maturity model offers actionable systematic development, by assessing external adaptation (e.g. crisis management) and internal integration (e.g. communication and authority) (Jespersen et al., 2016).

Stages of FSC	Description
1. Doubt	At the initial stage, food safety is seen as a regulatory requirement rather than a priority, with reactive, crisis-driven responses and minimal investment. Problem-solving is unsystematic, infrastructure is insufficient, and efforts rely heavily on senior leadership directives.
2. React to	At this stage, food safety is reactive, with practices aimed at avoiding immediate consequences rather than prevention. Basic systems exist but are inconsistently applied, and processes are task-focused. Responsibilities are assigned reactively, and data-driven decision-making is fragmented and unintegrated.
3. Know of	At this stage, organizations value food safety and adopt structured problem-solving methods like “Plan, Do, Check, Act.” Investments improve tools and data collection, though gaps in prevention remain. Control-focused strategies are still there, but leadership starts to include food safety with the goals of the organization.
4. Predict	At this state, managing of food safety happens proactively through data-driven decisions and preventive actions. Responsibilities are clearly defined, investments align food safety with business objectives and there is a continuous improvement overall.
5. Internalize	At the final stage, food safety becomes fully integrated into organizational culture and a core value. Both employees and leadership demonstrate strong commitment in using advanced technology and data for continuous improvement.

Table 2: Stages of food safety maturity (based on Jespersen et al., 2016)

d) Maturity calculation using method triangulation

Another approach to measuring food safety culture is the triangulation method. It integrates multiple methods, thus providing an enhanced depth and validity. It is also particularly useful in analyzing complex dimension, such as leadership, communication, employee behavior and organizational practices (Carugi, 2016; De Boeck et al., 2018; Jespersen et al., 2016).

Three-method-triangulation was applied by Jespersen et al. (2016) to assess FSC maturity across multinational food companies (*See figure 2*). The quantitative method were surveys that measured key dimensions like social norms and motivation. They acted as self-assessment maturity scales that offered numerical benchmarks but lacked contextual data. To balance this out, qualitative analysis of organizational documents like food safety records and audits, was conducted. This provided examination of systematic processes and adherence to safety protocols over time. The second qualitative method used, were semi-structured interview with plant leaders. This provided a deeper exploration of leadership engagement, challenges and employee perceptions. The results were mapped onto a FSC maturity model, coinciding of five stages, that helped organizations to identify gaps and implement targeted improvements.

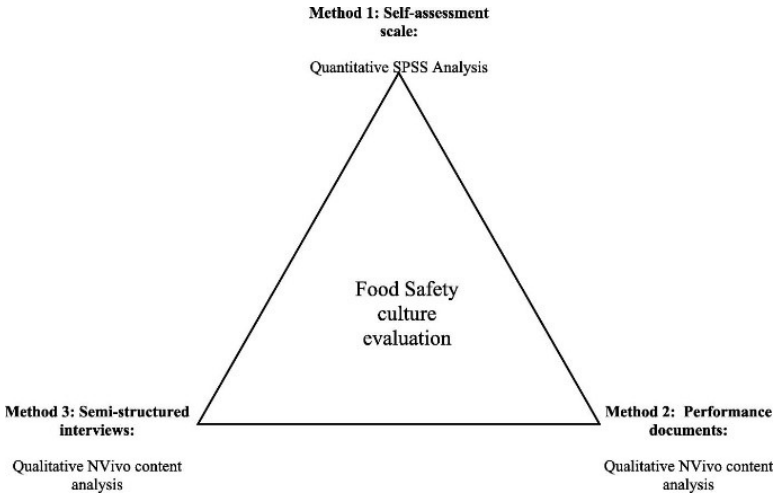

Fig. 2. Methods and data triangulation applied for evaluating food safety culture (Jespersen and Wallace, 2017).

De Boeck et al. (2018) also used triangulation to evaluate FSC in food service operations, using quantitative surveys, observations of daily operations, interviews and focus groups. The three methods provided employees' perceptions of different dimensions, real time insights into documenting of protocols, food safety challenges, organizational principles and cultural practices. When gaps between perceived and actual practices were found, the triangulation method offered actionable recommendations for enhancing FSC.

Both studies highlight how triangulation can deliver a multi-dimensional assessment of FSC and enable organizations to identify improvement areas, thus developing a proactive food safety culture. Quantitative methods help provide measurable benchmarks and qualitative - offer behavioral and contextual depth (Jespersen et al., 2016; De Boeck et al., 2018).

e) Diagnosis and gap analysis

The last approach discussed here is the method of diagnosing and addressing gaps in food safety culture maturity by Spagnoli et al. (2023). This framework represents the dynamic and complex concept of food safety culture and follows the three steps of a systematic mapping, analyzing and improving FSC within organizations. The first step of the "improvement roadmap" is assessing FSC maturity across all levels and departments of the organization, by using quantitative surveys and qualitative interviews. The second step is analyzing the problem area, while focusing on identifying the root causes behind gaps in the maturity, with the help of observations, interviews and document reviews. Developing and implementing interventions is the final step of the roadmap, that involves designing and applying actions to close the identified gaps, thus strengthening the food safety culture og the company.

In this study food safety culture is represented by three key building blocks: The Techno-managerial, the Human-organizational and Human-individual blocks. The first one uses diagnostic instruments to assess operational risks like hygiene, contamination prevention, compliance monitoring, validation and documentation, while rating the maturity level on a scale of 0 to 3, thus identifying areas of improvement (Spagnioli et al., 2023). The human-organizational block evaluates employees' perception of leadership, communication, commitment, resources, and risk awareness using tools like the food safety climate tool (De Boeck et al., 2015). Furthermore, a card-aided management interview provides additional insight from the leaders in adaptability, beliefs and values, and organizational vision (Nyarugwe et al., 2018; Jespersen et al., 2019). In the third Human-individual block motivation, knowledge and psychosocial well-being are measured through multiple-choice questions, using a Likert-scale, stress and burnout scales. This block assesses food safety behaviors like compliance with protocols and proactive participation in hygiene practices, thus providing an understanding of attitudes and behaviors essential for a strong FSC (Spagnoli et al., 2023).

Other key elements of food safety culture are the three layers of culture, which also form the heart of organizational culture: Espoused beliefs, values, underlying assumptions and artefacts represent the visible practices and act as predictors of behavior (Schein and Schein, 2017; Zanin et al., 2021a). These elements together affect organizational behavior

by influencing outcomes such as enhanced microbiological safety (De Boeck et al., 2016) and improved economic performance (Jespersen et al., 2019). Internal factors, like organizational structure and external influences, such as national culture and governance represent the interconnected nature of FSC in this framework (Spagnoli et al., 2023).

This roadmap is an extensive tool for diagnosing FSC and implementing specific improvement. It can be used by organizations to increase their FSC maturity level, while ensuring that food safety practices become proactive, sustainable and part of the company's culture. Such structured approach highlights the importance of considering internal processes together with external factors, in order to achieve robust food safety outcomes Spagnoli et al., 2023).

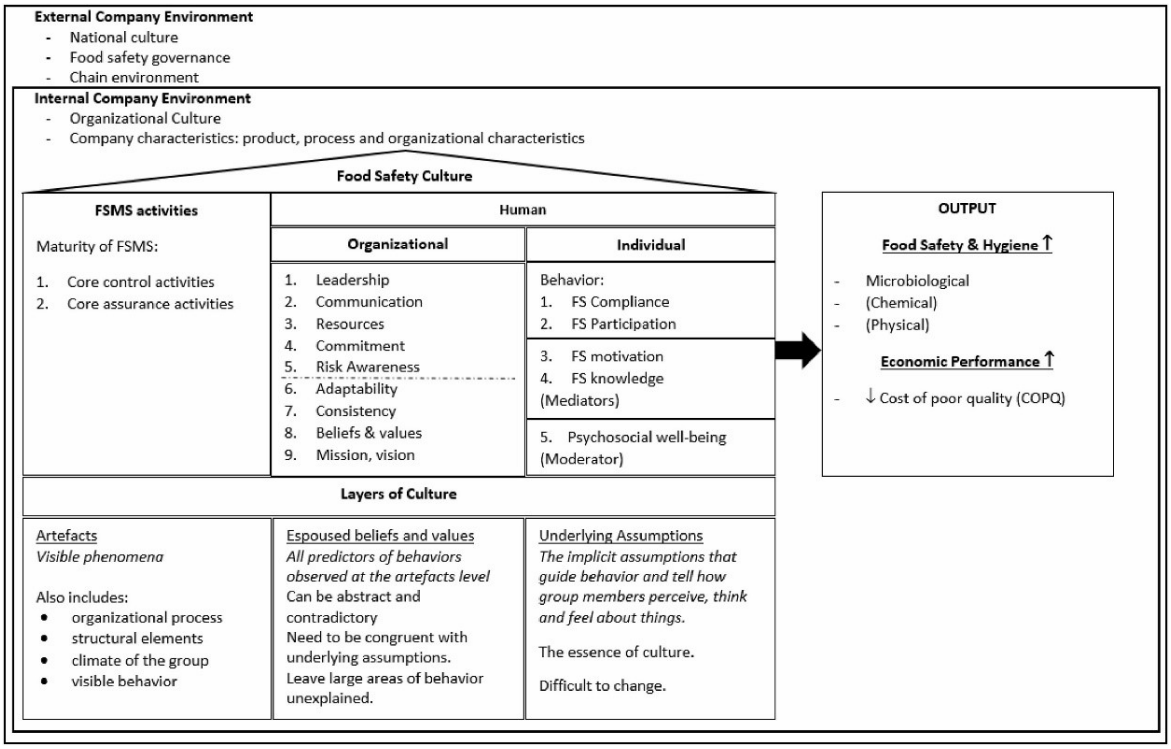

Fig. 3: Conceptual framework of FSC: Dimensions, building blocks, and cultural layers (Spagnioli et al., 2023)

3. Methodology

3.1 Research design

3.1.1 Exploratory research

In this thesis a structured methodology is employed to explore, describe and analyze food safety culture within a mid-sized food company in Austria. The research design includes elements from exploratory, descriptive and causal research to provide an extensive understanding of FSC.

A detailed literature review was conducted as a part of the exploratory research, which focused on understanding the principles, frameworks and methodologies related to FSC. A systematic approach was used to identify relevant content from sources in English, published between 2000 and 2024. Books, documents, classical and newspaper articles, randomized controlled trials, systematic reviews, meta-analysis and evaluation studies were considered in the research to ensure both historical context and modern perspectives.

The initial search was conducted using Boolean operators to address the first research questions. The keywords [‘food safety culture’ OR ‘food safety climate’] were used to capture articles discussing the general concepts of food safety culture and climate. A separate search focused on the phrase ‘measuring food safety culture’ to identify studies specifically addressing methodologies and tools for assessing food safety culture. This research included different databases, on both electronic platforms and websites of organizations. Electronic databases, such as Google Scholar, PubMed, and Science Direct, were used to access peer-reviewed journal articles, theses, and other academic publications. Industry guidelines and reports from institutional and organizational websites, such as Global Food Safety Initiative (GFSI), International Featured Standards (IFS), the World Health Organization (WHO), Food and Agriculture Organization (FAO), the Food and Drug Administration (FDA) for U.S. regulations, Eur-Lex for European Union legislation, and the International Nuclear Safety Advisory Group (INSAG), were also searched.

In addition, the snowball method was applied, helping to expand the pool for relevant literature by examining references in key studies and identifying works that cited them. This process ensured the inclusion of essential studies, articles, and books that might not have been captured in the initial search.

3.1.2 Descriptive research

The descriptive part of the research aimed to assess key dimensions like leadership, communication, commitment, resource allocation and risk awareness, thus evaluating the current state of FSC.

3.1.3 Casual research

Additionally, relationship between these categories were investigated by a causal research. It served for analyzing how factors like management engagement, resource availably etc. influence overall FSC.

3.2 Research approach and strategy

A mixed-methods approach was adopted to ensure a comprehensive analysis. A structured quantitative questionnaire, that was designed on established FSC indicators and already verified in studies was administered to employees in all departments. Employees' perceptions of the categories were rated on a five-point Likert scale and the data was statistically analyzed in order to identify strengths, weaknesses and gaps between different groups. The qualitative method of the thesis involved conducting individual semi-structured interviews with employees. They provided deeper understanding of the quantitative results, particularly in areas with significant differences between hierarchical levels or departments.

3.3 Quantitative approach: Food safety climate tool

3.3.1 Description of the questionnaire

The quantitative part of this thesis was based on a questionnaire developed by De Boeck et al. (2015). Five core components: management commitment, communication, employee behavior, risk awareness and organizational systems were identified as essential for assessing food safety climate (Griffith et al., 2010a). These categories surfaced from previous extensive research on leadership, accountability, knowledge, engagement and support systems (Berman Ltd et al., 2012; Harvey et al., 2002; Yiannas, 2009).

The two terms "climate" and "culture" are often used as if they had the same definition. This questionnaire focused on the more actionable components of food safety culture. The six key indicators forming the base for the questionnaire are leadership, communication, commitment, resources and risk awareness. They serve for compliance and alignment with food safety performance requirements (Griffith et al., 2010a; De Boeck et al., 2015).

The next section will detail the key dimensions of the questionnaire and their significance in providing an in-depth assessment of food safety culture.

3.3.2 Key dimensions measured

1) Leadership

The first key element is leadership, which plays a fundamental role in establishing and maintaining a strong FSC within an organization. It is defined as the employees' perception of the effective engagement of leaders in achieving hygiene and food safety goals, visions and standards (Griffith et al., 2010a). Leadership can influence behavior, communication and accountability at all organizational levels. A food safety culture originates at the top of an organization and flows downward, reflecting the priorities and values of its leaders (Yiannas, 2009).

Leadership serves as the cornerstone of FSC, influencing behavior, communication, and accountability at all organizational levels. Effective leadership goal should be not only to set expectations but also inspire and motivate employees to adopt and sustain compliant food safety practices. Under the supervision of a strong leadership, food safety, clearly defined goals and standards aligning with organizational objectives are interconnected. Furthermore, food safety culture is shaped by leaders at all levels of an organization. Top management is responsible for setting overarching goals and expectation, while middle management and supervisors take care of daily practices and ensure that they align with food safety standards (Griffith et al., 2010b). The following indicators evaluate key aspects of leadership with the context of safety:

L1: "In my organization, the leaders set clear objectives concerning hygiene and food safety."

Effective leadership's task is to set clear objectives that enable performance measurement, offering a basis for continuous improvement. Food safety goals should be well-defined, of high quality and achievable in order to guide employees and provide clear direction. When objectives are too complicated, results like inconsistent practices are possible, due to the fact that employees may not understand their responsibilities clearly. Overall leaders achieve better results when expectations are botch clear and uncompromising (Yiannas, 2009).

L2: "In my organization, the leaders are clear about the expectations concerning hygiene and food safety towards employees."

Expectations should be clearly communicated by leaders to ensure that employees understand their roles in maintaining hygiene and food safety. Workers may lose confidence or knowledge to perform tasks correctly if expectations are too vague. On the other hand, when expectations are concrete and well-communicated, it helps employees align their actions with organizational goals, fostering accountability and constant food safety practices.

Clear expectations are a key driver of employee performance and organizational success (Yiannas, 2009).

L3: "In my organization, the leaders are able to motivate their employees to work in a hygienic and food safe way."

Motivating employees to adopt and sustain hygienic and food-safe behaviors is a critical responsibility of leaders. Effective motivation goes beyond enforcing compliance, it involves inspiring employees to internalize the importance of food safety and take ownership of their actions. Motivated employees are more likely to exceed minimum requirements and contribute to a culture of continuous improvement, which is essential for sustaining FSC (Griffith et al., 2010a).

L4: "In my organization, the leaders listen to employees, if they have remarks or comments concerning hygiene and food safety."

Leaders' active listening skills help build trust and engagement among employees. The first ones, who often identify deviations or potential risks, are frontline workers, which makes their feedback invaluable. When leaders take their concerns and suggestions into consideration, it increases employee involvement, motivation and enhances problem-solving. Collaborative and proactive culture is built on employees who are more likely to engage positively with food safety initiatives, when they feel heard (Yiannas, 2009).

L5: "In my organization, hygiene and food safety issues are addressed in a constructive and respectful way by the leaders."

Constructive and respectful communication is an important part in avoiding blame culture. Blame culture can make employees fail to report mistakes due to fear of potential repercussions, which can further hinder information and the implementation of effective solutions. To avoid this, leaders should create a safe environment for employees to express their concerns by fostering constructive and respectful communication. This approach ensures that mistakes become opportunities for growth rather than barriers to progress (Griffith et al., 2010a).

L6: "In my organization, the leaders strive for a continuous improvement of hygiene and food safety."

When leaders strive for continuous improvement, they demonstrate commitment to excellent hygiene and food safety, ambition to go beyond compliance and proactively seek opportunities to enhance food safety practices. It also highlights the importance of FS within the organization, ensures adaptive processes, when challenges arise and standards evolve. (De Boeck et al., 2015).

2) Communication

Communication is a crucial element of a positive food safety culture and plays an important role in any organization. The effectiveness of the transfer of food safety-related information defines how good communication within the organization is (Griffith et al., 2010a). When communication is effective, employees feel well-informed about their roles, responsibilities and the company's goals concerning food safety. It influences their attitudes and behaviors and promotes compliance with hygiene and food safety standards (Yiannas, 2009).

There are many communication channels to share information in an organization, such as face-to-face discussions, informal workplace conversations, emails and visual aids like posters and signs. Formal communication ensures clarity and consistency, while informal one with its personal nature has a greater impact on employees' behavior. A strong communication strategy ensures to incorporate both interaction types to engage employee more effectively. It is also a two-way process, meaning that employees can also voice concerns and share feedback with leaders. That fosters teamwork and trust within the company (Griffith et al., 2010a).

Effective communication can further bridge the gap of the safety attitudes between management and employees, ensuring that workers understand food safety standards and also feel committed to maintain and continuously improve them. On the other hand, poor communication can lead to misunderstandings, reduced motivation and a weakened safety culture. To reinforce the importance of food safety practices and to make them a part of the work environment, visible reminders like signs and symbols can play an important role (Yiannas, 2009). The following indicators evaluate key aspects of communication in the context of food safety:

C1: "In my organization, the leaders communicate regularly with the operators about hygiene and food safety."

For employees to remain aware of their responsibilities and to reinforce the importance of food safety regular communication is a key element. Leaders create a continuous dialogue around food safety and help it stay a priority by consistent messaging and communication (Yiannas, 2009)

C2: "In my organization, the leaders communicate in a clear way with the operators about hygiene and food safety."

Communication also needs to be clear and understandable in order for employees to comprehend what is expected of them and what their responsibilities are. Specific, task-oriented communication has been shown to improve compliance, align employee actions

with company's goals and strengthen food safety practices, by avoiding confusion due to unclear messaging (Griffith et al., 2010a; Yiannas, 2009).

C3: "In my organization, it is possible for the operators to communicate about hygiene and food safety with the leaders."

Open channels of communication between workers and managers can provide collaboration by sharing views and concerns. This openness will allow transparency, pro-action, and a good food safety climate since employees feel valued, heard and supported (Griffith et al., 2010a)

C4: "In my organization, the importance of hygiene and food safety is permanently present by means of, for example, posters, signs and/or icons related to hygiene and food safety."

Visual aids such as posters and signs serve as constant reminders of the importance of food safety. These tools reinforce organizational values and encourage adherence to hygiene standards. Furthermore, strategically placed reminders like hand-washing instructions at sinks or signage at critical control points for example, increase awareness and improve compliance (Yiannas, 2009).

C5: "I can discuss problems concerning hygiene and food safety with colleagues in my organization."

Open discussions about hygiene and food safety issues among colleagues can enhance overall awareness and lead to higher standards of hygiene and food safety. Employees should feel comfortable approaching colleagues whose behavior may pose risks to hygiene and food safety to address these concerns constructively (Griffith et al., 2010a).

3) Commitment

Commitment in a food safety culture context is defined as the perception of the engagement and involvement of employees from all levels within an organization regarding hygiene and food safety (Griffith et al., 2010a; De Boeck et al., 2015). This category highlights how important strong leadership, employee attitudes and organizational practices are in fostering a collective dedication to food safety goals. Commitment can significantly influence motivation and behavior, by aligning the beliefs and values between employees and organization (Griffith et al., 2010a).

Commitment must be first demonstrated by leadership since the strength of an organization's FSC has a direct reflection on the importance of food safety. When leaders set example, involve employees in related matters and actively prioritize food safety, they create an environment where hygiene and safety are valued at all levels (Yiannas, 2009). The following indicators assess the key aspects of commitment:

E1: “In my organization, the leaders clearly consider hygiene and food safety to be of great importance.”

This indicator is adapted from the psychosocial safety climate scale and tailored to a food safety context (Hall et al., 2010). It reflects the extent to which leaders visibly prioritize food safety, shaping employees’ perceptions and behaviors. When leadership emphasizes the importance of hygiene and safety, it signals organizational commitment and encourages employees to internalize these values (Yiannas, 2009).

E2: “My colleagues are convinced of the importance of hygiene and food safety for the organization.”

Employees’ attitudes toward food safety are influenced by their alignment with organizational values. When employees recognize the significance of hygiene and safety, they exceed expectations because they view these practices as integral to their roles, not just tasks. This indicator captures the collective belief among employees, fostering a shared sense of responsibility (Griffith et al., 2010a).

E3: “In my organization, working in a hygienic and food safe way is recognized and rewarded.”

A big motivator and reinforcer for positive actions is recognizing and rewarding hygienic behavior. When long-term behavioral changes are needed, positive reinforcement is more effective than punitive measures, as it encourages employees to continuously follow safety protocols. Leaders who acknowledge and reward correct behavior create an open culture where food safety is actively promoted (Yiannas, 2009; Harvey et al., 2002).

E4: “In my organization, the leaders set a good example concerning hygiene and food safety.”

Leaders can significantly influence employee behavior by being a good role model, demonstrating commitment to proper hygiene and food safety practices and by setting a high standard. By simply observing employees often adapt their leaders’ behaviors, making this a critical aspect of food safety culture (Griffith et al., 2010a).

E5: “In my organization, the leaders act quickly to correct problems/issues that affect hygiene and food safety.”

This indicator evaluates leaders’ responsiveness to food safety issues. Prompt action reflects the organization’s commitment to maintaining high standards and ensures that problems are addressed before they escalate. This proactive approach reinforces the importance of hygiene and safety as organizational priorities (Hall et al., 2010).

E6: “In my organization, employees are actively involved by the leaders in hygiene and food safety related matters.”

Active employee involvement is essential for fostering a sense of ownership and pride in food safety outcomes. When leaders engage employees in decision-making and problem-solving, it empowers them to contribute meaningfully to hygiene and safety practices. This indicator reflects the collaborative efforts needed to sustain a strong FSC (Griffith et al., 2010a).

4) Resources

Resources refer to the physical and non-physical support that employees need to maintain hygienic and food-safe practices, which makes this element a crucial part of food safety culture. Resources include factors such as sufficient time, staffing, infrastructure training, education and clear procedures (De Boeck et al., 2015). When leaders provide these resources, it ensures that employees can effectively apply food safety practices, bridging the gap between their knowledge and performance. Furthermore, it creates an environment where employees feel supported and motivated, thus strengthening the organization's overall food safety climate (Griffith et al., 2010a). In contrast, insufficient resources give employees the impression that food safety is not a top priority and can hinder continuous application of food safety practices (Clayton et al., 2002). Each indicator in this dimension reflects a specific aspect of resources and their impact on FSC:

RES1: "In my organization, employees get sufficient time to work in a hygienic and food safe way."

A critical aspect of FSC is providing sufficient time for employees to complete their tasks hygienically and in a food-safe way. Under time pressure food safety efforts might be undermined by taking shortcuts or deviations from standard practices. When there is enough support in this regard, employees' motivation and commitment to maintaining hygiene standards increase. This, furthermore, contributes to better compliance with food safety protocols, thus bringing higher-quality outcomes (De Boeck et al., 2015; Griffith et al., 2010a).

RES2: "In my organization, sufficient staff is available to follow up hygiene and food safety."

Sufficient staffing levels ensure that all food safety tasks are adequately addressed and that workloads are manageable. When staff shortages occur, pressure might increase, leading to employees overlooking responsibilities and compromising of safety practices. During absences, like sick leave or vacation, backup staff should be available at all times, for the support of consistent adherence to hygiene and food safety standards (Griffith et al., 2010a).

RES3: "In my organization, the necessary infrastructure (e.g., good workspace, good equipment) is available to be able to work in a hygienic and food safe way."

Infrastructure, such as appropriate workspace design, functional equipment, and access to hygiene facilities like a handwashing station, ensures that employees carry out their duties in a safe and efficient manner. If these facilities are absent or of low quality, employees may perceive that food safety is not taken seriously, leading to inconsistent practices (Clayton et al., 2002; Griffith et al., 2010a).

RES4: "In my organization, sufficient financial resources are provided to support hygiene and food safety (e.g., lab analyses, external consultants, extra cleaning, purchase equipment)."

Organizations demonstrate commitment to maintain high standards, when they invest in food safety measures. Insufficient financial resources can lead to limitations of the organization's ability to address potential issues effectively. On the other hand, allocating funds for laboratory analyses, consulting services, additional cleaning efforts and equipment upgrades is a proactive approach to better managed food safety risks (Griffith et al., 2010a).

RES5: "In my organization, sufficient education and training related to hygiene and food safety is given."

The aspect of education and training are critical for ensuring behavioral change and clear understanding of how important hygiene and food safety is. Education provides a foundation by stressing on the importance of the practices, while training can guide employees in correctly implementing them. In order to translate knowledge into consistent, practical application in daily operations, both education and training should be implemented together (Clayton et al., 2002; Yiannas, 2009).

RES6: "In my organization, good procedures and instructions concerning hygiene and food safety are in place."

Clear, written procedures and instructions are crucial for providing employees with a structured plan, in order to perform their tasks correctly and consistency. When guidelines are well defined and documented, they ensure that all employees understand what is expected of them, thus preventing deviations in the practices. This systematic approach supports a stable and reliable food safety culture (Yiannas, 2009).

5) Risk awareness

Risk awareness refers to how well an organization identifies and understands hygiene and food safety risks, as well as its ability to manage and control them effectively (Griffith et al., 2010a). It also highlights the importance of recognizing and addressing risks across all levels. It involves identifying potential risks, implementing control measures and ensuring that risk perception of all employees is accurate and that everyone from workers to

leadership understand their role in managing those risks. Strong risk awareness is fundamental to building a solid food safety culture (Clayton et al., 2002; Harvey et al., 2002). Furthermore, this aspect has an impact on employee actions, leadership decisions and overall food safety performance. When potential hazards are clearly understood, they are more likely to be prevented in the first place. On the other hand, carelessness or ineffective safety practices can occur, when there is poor risk awareness or misunderstandings. For that reason, clear communication and proper training are important factors in ensuring that everyone in the company shares the same perceptions and work together to manage food safety risks (Griffith et al., 2010a). The following indicators evaluate key aspects of risk awareness within the organization:

RI1: "In my organization, the risks related to hygiene and food safety are known."
Risk perception is a critical factor, which can influence employees' actions and daily decision-making. This indicator shows to which extent employees are aware of hygiene and food safety risks. Risk awareness is a key element in ensuring a strong food safety climate. Employees need to recognize potential hazards to effectively incorporate preventive measures into their routines (Griffith et al., 2010a).

RI2: "In my organization, the risks related to hygiene and food safety are under control."
Controlled risks show that organizations are committed to maintaining a reliable food safety management system. When employees trust the effectiveness of the FSMS, they experience less stress and are more confident in their workplace environment. It is crucial for this trust to be balanced in order to avoid blind complacency and reliance on the system (Zhu and Akhtar, 2014).

RI3: "My colleagues are alert and attentive to potential problems and risks related to hygiene and food safety."
Alertness and attentiveness among employees reflect their proactive engagement in identifying and addressing potential issues. Overconfidence or underestimation of risks can undermine food safety efforts. Promoting awareness and a balanced understanding of risks helps employees to stay dedicated to hygienic practices and respond effectively to new challenges (Griffith et al., 2010a).

RI4: "In my organization, the leaders have a realistic picture of the potential problems and risks related to hygiene and food safety."
Leadership's understanding of food safety risks significantly impacts organizational practices and employee attitudes. When risks are accurately assessed and communicated by the leaders, there is a set tone for a culture of accountability and preparedness. Over-or

underestimation of risks by leaders can influence employee trust and willingness to engage in safe practices, which makes realistic risk assessment a critical leadership responsibility (Griffith et al., 2010a).

RI5: "In my organization, the operators have a realistic picture of the potential problems and risks related to hygiene and food safety."

Employees' perceptions of risks are crucial, as they are often directly responsible for implementing hygiene and safety practices. Effective risk communication ensures that operators understand and appreciate the significance of potential hazards, enabling them to act accordingly. This shared understanding between leadership and operators strengthens the overall food safety climate (Griffith et al., 2010a).

3.3.3 Expert validation

During the expert validation phase of the food safety climate assessment tool, a diverse group of twenty experts from governmental agencies, certification bodies, industry, associations, and academia assessed the tool's 27 indicators for relevance and validity. The expert validation process confirmed the relevance and validity of all indicators in the food safety climate assessment tool, as more than half of the experts deemed each indicator relevant. Most indicators scored a median importance above 2 on a 0–3 scale, affirming their significance. Feedback led to minor textual improvements for clarity, and a new indicator, L6 ("striving for continuous improvement"), was added to emphasize leadership ambition and continuous improvement in hygiene and food safety, addressing a gap in the preliminary version of the tool (De Boeck et al., 2015).

3.3.4 Questionnaire design and implementation

The self-assessment tool used in this research was designed to evaluate employee perceptions regarding the organization's food safety climate, which is a key component in maintaining and improving overall food quality standards. The tool focuses on five core categories that are widely recognized as critical for fostering a positive food safety climate: leadership, communication, commitment, resources, and risk awareness. Each of these categories comprises of 5 to 6 questions, resulting in a total of 28 indicators. These indicators were crafted to be very precise and still clear, covering a wide range of behaviors and attitudes related to food safety.

Respondents used a five-point Likert scale to express their views, with 1 representing "totally disagree," 2 for "disagree," 3 for "neutral," 4 for "agree," and 5 for "totally agree." This scale provided a balanced range of response options, allowing clear distinctions between varying levels of agreement or disagreement. By incorporating a neutral midpoint, the design

avoided the limitations of binary choices, giving respondents greater flexibility and reducing the likelihood of them feeling compelled to take a side when uncertain.

The questionnaire was structured in three parts and designed to collect data and provide a comprehensive understanding of the organization's food safety climate. In the first section the participants could give information about department, gender, type of employment and if they have a leadership responsibility or not. In order to maintain anonymity and also ensure that the groups' sizes were sufficient, departments were grouped in broader categories based on their functions. These groups included: Quality Management + Product Development + Quality Control, reflecting their shared focus on standards and quality assurance, Warehouse + Material Management + Purchasing, responsible for logistics and procurement, HR + IT + Marketing, combined due to their smaller size and internal operational focus, Production, treated as a standalone group due to its significant size and central role in manufacturing, and Maintenance + Engineering, merged for their overlapping technical and operational support functions. Employees were further categorized by type into three groups: Workers – involved production tasks and manual labor, Employees – occupying administrative and professional roles and Temporary workers – hired through external agencies for short-term production roles. To ensure inclusivity gender options included "male," "female," and "diverse". Leaders and non-leaders were distinguished through a yes/no answer to the question if they have any leadership responsibilities. This demographic information allowed for detailed analyses across different organizational groups, providing insights into trends and variations in responses.

The second section of the questionnaire included the questions about food safety climate e.g. the five key dimensions: leadership, communication, engagement, resources and risk awareness. With those indicators' help, employee perceptions of critical aspects that could influence the organization's food safety practices, were assessed. They provided a comprehensive view of the company's strengths and improvement areas in its food safety climate.

The final section included open-ended questions, designed to encourage employees to reflect on their contribution to product safety and quality and to share suggestions for improvement. Additionally, one question made respondents rate the importance of product safety and quality from 1 = very important to 5 = unimportant, thereby allowing them to express the significance they place on these values. This qualitative data complemented the structured responses, adding depth to the analysis and capturing different perspectives on food safety culture. These open-ended questions were not part of the original self-assessment tool. They were introduced internally within the company with the goal of encouraging personal accountably, ownership and maintaining high standards. Additionally,

questions about importance of product safety and quality provided valuable insights into how deeply these values are integrated in the company's culture.

The questionnaire was made available online and offline (paper-based format). The online version made with Microsoft Forms, was distributed in German to employees with regular access to computers in the workplace, mostly in the departments like Management, Product Development, Marketing, Purchasing, IT and HR. For employees in production areas, who may not have regular access to computers during work hours, a paper version of the questionnaire was distributed. The paper version of the survey was done in a group setting in the lunch area in order to create a comfortable and supportive environment for the workers. It also allowed for clarification in case there were any questions or uncertainties. Understanding that the production workforce speaks a variety of languages, translated versions of the paper questionnaire were provided as reference materials. Translations of the questionnaire were made in Slovakian, Turkish, and Bosnian-Croatian-Serbian (BKS) to help employees who might have difficulties with the German language. Employees were instructed to complete only the German version and use the translation as a helping mechanism in order to ensure anonymity.

The wide access to the questionnaire aimed at obtaining a representative dataset that would be used in analysis and comparison across different groups within the company.

3.4 Qualitative approach: Interviews

3.4.1 Selection criteria and structure

The qualitative part of this thesis aimed at expanding the understanding of food safety culture from the survey using semi-structured interviews with employees. The questions focused on categories of the questionnaire that scored the lowest. All the scores from questions L1 to RI5 were ranked from lowest to highest. The ten categories with the lowest scores were further explored in the interviews and further statistical analyses were done for eight of them. For each of the ten categories, 5-8 questions were developed to better understand the reasons behind the low scores and find connections with the statistical results. The goal was not only to unveil underlying issues in these categories but also to investigate the differences in the perspectives of leaders and non-leaders, which were identified in the questionnaire analysis.

The questions for the interviews were specifically tailored to employees with and without leadership responsibilities, in order to include their different roles and perspectives within the organization. For employees without a leadership role, the focus was on their daily practices, challenges and perceptions regarding food safety and hygiene. Questions

included topics like recognition for hygienic work, resource availability (time, equipment, personnel), communication from leaders etc., looking to discover barriers to compliance with food safety standards. Examples from the questions are “What improvement in equipment would help you maintain hygiene better?” and “Do you feel comfortable pointing out hygiene issues?”.

For employees with leadership responsibilities the questions explored different aspects of their roles, such as decision-making, resource management and leadership in promoting food safety. Leaders were asked to describe their strategies for motivating employees, maintaining hygiene standards, and addressing feedback constructively. Examples include, “How do you ensure employees understand the importance of hygiene?” and “What actions do you take to recognize good practices in food safety?”. The interviews aimed to assess how leaders set an example, handle challenges and drive improvements, while reflecting on their communication methods and effectiveness. The full spectrum of the interview questions is in the appendix (*See 9.3 Interview questions*).

These provided a comprehensive understanding of food safety culture within the organization and how they perceive and influence safety practices, by designing specific questions to the roles of leaders and non-leaders. After interviewing a solid sample of employees, the responses were analyzed to identify common themes, differences between the levels of authority and barriers that could play a role in establishing a good safety culture.

For employees without leadership responsibilities, a total of 56 questions across all categories were prepared, and 53 questions for employees with leadership responsibilities. The questions were distributed to participants shortly before the interviews to allow them to familiarize themselves with the topics, thus reducing stress levels during the session. The semi-structured interviews were done individually in one-on-one sessions due to the logistical challenges of organizing group discussions within the workplace. The interviews were held in a designated meeting room, free from distractions, to provide a confidential and comfortable environment where the employees would feel like they can share their thoughts freely. All participants signed consent forms before the interviews, agreeing to be recorded. These recordings were used only for transcribing and analyzing the content, making sure employees’ confidentiality was maintained.

The participants were carefully selected to ensure the inclusion of a representative sample of employees from departments that have the most influence on food safety. The leadership group consisted of seven participants, each representing a different role within the organization. These included a member of the Quality Management team, the head of Quality Control, a leadership representative from Maintenance and Engineering, a shift

leader and a Production manager, a safety expert, and the Warehouse manager. The non-leadership group consisted of seven participants from operational roles, including one mixer and two line workers from Production, one machine operator from Maintenance and Engineering, two workers from Quality Control, and one warehouse worker from the Warehouse department.

3.4.2 Analytical framework

The interviews were transcribed manually and the analysis of the transcripts involved identifying key themes and patterns that emerged in the responses from participants. The systematic coding process thus allowed for categorization of data into recurring themes, which were then cross-referenced with one another to identify similar points and differences in the perspectives of leaders and non-leaders.

The analysis followed a systematic approach, beginning with initial coding. During the first phase transcripts were read and detailed code phrases were added to sections of text that represented shared ideas, insights, or concerns.

Next step was to organize the codes into wider categories to identify common themes. These topics showed important challenges that organizations face, such es problems related to communication gaps, resource constraints, and varying risk perceptions. Analyzing these subtopics outlined gaps and linkages between participants (*See 4.2.2 Key issues highlighted in interviews*).

The final step included comparing the differences in the perspectives of leaders and non-leaders, and identifying connections between emerged themes and specific organizational practices. The results showed how roles and responsibilities influence perceptions of food safety culture. This analysis further established connections between interviews' findings and gaps in the questionnaire, while providing insight into systemic issues and potential areas of improvement.

3.5 Ethical considerations

3.5.1 Ensuring anonymity and consent

Anonymity in the questionnaire was ensured by not collecting any identifying information neither in the online nor in the paper format. Additionally, the combination of different departments together made it impossible to track data back to individual participants. This approach preserved participants' confidentiality, while still allowing for comprehensive analysis between groups.

For the semi-structured interviews with employees, a consent form was signed, ensuring full anonymity (*See 9.1 Einverständniserklärung*). Participants were informed that the session would be audio-recorded for accurate transcription and analysis, while assuring them that all data would be treated confidently. No personal information that could identify participants would appear in the final thesis or any related documents. Furthermore, participants were reminded that their participation was entirely voluntary and that they could withdraw their consent at any time without providing a reason.

These measures ensured that ethical standards, including the protection of participants' privacy and the voluntary nature of participation, were upheld throughout the research process.

4. Results

4.1 Quantitative findings: Questionnaire

The survey was conducted during the summer from July 11th to August 21st 2024 over a span of six weeks. Due to different employee schedules, shifts and vacation times, it was challenging to reach all participants at once, thus the extended timeframe.

	Employees total	Participated	Participation rate
Employment type			
Workers	83	71	85%
Temporary workers	20	8	40%
Employees	32	25	78%
Departments			
Research and development + Quality Management + Quality Control	15	16	107%
Warehouse + Materials Management + Purchasing	12	11	92%
HR + IT + Marketing	14	8	57%
Production	79	54	68%
Maintenance + Engineering	15	15	100%

Other characteristics	Participated
Non-leaders	80
Leaders	24
Male	52
Female	51
Diverse	1

Table 3: Overview of participant demographics and participation rates by employment type, departments, leadership responsibilities and gender.

In total, 104 out of 135 employees across the company participated in the self-assessment questionnaire, resulting in a response rate of approximately 77%. Overall response rates varied across different groups, with workers having a strong participation rate of 85%, while temporary workers had a significantly lower rate of 40%. In the departments the participation was also inconsistent, with one group (Research and development + Quality management + Quality control) even exceeding the number of employees listed (response rate of 107%), likely due to possible overreporting or misclassification from one participant. The lowest response rate of 57% was in the department HR + IT + Marketing, possibly due to the fact

that they are less directly involved with production-related safety concerns and had a feel of no relevance to complete the survey. Participation rate could have also been influenced by factor like workload and shift pattern, with some employee having more availability to complete the survey during a shift.

To ensure smooth flow of the text, clarity and avoid repetition of lengthy names, the following abbreviations for the department were assigned:

Research and development + Quality management + Quality control	RQMQL
Warehouse + Materials management + Purchasing	WMP
HR + IT + Marketing	HIMa
Production	P
Maintenance + Engineering	ME

Table 4: Abbreviations of the department categories for the analysis

4.1.1 Statistical analysis – Score calculating

Category	Mean	Standard deviation
Overall score	3.60	± 0.61
Leadership	3.66	± 0.75
Communication	3.73	± 0.69
Commitment	3.52	± 0.70
Resources	3.41	± 0.76
Risk awareness	3.74	± 0.61

Table 5: Descriptive statistics (mean scores and their standard deviations) for employees' perceptions of the overall score and five food safety climate categories.

IBM SPSS Statistics version 28.0.0.0 (Statistical Package for the Social Sciences) was used for calculation of the scores for the food safety climate categories. The data from the responses was entered into the software and descriptive statistics were applied to determine the mean scores and standard deviations for each category. These scores acted as a reflection of the average perceptions of employees across all levels of key dimension of food safety climate in the organization. The overall score was calculated to be 3.60 (SD = 0.61), which gives a quantifiable definition of the food safety climate in the company and can be used as a benchmark in future analyses. Among the individual categories, risk awareness received the highest mean score of 3.74 (SD = 0.61), followed closely by communication with a mean score of 3.73 (SD = 0.69). The leadership category achieved a mean score of

3.66 (SD = 0.75), while commitment a slightly lower one at 3.52 (SD = 0.70). The lowest mean score was reported in the resources category (SD = 0.76), with a value of 3.41.

The Likert scale data were treated as ordinal variables for the analysis. The categorical variable “Departments” consisted of five groups, “Leadership responsibilities” included two groups and “Employment type” - three groups, all of which were nominal. Normality tests were conducted for each variable within every category to determine which statistical tests were appropriate to apply. Non-parametric tests were used for data that did not follow a normal distribution.

For comparisons between two groups of a categorical variable, such as “Leadership responsibilities,” the Mann-Whitney U test was used, while for comparing variables across more than two groups, such as “Departments” or “Employment type,” the Kruskal-Wallis test was employed. ANOVA was used for data that was normally distributed to compare variables across multiple groups, and a t-test for comparisons between two groups. A significance threshold of 0.05 was set for all tests.

Each of the five categories: leadership, communication, commitment, resources, and risk awareness and the overall score, underwent statistical analysis to identify differences across various groups. These groups included the five mixed departments, leaders and non-leaders, and different employment types. The goal of the analysis was to find statistical differences or trends in perceptions and responses within these categories, providing more insight into how organizational roles, departmental functions, and employment status influence the evaluation of food safety climate in organization.

A) Overall score

Fig.4: Boxplot comparison of overall score across employment types and bar chart representation by departments and leaders / non-leaders.

Across the departments, RQMQL (N = 16) had the highest mean overall score of 3.77 (SD = 0.53), which reflects a relatively positive perception of the food safety climate, but still not a “very good” one. The lowest mean overall score of 3.30 (SD = 0.66) was reported by the HIMa group. Employees from WMP (N = 11), ME (N = 15), and Production (N = 54) displayed

scores in between, with mean values of 3.53 (SD = 0.51), 3.59 (SD = 0.40), and 3.61 (SD = 0.70), respectively. The Production department showed the greatest range of scores, which suggested big variability in perceptions within the department. Despite the differences of the five groups, a Kruskal-Wallis test showed no statistically significant differences between their scores (H(4) = 6.195, p = 0.185).

Regarding leadership responsibilities, employees without leadership roles (N = 80) reported a mean score of 3.54 (SD = 0.61), with a median of 3.55 and a range of 3.43. In contrast, those with leadership responsibilities (N = 24) provided a higher mean score of 3.81 (SD = 0.59) and a median of 3.75, with a smaller range of 2.21, which indicated less variability in their responses. The Mann-Whitney U test showed no statistically significant differences between the two groups, however with a trend toward higher scores among leaders (U = 734.00, Z = -1.57, p = 0.116).

When considering employment types, the mean overall scores were relatively close: workers scored 3.58 (SD = 0.66), employees - 3.59 (SD = 0.50), and temporary workers - 3.81 (SD = 0.55). A one-way ANOVA revealed no significant differences between the groups (F(2, 101) = 0.528, p = 0.591). Post-hoc analysis using Tukey's HSD confirmed no significant differences between any pairs of employment types (p = 0.512), indicating consistent perceptions across these groups.

B) Leadership

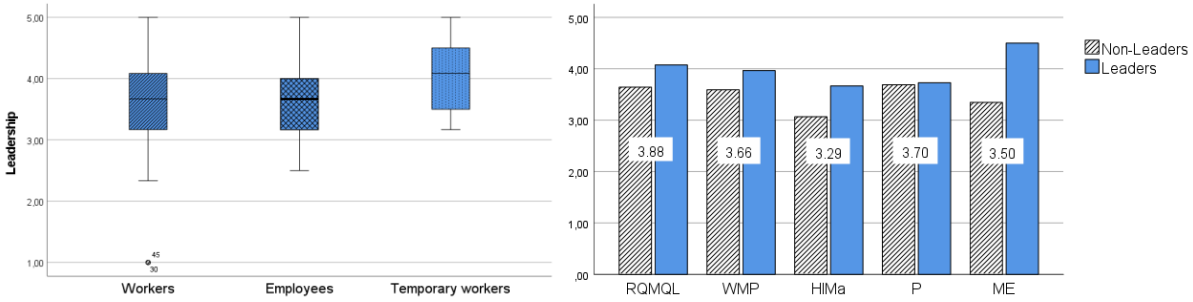

Fig. 5: Boxplot comparison of score for "Leadership" across employment types and bar chart representation by departments and leaders / non-leaders.

The highest mean leadership score of 3.88 (SD = 0.66) was recorded in the group RQMQL, while the lowest one coming from HIMa (M = 3.29, SD = 0.71). The rest of the groups showed the following scores: 3.70 (SD = 0.85) in Production, 3.66 (SD = 0.51) in WMP and 3.50 (SD = 0.57) in ME. Despite the variations in leadership scores, no statistically significant differences from the Kruskal-Wallis test were found between these groups (H(4) = 8.017, p = 0.091).

In the category leadership responsibilities, the descriptive analysis showed that leaders also reported higher scores (M = 3.93, SD = 0.64), compared to non-leaders (M = 3.58, SD = 0.77). These results showcase a trend toward more positive perceptions of leadership among those in managerial positions. However, no statistically significant differences were revealed with a Mann-Whitney U test (U = 1207.50, Z = 1.92, p = 0.055). This indicates that while leaders perceive themselves as more engaged in fostering leadership, this perception does not diverge significantly from that of non-leaders.

Across employment types temporary workers reported the highest mean score in the category leadership with a mean score of 4.04 (SD = 0.63), followed by employees (M = 3.67, SD = 0.61) and workers (M = 3.62, SD = 0.80). A Kruskal-Wallis test confirmed no statistically significant difference between the employment types, even when the scores differ from each other (H(2) = 2.366, p = 0.306).

C) Communication

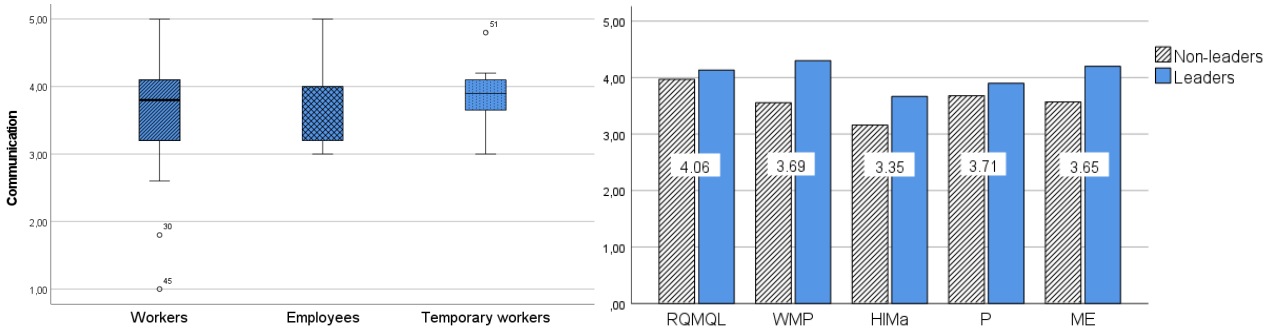

Fig. 6: Boxplot comparison of score for "Communication" across employment types and bar chart representation by departments and leaders / non-leaders.

In the category communication the group RQMQL again showed the highest mean score of 4.06 (SD = 0.59), reflecting their strong perceptions of effective communication practices, while HIMa recorder the lowest once more (M = 3.35, SD = 0.67), indicating potential challenges in communication in these three departments. The rest of the groups, including WMP, Production, and ME, reported mean scores of 3.69 (SD = 0.58), 3.71 (SD = 0.75), and 3.65 (SD = 0.49), respectively. The differences between these groups in this category were confirmed as significant by a Kruskal-Wallis test (H(4) = 10.065, p = 0.039). For further exploration Mann-Whitney U test was used to analyze the groups in pairs. The results revealed that RQMQL rated communication significantly higher than those in HIMa (p = 0.013), Production (p = 0.041), and ME (p = 0.024). No other significant differences were observed between the groups.

Employees with leadership responsibilities reported higher communication scores (M= 4.02, SD = 0.57) compared to those without (M = 3.64, SD = 0.69). This gap was confirmed with Mann-Whitney U test revealing statistically significant difference between the two groups (U

= 1292.00, p = 0.010). These results suggest that leaders perceive communication practices more positively, possibly due to them being more involved in decision-making and access to information.

For the variable “Employment types” descriptive statistics showed that temporary workers reported the highest mean communication score (M = 3.89, SD = 0.52), followed by employees (M = 3.78, SD = 0.54) and workers (M = 3.69, SD = 0.75). Kruskal-Wallis test did not give indication for significant differences between the two groups (H(2) = 0.927, p = 0.629). Despite that, the data shows a trend of temporary workers perceiving communication slightly more positively.

D) Commitment

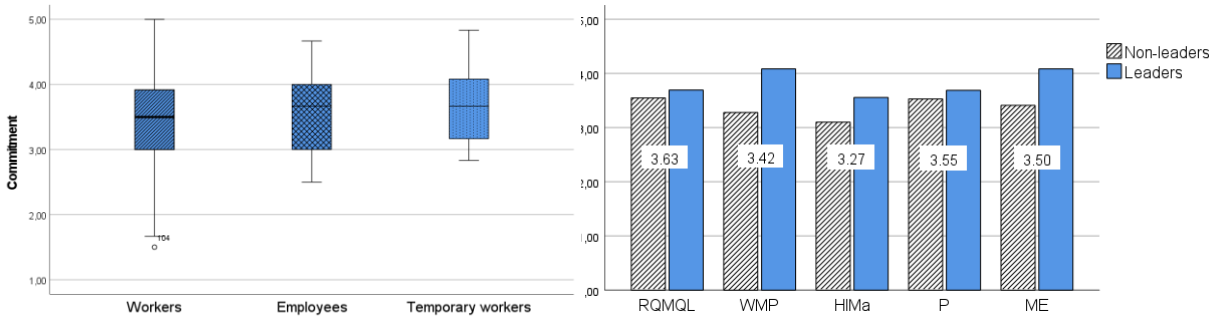

Fig. 7: Boxplot comparison of score for “Commitment” across employment types and bar chart representation by departments and leaders / non-leaders.

The RQMQL group showed the highest commitment score between the five groups of 3.63 (SD = 0.55), followed by those in Production (M = 3.55, SD = 0.82), ME (M = 3.50, SD = 0.42) and WMP (M = 3.42, SD = 0.63). Employees from HIMa reported the lowest score in this category as well (M = 3.27, SD = 0.58). Despite these descriptive differences, an ANOVA test showed no statistically significant differences between the departmental groups (F(4, 99) = 0.431, p = 0.786).

Leaders reported a higher mean score in the category commitment (M = 3.74, SD = 0.61) compared to non-leaders (M = 3.46, SD = 0.71). When an independent samples t-test was conducted to analyze the difference between leaders and non-leaders, the one-tailed test showed a significant trend (p = 0.040), while the two-tailed test displayed no statistically significant differences (t(102) = 1.774, p = 0.080), suggesting a potential trend towards leader perceiving commitment higher, likely reflecting their involvement and accountability.

When comparing commitment scores across employment types, descriptive statistics showed slight differences. Temporary workers reported the highest mean commitment score

(M = 3.69, SD = 0.68), followed by employees (M = 3.56, SD = 0.53) and workers (M = 3.49, SD = 0.75). However, a Kruskal-Wallis test revealed no statistically significant differences among the groups (H(2) = 0.589, p = 0.745), which can indicate that perceptions of commitment are generally consistent across different employment categories, regardless of whether employees are permanent or temporary.

E) Resources

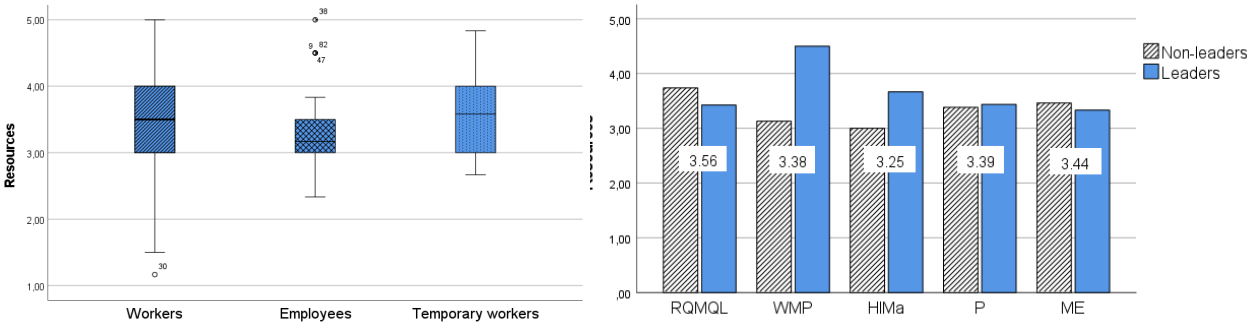

Fig. 8: Boxplot comparison of score for "Resources" across employment types and bar chart representation by departments and leaders / non-leaders.

Across the department groups, employees from RQMQL reported the highest mean score of 3.56 (SD = 0.74) in the category "Resources", which scored the lowest among the other categories. The HIMa group reported the lowest mean score once more (M = 3.25, SD = 0.72). The scores of the other groups fell between these two extremes: WMP (M = 3.38, SD = 0.81), Production (M = 3.39, SD = 0.82) and Maintenance and Engineering (M = 3.44, SD = 0.55). Despite the descriptive differences, no statistical significance was found among the groups using a Kruskal-Wallis test (H(4) = 3.085, p = 0.544), indicating largely uniform perceptions of resources across the organization.

In the resources category employees with leadership roles reported a higher mean score of 3.54 (SD = 0.84), compared to non-leaders as well (M = 3.38, SD = 0.73). However, an independent samples t-test revealed no statistically significant difference between the two groups (t(102) = −0.947, p = 0.173).

The analysis of resources across employment types revealed slight variations in mean scores, with temporary workers reporting the highest mean score (M = 3.58, SD = 0.71), followed by workers (M = 3.42, SD = 0.79), and employees reporting the lowest mean score (M = 3.33, SD = 0.68). However, a Kruskal-Wallis test did not confirm any statistically significant variations between the three groups (H(2) = 1,411, p = 0.494).

F) Risk awareness

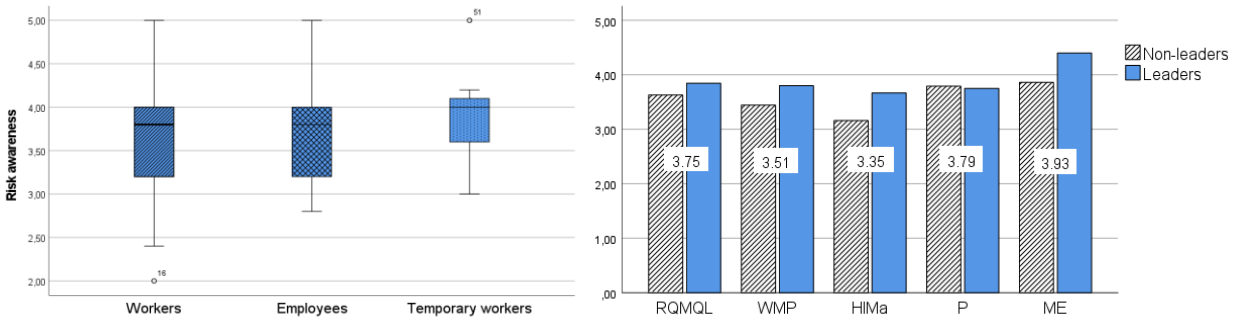

Fig. 9: Boxplot comparison of score for "Risk awareness" across employment types and bar chart representation by departments and leaders / non-leaders.

In the highest rated category - risk awareness, the group with the highest mean score differed from the previous categories. Maintenance and Engineering (ME) reported the highest mean score of 3.93 (SD = 0.48) reflecting a strong perception of risk awareness between the employees in these two departments. In contrast, the lowest mean was scored by HIMa (M = 3.35, SD = 0.70). The other departmental groups RQMQL, WMP and Production showed the following mean scores: 3.75 (SD = 0.64), 3.51 (SD = 0.48), and 3.79 (SD = 0.63). A Kruskal-Wallis test confirmed these differences as statistically significant ($H(4) = 9.853$, $p = 0.043$). Post-hoc Mann-Whitney U tests were used to identify significance between pair groups. Significant pairwise differences were found between HIMa and Production ($p = 0.024$), HIMa and ME ($p = 0.019$), and HIMa and WMP ($p = 0.024$). These results suggest gaps in perception and prioritization of risk awareness, with technical departments like ME and RQMQL exhibiting higher scores compared to HIMa.

Leaders reported higher scores (M = 3.83, SD = 0.73) than employees without leadership responsibilities (M = 3.71, SD = 0.57) also for the risk awareness category. However, no statistically significant differences between the groups were found from a Mann-Whitney U test ($U = 1118.50$, $p = 0.179$). While leaders may perceive themselves as more risk-aware, the difference is not significant enough to indicate a substantial distinction between the two groups.

In the analysis of risk awareness between different employment types, temporary workers reported the highest mean score of 3.93 (SD = 0.61), followed by workers (M = 3.74, SD = 0.64), and employees, who reported the lowest mean score (M = 3.67, SD = 0.54). However, no statistically significant differences between the three groups were found using Kruskal-Wallis test ($H(2) = 1.471$, $p = 0.479$). These finding suggest that employees generally share similar views on risk awareness, regardless of their employment status.

4.1.2 Analysis of the top 8 questions with the lowest scores

The next step of the analysis was to calculate the mean score for each of the 28 indicators about food safety climate and rank them in descending order, from questions with the lowest scores to the highest. The eight indicators with the lowest scores were selected and further analyzed in order to identify potential weaknesses in food safety practices or perceptions in the company and use them as a basis for the improvement strategy.

Chi-square tests were applied to find any significant differences in the perception or implementation of food safety standards among the department groups, leaders and non-leaders and the different employment types. This analysis helped to find any gaps and to identify areas requiring targeted interventions to strengthen food safety measures.

1) E3 Commitment: "In my organization, working in a hygienic and food safe way is recognized and rewarded."

Characteristics	Chi-Square test χ^2	df	P value
Departments	24.19	16	0.086
Leadership responsibilities	0.20	4	0.995
Employment type	8.36	8	0.399

Table 6: Chi-square results with degrees of freedom and p-value for associations between departments, leadership roles and employment type and perception of recognition.

This category about work recognition and rewarding scored the lowest of all of the 28 indicators. The ME department group reported the highest mean score of 3.07 (SD = 0.15). RQMQL had the lowest one (M = 2.88, SD = 0.27), followed by WMP (M = 2.91, SD = 0.21) and P (M = 2.91, SD = 0.16), which had identical results. The Chi-square test confirmed no significant association between the department groups and perception of rewards as well. The results also showed no significant association between leadership roles and employment types in regard to perception of rewards and recognition (*See Table 6*). Temporary workers demonstrated a more dispersed response pattern, including some higher scores, while workers, particularly in production, predominantly rated their reward experience at lower levels. For departments, RQMQL reported the lowest mean score (M = 2.88. In contrast, ME reported the highest means (M = 3.07, SD = 0.15). Despite these differences, the Chi-square test confirmed no significant association between departments and perceptions of rewards.

2) RES1 Resources: "In my organization, employees get sufficient time to work in a hygienic and food safe way."

Characteristics	Chi-Square test χ^2	df	P value
Departments	19.22	16	0.257
Leadership responsibilities	1.04	4	0.903
Employment type	9.65	8	0.290

Table 7: Chi-square results with degrees of freedom and p-value for associations between departments, leadership roles, employment type and perception of sufficient time.

In the second lowest indicator about perception of sufficient time, the RQMQL group reported the lowest mean score (M = 2.88, SD = 1.05), while ME had the highest (M = 3.27, SD = 0.96). Descriptive statistics showed a slightly higher mean score for those with leadership roles (M = 3.29, SD = 1.12) compared to those without (M = 3.11, SD = 1.08). In the category employment types temporary workers showed the lowest mean of 2.50 (SD = 1.07), in contrast to employees' group that scored the highest (M = 3.24, SD = 1.02), still showing relatively low scores. None of the Chi-square tests showed statistically significant differences for the groups departments, leadership responsibilities and employment types (*See Table 7*).

3) RES3 Resources: "In my organization, the necessary infrastructure (e.g. good work space, good equipment …) is available to be able to work in a hygienic and food safe way."

Characteristics	Chi-Square test χ^2	df	P value
Departments	21.53	16	0.159
Leadership responsibilities	2.17	4	0.529
Employment type	7.39	8	0.495

Table 8: Chi-square results with degrees of freedom and p-value for associations between departments, leadership role, employment type and perception of available infrastructure.

Those with leadership roles reported a slightly higher mean score for the indicator perception of available infrastructure (M = 3.29, SD = 1.12) than those without (M = 3.11, SD = 1.08). Across the employment types, temporary workers reported the lowest score (M = 2.50, SD = 1.07), while employees scored the highest (M = 3.24, SD = 1.02). Across departments, RDQL had the lowest mean (M = 2.88, SD = 1.05), while ME scored the highest (M = 3.27, SD = 0.96). The Chi-square tests confirmed no significant association between departments,

leadership responsibilities, employment types and perceptions of infrastructure availability (*See Table 8*).

4) L4 Leadership: "In my organization, the leaders listen to employees, if they have remarks or comments concerning hygiene and food safety."

Characteristics	Chi-Square test χ^2	df	P value
Departments	34.68	16	0.005
Leadership responsibilities	8.62	4	0.073
Employment type	16.06	8	0.046

Table 9: Chi-square results with degrees of freedom and p-value for associations between departments, leadership role, employment type and perception of leaders' active listening.

The indicator leaders' active listening had the fourth lowest score. Individuals with leadership roles reported higher scores (M = 3.87, SD = 0.87) compared to those without (M = 3.28, SD = 1.15) for this category. Across employment types, temporary workers showed the highest mean (M = 4.13, SD = 1.13), while workers scored the lowest (M = 3.30, SD = 1.13). Across departments, ME had the lowest score (M = 3.13, SD = 0.64), while RDQL scored the highest (M = 3.69, SD = 1.19). For this category two of the Chi-square test showed statistically significant differences. The association between employees' perception of active listening and department groups was statistically significant (p = 0.005) as well as employment types (p = 0.046). This associations indicated that the department and employment type could have an influence of the perception of leaders´ listening behavior (*See table 9*).

5) RES 2 Resources:" In my organization, sufficient staff is available to follow up hygiene and food safety."

Characteristics	Chi-Square test χ^2	df	P value
Departments	19.76	16	0.231
Leadership responsibilities	1.20	4	0.877
Employment type	11.95	8	0.154

Table 10: Chi-square results with degrees of freedom and p-value for associations between departments, leadership role, employment type and perception of sufficient staff availability.

In the indicator for sufficient staff, RQMQL reported the lowest mean of 3.19 (SD = 1.05) and HIMa the highest (M = 3.50, SD = 0.93). In the leadership category, the two groups had pretty similar results with leaders reporting a score of 3.33 (SD = 1.10) and non-leaders a lower score of 3.27 (SD = 0.98). Among employment types, workers reported the lowest

score (M = 3.25, SD = 0.98), while temporary workers scored the highest (M = 3.43, SD = 1.27). The Chi-square tests did not show any statistically significant differences between the three categories in their perception of "sufficient staff" (*See Table 10*).

6) L5 Leadership: "In my organization, hygiene and food safety issues are addressed in a constructive and respectful way by the leaders."

Characteristics	Chi-Square test χ^2	df	P value
Departments	23.81	16	0.095
Leadership responsibilities	3.62	4	0.468
Employment type	5.35	8	0.733

Table 11: Chi-square results with degrees of freedom and p-value for associations between departments, leadership role, employment type and perception of respectful communication.

Across departments, HIMa reported the lowest mean score (M = 3.25, SD = 0.250), while RDQL reported the highest (M = 3.81, SD = 0.245) in the category for respectful communication. Leaders scored higher (M = 3.83, SD = 0.167) compared to non-leaders (M = 3.48, SD = 0.119). Among employment types, workers reported the lowest score (M = 3.52, SD = 0.130), while temporary workers scored the highest (M = 3.71, SD = 0.421). None of the Chi-square tests showed significant difference of the groups departments, leadership responsibilities and employment types in their perception of respectful communication (*See table 11*).

7) E4 Commitment: "In my organization, the leaders set a good example concerning hygiene and food safety."

Characteristics	Chi-Square test χ^2	df	P value
Departments	24.63	16	0.077
Leadership responsibilities	4.42	4	0.352
Employment type	4.78	8	0.781

Table 12: Chi-square results with degrees of freedom and p-value for associations between departments, leadership role, employment type and perception of role model behavior.

The indicator of "leaders set a good example" scored the seventh lowest score, with the WMP group giving it the lowest score of 3.09 (SD = 0.25), while ME reported the highest (M = 3.60, SD = 0.12). Those with leadership roles reported a higher mean score (M = 3.65, SD = 0.205) than those without (M = 3.33, SD = 0.106). For employment types, temporary workers scored the highest (M = 3.75, SD = 0.250), while workers had the lowest mean (M = 3.34, SD = 0.124). The three chi-square tests didn't result in any statistically significant

differences between the groups in the perception of leaders being role models (*See Table 12).*

8) L3 Leadership: "In my organization, the leaders are able to motivate their employees to work in a hygienic and food safe way."

Characteristics	Chi-Square test χ^2	df	P value
Departments	19.01	16	0.264
Leadership responsibilities	1.67	4	0.797
Employment type	9.73	8	0.284

Table 13: Chi-square results with degrees of freedom and p-value for associations between departments, leadership role, employment type and perception of leaders' motivation.

The last indicator that was analyzed showed employees' perception of how much leaders motivate their staff. Across departments, HIMa and ME reported equally lowest scores (M = 3.13, SD = 0.295; M = 3.13, SD = 0.215), while P scored the highest (M = 3.61, SD = 0.141). Leadership roles showed higher scores for individuals with responsibilities (M = 3.58, SD = 0.190) compared to those without (M = 3.39, SD = 0.109). Temporary workers scored the highest (M = 4.13, SD = 0.295), in contrast to employees who had the lowest score (M = 3.20, SD = 0.141). No significant differences were found between the groups in this category (*See Table 13*).

4.2 Qualitative insights

4.2.1 Common themes from questionnaire's open-ended responses

One of the open-ended questions in the third section of the questionnaire invited participants to share their improvement suggestions within the company. Similar responses were grouped into common themes, which are presented in the table below.

Hygiene and cleaning	• **Stricter hygiene practices:** Avoid placing tools like shovels on the floor. • **Improved cleaning equipment:** Provide more vacuum cleaners and better cleaning tools, increase cleaning frequency, install fly screens, offer more accessories for vacuum cleaners. • **Detailed cleaning plans**: Develop detailed cleaning schedules and allocate more time for cleaning tasks.

	• **More frequent inspections**: Conduct regular and stricter inspections to ensure better compliance with hygiene and cleanliness standards.
Training	• **Improvement of training programs**: Enhance training for new employees and provide continuous education on machinery and computer systems. Emphasize the importance of ongoing learning. • **Focus on hygiene training**: Conduct regular training sessions highlighting the importance of hygiene. • **Insufficient initial introduction**: Three hours of training for new employees is inadequate and should be extended.
Work environment	• **Climate issues**: High humidity and poor ventilation during summer, suggestions for improved air conditioning systems. • **Cooling and air quality**: Better cooling systems and enhanced air circulation. • **Improved Accessibility of Facilities**: Suggest locating restrooms closer to production areas for convenience.
Communication and leadership	• **Communication gaps**: Lack of communication between shift leaders and employees results in inefficiencies. • **Leadership responsibility**: The head of the department should be more aware of and sensitive to hygiene practices. • **Respectful communication**: Emphasis on respectful communication, with advice to "think before speaking." • **Recognition and incentives**: Provide greater recognition or material rewards, such as extra vacation days, for maintaining high hygiene standards.
Time and work management	• **More time for cleaning**: Allocate more time for thorough cleaning without pressure, emphasizing patience and prioritizing quality over quantity. Ensure machines are cleaned immediately after use and not left dirty; suggest establishing a dedicated cleaning team. • **Reorganization of breaks**: Split breaks into two 15-minute intervals to improve productivity and employee well-being.
	• **Ergonomics**: Prolonged standing on hard floors causes discomfort; propose improving flooring conditions or providing training to reduce physical strain. Install suitable flooring for workstations.

Health and safety	• **Safety organization**: Structure production processes to ensure adequate time for cleaning and compliance with safety standards. • **Physical discomfort**: Prolonged standing leads to knee and back pain; recommend improving flooring conditions or allowing more frequent breaks.

Table 14: Summary of employees' improvement suggestions from the open-ended part of the questionnaire.

4.2.2 Key issues highlighted in interviews

The following table showcases the subtopics emerged from the interviews for the five categories leadership, communication, commitment, resources and risk awareness. These also act as barriers for a good safety culture in the company.

Themes	Non-leaders	Leaders
Leadership		
Role model behavior	Leaders occasionally fail to adhere to hygiene standards, undermining credibility.	Leaders view themselves as role models and address inconsistencies when highlighted.
Priorities under pressure	Employees feel pressured to prioritize speed over quality due to leadership goals.	Leaders acknowledge performance pressures but emphasize maintaining quality.
Leadership presence	Employees desire more visibility and active participation from leaders in day-to-day operations, particularly during high-pressure situations.	Leaders focus on periodic rounds and structured interactions with employees to maintain engagement.
Communication		
Departmental gaps	Employees highlight poor communication within and between departments, leading to misaligned goals and delays.	Leaders acknowledge the lack of communication within and between departments.
Clarity of instructions	Guidelines and procedures are often unclear or	Misunderstandings are attributed to a lack of employee comprehension, not unclear standards.

	inconsistent, creating confusion.	
Feedback	Employees feel they receive limited helpful feedback and recognition.	Leaders see feedback as adequate but recognize room for improvement in creating open communication spaces.
Frequency of updates	Hygiene topics are communicated too infrequently to maintain awareness.	Leaders feel the frequency of communication is adequate.
Blame culture	Employees hesitate to report minor issues due to fear of repercussions or being ignored.	Leaders encourage an open communication culture for reporting but recognize barriers to implementation.
Commitment		
Recognition and rewards	Employees desire more frequent acknowledgment and feel current efforts are insufficient.	Leaders emphasize that existing verbal praise or occasional bonuses are sufficient. They also see monetary incentives as a primary motivator.
Intrinsic motivation	Employees rely on self-motivation but wish for external support to enhance engagement.	Leaders expect employees to be self-motivated, considering it a prerequisite for food industry roles.
Resources		
Time management	Employees mention insufficient time to complete hygiene-related tasks and taking shortcuts while under time constraints.	Leaders highlight that time is often misallocated due to process inefficiencies and stress that speed should not come at the expense of safety and hygiene practices.
Staffing issues	Employees note adequate staffing numbers but question employee competency and motivation.	Leaders note adequate staffing numbers but state that individual performance is inconsistent, leading to perceived gaps.
Infrastructure adequacy	Missing or poor-quality equipment.	Infrastructure is generally prioritized, but gaps in accessibility or quality remain unaddressed.

Budget allocation	Employees believe budget constraints limit necessary improvements in tools and resources.	Leaders attribute limitations to budget prioritization, not a lack of funds.
Training effectiveness	Employees desire more frequent and practical sessions.	Leaders believe training programs are adequate but acknowledge a need for practical enhancements.

Table 15: Summary of the food safety culture barriers from the interviews with employees.

5. Discussion - Interpretation of quantitative and qualitative results

The questionnaire results provide a comprehensive understanding of the organization's food safety climate, identifying strengths and areas requiring improvement across critical dimensions, including leadership, communication, commitment, resources, and risk awareness. By identifying these strengths and weaknesses, the results serve as a diagnostic tool, offering a foundation for analyzing underlying organizational dynamics and assessing their impact on food safety culture.

Even though the overall score of 3.60 for the food safety climate of the company is not close to 5.0, which would represent the best possible outcome, it still draws a strong baseline. It suggests that employees recognize efforts towards food safety culture but still identify significant gaps in certain areas. It reflects a functional food safety climate, that is not yet optimal and require further refinement to reach higher standards, but foundational practices are in place. Among the five categories, risk awareness and communication achieved the highest scores with 3.74 and 3.73 respectively, reflecting areas of strength. Leadership (3.66), commitment (3.52) and resources (3.41), showed lower mean scores, requiring targeted strategies for improvement.

5.1 Overall score

The overall food safety climate score of 3.60 indicated a moderately positive perception of food safety practices in the company and provides an essential benchmark for understanding the organization's food safety culture and its alignment with industry standards. In this practical work, the mean score of 3.60 on a 5-point Likert scale indicates a moderate level of food safety climate, where 5 represents a "very good" one. When compared to findings from previous studies, the score of 3.60 is lower than the averages reported in the literature. In the study of De Boeck et al. (2015) a mean score of 4.20 was reported in a centrally managed meat distribution company, setting the base for a robust food safety management, which was supported by regular training and extensive hygiene protocols. Similarly, same authors employed a study in Belgian food processing companies, where established systems and practices contributed to higher rating, with mean scores calculated from 4.0 to 4.2, placing the base of a "very good" food safety climate at 4.2 (De Boeck et al., 2018). A third study showed variability in the mean scores, with affiliated butcher shops scoring between 3.81 and 4.55, showing the influence of centralized management on food safety climate perceptions (De Boeck et al., 2016).

The analysis may not have revealed any statistically significant differences across departments, leadership responsibilities or employment types in regard to the overall score, however, descriptive statistics showed valuable insights into trend and variations that calls for further discussing.

The RQMQL department group reported the highest score of 3.77, suggesting that a stronger food safety climate is perceived by employees in departments closely involved with quality management and laboratory tasks. Findings in the literature also emphasize that employees in roles directly tied to safety-critical functions often demonstrate heightened awareness and alignment with food safety protocols due to their daily responsibilities (De Boeck et al., 2015; Griffith et al., 2010a). In contrast, the lowest score was reported by HIMa. Departments like HR, IT, and Marketing usually have limited involvement in direct food safety activities, which may contribute to this lower score, as also highlighted in studies showing that employees in peripheral roles often perceive food safety culture as less relevant to their work (Yiannas, 2009). The larger range of scores in the Production department (SD = 0.70) suggests diverse experiences and perceptions among its employees, possibly influenced by varying roles and responsibilities within the production processes. In order to achieve uniform perceptions within large, operationally diverse departments requires targeted communication and training tailored to specific roles (Jespersen et al., 2019).

Employees with leadership responsibilities reported a higher mean score of 3.81 (SD = 0.59) compared to non-leaders, with a score of 3.54 (SD = 0.61). Studies show that leaders have enhanced understanding and alignment with organizational goals, since they often have more access to strategic information and decision-making discussions, which aligns with the trend shown from the descriptive analysis, even it not being statistically significant (Griffith et al., 2010a). The leaders' group, furthermore, showed a smaller range of 2.21, which may indicate a more cohesive perception within the group itself due to greater exposure to activities for the implementation of food safety initiatives and policies. In contrast, the broader variation among non-leaders (range = 3.43) may reflect varying levels of engagement and understanding of food safety practices across frontline workers. It is, therefore, underlined in studies that leadership should be visible and accessible for bridging the gap, since leaders who show active commitment in food safety can positively influence the perceptions and behavior of employees (Yiannas, 2009; De Boeck et al., 2015).

Temporary workers scored the highest overall food safety climate of the employment types, reflecting better compliance with organizational expectations, which is a phenomenon often observed in short-term employees striving to meet performance standards (Griffith et al., 2010a). These results, however, should be interpreted with caution, as studies indicate that

temporary workers may lack long-term engagement with the organization's safety culture, potentially creating challenges for sustainability (Jespersen et al., 2019).

The qualitative findings from the conducted interviews provide critical context for understanding the resulted scores. Barriers such as communication gaps, inconsistent leadership visibility, and resource constraints were repeatedly highlighted as challenges that could influence employees' perceptions. Addressing these issues could lead to a significant improvement in future scores and bring the organization closer to the industry benchmarks.

5.2 Leadership

The category leadership was a factor that revealed to be an area of variance in particular between technical and support departments. For instance, Maintenances and Engineering and Quality Management include departments with technical functions that scored higher in leadership compared to support departments such as HR, IT ad Marketing, indicating that leadership is more involved in areas directly related to product safety. Although no statistically significant differences were observed between participants with and without leadership responsibilities, there was a clear trend. The leaders rated their leadership practices higher that non-leaders, perceiving themselves as more proactive and committed to enhancing food safety. This aligns with the assertion that leadership plays a very vital role in influencing food safety culture by means of accountability, visibility and consistent messaging (De Boeck et al., 2015). However, non-leaders rated leadership less favorably, showing a gap between the intentions of management and how employees perceive them, which was also shown in their answers form the interviews.

The literature highlights that visible leadership is crucial in developing trust and motivation employee to take food safety seriously, and that leaders also need to show consistent involvement if a strong food safety culture is to be achieved (Griffith et al., 2010a). This inconsistency would suggest that while leaders feel that they are doing enough, their behaviors and activities are not always communicated or displayed to the frontline employees, which results in misalignment. In the interviews several barriers to achieving a robust safety culture were identified, providing further insights into these different perceptions.

5.2.1 Role model behavior

The differences in perceptions between leaders and non-leaders reveal a dynamic that can significantly impact the organization's food safety culture. Leaders generally view themselves as role models who are committed to promoting food safety practices, while non-leaders sometimes perceive inconsistencies in leadership behavior. These discrepancies

present challenges in creating a unified and proactive FSC, thus pointing to the need for aligning leadership intentions with employee experiences.

Leaders' role is a recurring topic in the interviews as well. Some workers expressed frustration, stating, "*Leaders do not always adhere to hygiene guidelines".* Such gaps in views can reduce the trust in leadership and send the wrong messages about the organization's priorities, potentially reducing employee commitment to food safety. Employees are more likely to follow the behaviors demonstrated by leaders they trust, which makes this aspect crucial to a robust FSC (Griffith et al., 2010a). However, some workers expressed that leadership behavior does not directly influence their performance, stating, "*Leadership behavior has no influence on the quality of my work*". This autonomy suggests that some employees maintain personal commitment to food safety regardless of leadership behavior. This may have an influence in reducing immediate risks from leadership gaps, it also reflects missed opportunities for leaders to inspire employees to a stronger adherence to food safety standards. Leaders acknowledged their role as exemplary individuals, with one stating, "*I always try to do my best and be a role model. And I know what I should pay attention to".* Another emphasized that there is no need for a constant analyzing of their actions as role models, due to their experience, saying, "*I no longer check whether I am complying with everything. I have 35 years of experience, it is just part of my everyday life".* While this confidence shows great expertise, it may lead to complacency or blind spots, especially if employees feel the lack of leadership engagement.

These misalignments bring important insights into the different perceptions within the organization. Actions have greater influence on employees than words, which makes consistent leadership behavior essential for building trust and reinforcing food safety priorities. Employees frustration and weaker commitment to food safety practices are inevitable when leaders are perceived as being disengaged or inconsistent. Active engagement by leaders, visible prioritization of food safety and open communication can overcome these differences and provide a stronger and more cohesive FSC (Yiannas, 2009).

5.2.2 Priorities under pressure

This indicator shows a significant pressure between operational demands and adherence to food safety protocols. Employees often feel forced to prioritize speed over thorough work, as highlighted by one worker saying, "*If we don't have enough time, it affects the quality of the work*" and another who remarked, "*Performance is more important to leadership than quality when we are under pressure*". These findings reflect the broader challenge observed in food safety culture research, that operational efficiency often competes with and sometimes overrides priorities in food safety (Yiannas, 2009). Leaders, however,

emphasized their focus on quality, with one stating, "*Quality takes precedence, even under pressure*" and another noting, "*Quality is a priority when designing schedules*". Moreover, some leaders expressed that they were unaware of time management issues, with one saying, "*I have never received feedback that employees do not have enough time for cleaning*". This communication gap indicates a disconnection between leadership goals and employee experiences, which is supported by literature that indicates clear communication is needed to align practices (Griffith et al., 2010a).

The lack of feedback from employees further widens this gap, preventing leaders from fully understanding the pressures faced by their teams. Open communication can help bridge this disconnect and build trust, which is critical for strengthening FSC (De Boeck et al., 2015).

5.2.3 Leadership presence

Employees often stressed on the fact that they want leaders to be more attending and participate actively in daily operation especially during high-pressure situations: "*I wish leaders were on-site more often*" one employee commented, reflecting a need for consistent engagement. Another one added "*Sometimes when a problem occurs, the leaders know it, but we don't get any support*". In contrast, leaders emphasized that they interacted regularly with employees during structured rounds as effort to maintain presence: "*I walk around twice per shift and talk to the employees*". These results suggest that while engagement occurs, it may not align with employees' expectations for consistent leadership attendance.

This disparity indicates that there is a misalignment between leaderships' intentions and employees' perceptions. Leadership is considered one of the key factors that drive behavioral change in organizations. The findings reveal that leaders need to continuously demonstrate best practices and be visibly present among employees in order to gain trust and credibility in them (Yiannas, 2009). While leaders view their roles positively, their actions may not consistently meet employee expectations, leading to a disconnect in perceptions.

Overall, there is a slight difference in leadership across the categories departments, leaderships responsibilities and employment types. For example, RQMQL reported higher score, while the HIMa group the lowest. The leadership score was slightly higher in employees with a leader's role compared to those without. Furthermore, temporary workers also rated this category more favorably than permanent employees and workers. However, these differences were not statistically significant, suggesting an overall consistent perception of leadership across the organization.

5.3 Communication

Communication became the seconds highest rated aspect of the organization's food safety culture with a score of 3.73, which generally reflects that information is optimally distributed within the company. Effective communication should be clear, consistent and frequent to build teamwork and assure compliance with food safety practices (Yiannas, 2009). The relatively high score may mean that internal communication is generally viewed positively, especially in departments that are closely related to the food safety process. However, disparities in communication scores between departments indicate areas for improvement. Employees in RQMQL reported the highest communication scores, reflecting well-structured and openly communicated practices in departments with active involvement in the processes related to food safety control. On the other hand, HIMa reported the lowest scores, reflecting difficulties in effectively sharing food safety information at the support function level.

Effective communication is essential for aligning employees' understanding of food safety protocols and creating a shared commitment across all organizational levels (De Boeck et al., 2015). There was a noticeable gap between leaders and non-leaders. Leaders rated communication more positively, likely due to their active roles in decision-making and involvement in food safety discussions. However, this advantage does not always ensure that messages are conveyed clearly and effectively to frontline employees. To bridge this gap, it is crucial to establish open communication channels and ensure a consistent flow of information throughout the organization, in order to enhance the overall food safety culture (Griffith et al., 2010a).

Despite the generally high overall score, employees expressed dissatisfaction with regard to unclear instructions and lack of feedback, making communication to an area of concern. Various barriers for a good safety culture were identified from the interviews, providing insight into possible areas where targeted intervention may be appropriate.

5.3.1 Clarity of instructions

Protocols and procedures were described as unclear or inconsistent by employees, leading to confusion in how to best implement them. Employees reported a lack of clarity, illustrated by one comment: "*When some of my colleagues make mistakes, most of the time is because they didn't understand the training*". Leaders acknowledged these concerns but attributed them to employees' misunderstandings, noting, "*In most cases, when standards are not followed, it is because employees did not understand them*".

Direct communication is essential to ensure that employees fully understand what is expected of them. Clear messaging avoids confusion, directs employee actions toward

organizational goals, and reduces errors related to vague information (Griffith et al., 2010a; Yiannas, 2009). Clear, written procedures and instructions provide employees with a reference in how to execute their tasks correctly and consistently. This systematic approach supports a stable and reliable food safety culture (Yiannas, 2009).

5.3.2 Departmental gaps

Misalignment of goals and delays in operations were the result of a lack of effective communication between departments as illustrated by one employee noting, "*Information often stays within the department and doesn't reach other relevant teams*" and another one adding, "*I sometimes get different opinions and tasks on the same problem. There is a lack of communication within the department and between departments*". Interestingly leaders acknowledged this disparity, with one stating, "*Usually there are 2-3 people involved in each department and the 4th one no longer knows. There is no further communication"*. Workers also noted the lack of communication between leaders and employees in the recommendations part of the written questionnaire, while adding that they wish for a more respectful communication (*See 4.2.1 Common themes from questionnaire's open-ended responses*).

In the quantitative part, however, a gap in the perception of communication between leaders and non-leaders was noticed. Leaders generally rated this aspect more positively, while non-leaders reported feeling left out or uninformed, which can lead to misalignment with organizational initiatives. Therefore, open and transparent communication within and between all levels is important in ensuring that employees feel equally informed and engaged (Yiannas, 2009).

Effective communication ensures that employees are well-informed about their roles, responsibilities and the organization's overarching goals concerning food safety. It can help bridge this gap, ensuring that employees not only understand food safety policies but also feel empowered to contribute to the maintenance and improvement of these standards. Poor communication, on the other hand, can lead to misunderstandings, reduced motivation, and generally weakened safety culture. (Yiannas, 2009).

5.3.3 Feedback

Employees expressed dissatisfaction about the lack of feedback and recognition for their efforts. One employee commented, "*I wished for more praise, a quick 'You did a great job' goes a long way*", while another stated, "*Often we don't realize that we have made a mistake because management doesn't tell us, and we can't learn from it*". Workers also noted that they preferred face-to-face communication, which they viewed as the most effective communication channel. Leaders acknowledged the need for improvement in giving

feedback, with one stating, "*We do provide feedback, but there's room to create more open communication spaces*".

This highlights a gap between leadership's intentions and how employees experience feedback and recognition. Bridging this gap is a critical action in sustaining a transparent and supportive food safety culture, where employees feel valued and motivated to maintain high standards (Griffith et al., 2010a).

5.3.4 Frequency of updates

Employees expressed that hygiene topics and food safety updates were not communicated often enough, affecting their ability to stay informed. "*We only hear about hygiene topics during annual training sessions*", said one respondent. In contrast, leaders felt the current communication frequency was adequate, with one noting, "*Hygiene topics are discussed as needed, and employees are informed in a timely manner*" and another one saying, "*News is usually collected and included in the next training session*".

This difference in perceptions suggest that there is a gap between how communication efforts are perceived by leaders and employees. There is a need for regular and more frequent communication to emphasize that food safety is a priority and maintain the engagement and knowledge of employees. Consistent updates help not only to reinforce food safety objectives but also to avoid indifference by intergrading these values into everyday operations (Yiannas, 2009).

5.3.5 Blame culture

Another barrier in promoting an open and proactive food safety environment is the topic of blame culture. Employees reported hesitating to report minor issues due to fear of repercussions or because they did not feel their concerns would be taking seriously or lead to meaningful change. One employee shared, "*I don't report small problems because nothing changes, or I worry I'll be blamed*". This reluctance to communicate problems reduces the chances that food safety risks would be identified and addressed effectively, as unreported issues can escalate over time (Yiannas, 2009). Leaders acknowledged these challenges, highlighting the existence of a blame culture within the organization. One leader noted, "*We always look for someone to blame. We don't look to solve the problem or to stop it from happening again, but rather to find someone to blame*". This fault assigning further shifts the focus from problem-solving and discourages employees from raising concerns. Another leader admitted, "*There isn't really an open atmosphere. The workers don't dare go to every leader and discuss things, but they know that they can always express themselves freely with others*", reflecting inconsistencies in the perceived accessibility of leadership.

A blame culture can severely hinder food safety through reduced openness in communication and employee engagement. Constructive and respectful communication is important for creating an environment where employees feel safe to report concerns. Addressing food safety issues with a non-punitive approach encourages continuous learning and improvement of personnel (Griffith et al., 2010a). Leaders play a critical role in developing the work atmosphere to move away from blame into discussing solutions and making sure reported issues are respondent to with an actionable outcome (De Boeck et al., 2015).

The gap between how communication is perceived by employees versus leaders highlights a significant challenge, where employees believe they are not supported, while leaders perceive that the issues come from understanding problems. A strong food safety culture is based on effective communication. These findings suggest that communication strategies such as providing clearer and more regular instructions, should be implemented in order to help close this gap and generally improve compliance (Yiannas, 2009).

Overall, communication scores were significantly different across departmental groups, with RQMQL having the highest perception of effective communication. Having leadership responsibilities was associated with higher communication scores, reflecting that role-related access to information and decision-making had an influence how positively communication was perceived. While temporary workers reported slightly higher communication scores compared to employees and workers, the differences were not statistically significant, suggesting consistent perceptions of communication practices across the employment types. These findings emphasize the need for tailored communication strategies to address specific departmental challenges and enhance overall organizational communication.

5.4 Commitment

In the commitment category, there was a non-significant trend toward higher scores in leaders than non-leaders. The leaders might view themselves as more committed since they are more involved in decision-making at higher strategic levels, whereas non-leaders could feel less engaged or not recognized for their contributions. Ensuring commitment requires active involvement of employees, the organization to value their efforts and create a sense of ownership over food safety practices (Jespersen et al., 2019). Temporary workers reported slightly higher commitment scores compared to permanent employees, potentially reflecting their efforts to meet expectations during their limited occupation.

Commitment, scoring 3.52, also emerged as an area that requires attention. Lower commitment scores might suggest a lack of participation or recognition of workers in food safety initiatives. This could be the result of lacking opportunities for participation or unclear communication on how their individual roles contribute to the overall safety framework (Jespersen et al., 2019). Such sense of ownership from employees can play a crucial role in ensuring commitment and motivation, particularly in industries relying on operational precision (Griffith et al., 2010a).

5.4.1 Recognition and rewards

The topic of recognition and rewards reveals a misalignment between the acknowledgement that employees need and leader's perception of what is sufficient rewarding. Employees emphasized the lack of frequent and meaningful recognition, with one stating, "*A simple 'thank you' would be enough, but it rarely happens*". This suggests that employees often feel their contributions to food safety are overlooked. On the other hand, leaders believed that their verbal praise and occasional bonuses were adequate rewards, as one leader commented, "*Verbal praise is given, and that should suffice*", while another implied, "*Monetary rewards are the best motivation. People are happy when they get more money. But it is not certain whether the work will improve*", questioning employees' motivation even if they get more monetary compensation. In the recommendation part of the questionnaire workers also expressed their wish for a greater recognition or material rewards, like more vacation days.

Acknowledgment of any type, verbal or monetary, could lead to motivation and reinforces positive behaviors and continuous adherence to food safety practices (Yiannas, 2009). However, over-reliance on financial rewards risks neglecting the role of the workers intrinsic motivation, which is essential in order to ensure long-term commitment (Harvey et al., 2002).

5.4.2 Intrinsic motivation

Intrinsic motivation suggests playing a role in employees' commitment for quality. Employees reported they rely on self-motivation to maintain work that is up to standard, but also expressed a wish for more external support to further enhance their commitment. "*I motivate myself because I care about doing things right*", stated one employee. Leaders noted that they expected workers' motivation to come naturally from within and counted wanting to maintain food safety standards as a prerequisite for roles within the food industry. As one leader explained, "*Self-motivation is key. It's something we expect from everyone*".

Motivating employees to implement and maintain hygienic and food-safe behavior is an important role of leaders. Motivation that goes beyond simple compliance, it also involves inspiring employees to take ownership of their action in relation to food safety. Motivated

employees are more likely to exceed minimum requirements and contribute to a culture of continuous improvement, which is vital for sustaining FSC (Griffith et al., 2010a).

In summary, this commitment score analysis has shown small variations in departments, leadership roles and employment type, with higher scores among leaders and temporary workers. However, none of the differences were statistically significant, indicating an overall similar perception of commitment across the organization.

5.5 Resources

The resources category, which scored the lowest at 3.41, shows that there is a potential challenge in equipping employees with the necessary tools, infrastructure and support to maintain high food safety standards. When resources are insufficient, it can lead to inconsistencies in food safety actions, undermining employee efforts despite them having best intentions in maintaining quality. Such findings call for targeted investments in equipment, staffing, and training resources to address perceived gaps (Clayton et al., 2002).

The highest score in this category was achieved from the group RQMQL, while HIMa recorded the lowest, which reflected less favorable perceptions of the availability of resources in departments with support functions as mentioned earlier. These findings were consistent with previous studies, which showed that sufficient time, staffing, infrastructure and training are what employees need for an effective adoption of food safety practices (Clayton et al., 2002). The gap in the scores between leaders and non-leaders shows an even bigger disparity, with frontline employees reporting greater resource limitations. Closing this gap will require targeted investments (not only financial) to ensure employees have the tools and support they need to maintain food safety standards (Clayton et al., 2002).

Several subthemes emerged from the interview analysis that indicated differences between employees and leaders in their perceptions of resource adequacy.

5.5.1 Time management

Employees frequently mentioned insufficient time to complete hygiene-related tasks, especially when there is pressure for production. One employee stated, "*Under time pressure, cleaning is not done thoroughly*" illustrating the direct impact of tight schedules on working thoroughly and maintaining food safety. Workers also highlighted the need for more time for cleaning tasks in the recommendation part of the questionnaire. Leaders, on the other hand, blamed inefficiencies on inappropriate scheduling and ineffective processes, stating, "*Time for cleaning is often misallocated due to process inefficiencies*". The bigger

problem than just having limited time is that often time constraints lead to shortcuts, that could potentially compromise safety and quality. One employee observed, "*Under time pressure, shortcuts are taken*", highlighting how demand for production can overshadow safety priorities. Leaders emphasized the importance of maintaining hygiene practices despite these challenges and regardless of operational speed. One leader asserted, *"Speed should not come at the expense of hygiene practices,"* reinforcing the organization's commitment to sustain safety standards even under pressure.

Providing employees with adequate time to perform all their tasks according to hygiene and food safety standards is a crucial part of positive food safety climate. When there is enough support from the organization given to the employees in this regard, they feel motivated to have greater commitment for their work, resulting in outcomes of higher quality and better compliance with food safety protocols. These findings are also supported by literature stating that good food safety practices result from proper time management. Therefore, improving inefficiency and allowing sufficient time for tasks relating to hygiene remains essential for overcoming this gap between operational demands and priorities related to safety (De Boeck et al., 2015; Griffith et al., 2010a).

5.5.2 Staffing issues

Employees explained that challenges arose more from issues with workers having low motivation and not being competent, than from staff being insufficient: "*There are enough staff members, but not everyone works well*". Leaders also had similar views, mentioning that a suboptimal performance often led to a feeling of staff shortages, by one leader explaining, "*We have sufficient staff, but inconsistent performance creates gaps*".

This also depicts the significance of closing the motivational and skill gaps with specific training and engaging activities, since competent and motivated employees are crucial to any food safety framework (Yiannas, 2009).

5.5.3 Infrastructure adequacy

The topic of inadequate infrastructure also emerged as an aspect influencing food safety culture. Employees expressed concerns about inadequate or poorly maintained tools, with one stating, "*Equipment is there but with poor quality*" and another emphasizing that work inefficiencies are often caused by disorganization of tools, saying, "*There are enough tools, but you always have to search for them, which costs us time*". Improved cleaning equipment emerged also as a written recommendation from the questionnaire. Leaders acknowledged these issues while defending the overall prioritization of infrastructure, noting, "*The infrastructure is sufficient, but some areas require better accessibility and upgrades*".

These findings are supported by literature that has identified functional infrastructure as a promotor of safe behavior. Adequately designed workspace, reliable good quality equipment and easily accessible hygiene facilities are crucial for workers to perform their tasks comfortably and effectively. Moreover, when infrastructure is poorly developed, employees may believe that food safety is not sufficiently prioritized and may weaken routine practices and compliance. Filling these gaps with specific investment has the potential to improve food safety culture along with operational efficiency (Clayton et al., 2002; Griffith et al., 2010a).

5.5.4 Budget allocation

Another barrier that was mentioned by employees is budget being a limiting factor in improving of tools and resources. "*A washbasin doesn't generate money, that's why it's often not prioritized*" an employee shared. Leaders, however, attributed resource challenges to the inaccurate prioritization of funds rather than finances not being sufficient. "*Constraints are mostly due to budget prioritization, not the budget itself*" one leader stated, highlighting issues in the systemic approach of resource allocation.

The differences in perspectives between leaders and non-leaders highlight a key issue: while employees experience the immediate effects of resource deficits, such as missing washbasins or poor-quality tools, leaders focus on challenges that are broader and more systemic. Studies confirm that addressing resource allocation and prioritization plays a critical role in improving operational efficiency and compliance, thus fostering a strong food safety culture (De Boeck et al., 2015).

5.5.5 Training Effectiveness

In the interviews, employees expressed strong wish for more and frequent practical training sessions in order to help them with understanding and correct application of food safety protocols. One employee noted, "*I wish for more hands-on training in different topics like using the computer*", emphasizing the need for more interactive and applicable learning opportunities. Leaders, on the other hand, considered the current training programs to be frequent enough but acknowledged potential areas for improvement, with one stating, "*Training is done once a year or when we see that someone doesn't do the work correctly. There could be a discussion if that is actually often enough*". Workers also noted continuous learning as another important issue, mentioning in the questionnaire the need for better training of new employees and continuous education related to various aspects relevant to their work activities.

This discrepancy points at a serious gap between expectations of the employees on one side, and perceptions of leadership on the other, with regard to the efficacy of training. The existing approach in the company may not adequately address employees' needs for more

frequent and practical opportunities, which can lead to sustained behavioral change. Traditional food safety training programs are shown to enhance knowledge but not to change or improve behaviors and practices (Zanin et al., 2017). While leaders believe that existing systems are effective, for the employees there is still room for improvement in both practical application and support mechanisms. Addressing these gaps will strengthen overall awareness and promote a more cohesive food safety culture (De Boeck et al., 2015).

In summary, even though statistical tests showed no significant differences in resource perceptions across departments, leadership roles, or employment types, the qualitative data revealed critical areas for improvement. Addressing time management inefficiencies, performance variability, infrastructure gaps, and budget prioritization will strengthen the organization's food safety culture, ensuring employees are supported in maintaining high standards.

5.6 Risk awareness

The highest mean score of 3.74, obtained for the category risk awareness, indicates that employees are conscious of potential hazards and the importance of preventive actions. This result highlights that the already established training programs and risk communication strategies are effective in creating an organizational culture where employees believe that food safety risks are critical (Yiannas, 2009). Studies indicate that organizations with strong risk awareness are more likely to maintain proactive food safety practices and have less chance of critical incidents occurring (Griffith et al., 2010a).

The results indicate that there are variations in the perception of risk awareness among departments, roles, and employment types, reflecting views of how food safety is understood and prioritized. Technical departments like Maintenance and Engineering showed stronger awareness, likely due to their direct involvement with critical processes and potential hazards. This is in line with findings from the literature where it is described that departments, that have more to do with operational tasks, often show heightened risk perception (Jespersen et al., 2019). In contrast, administrative and support roles reported lower awareness, underscoring the importance of targeted communication and training in fostering a shared understanding of risks across all functions (Griffith et al., 2010a). The slightly higher score of leaders compared to non-leaders suggests that risk awareness is relatively well integrated across hierarchical levels. Nevertheless, fostering a collective sense of responsibility is critical for a strong safety culture (Yiannas, 2009)

Since risk awareness scored the highest and none of the indicators in this category fell in the bottom questions, no further in-depth questioning of employees was necessary and

therefore no additional subtopics or barriers for FSC emerged from the interviews. This absence of additional insights in this category may indicate that the current risk awareness practices might be well-established and widely accepted across the organization.

6. Improvement strategies

A comprehensive improvement strategies set was developed, based on the insights from the statistical analysis and the barriers identified in the interviews. These strategies derived from different studies and aim, where possible, to address the identified challenges in the company. Each of the four main categories, including their subcategories, were considered in these targeted approaches to enhance food safety culture.

6.1. Leadership strategies

Leadership drives food safety culture from the top down. Setting clear expectations, creating a vision and inspiring others are all characteristics of strong leaders. Companies with robust safety cultures pair effective management systems with committed leaders who influence and guide safer performance (Yiannas, 2009).

6.1.1 Strategies for optimizing the leaders' role model behavior

Leaders' commitment to food safety needs to be visibly demonstrated in order to improve the employees' perception of their role model behavior. Workers will become more confident when the actions of the leaders are aligned with the communicated organizational values. Inconsistency between words and actions erodes trust and credibility, factors that are important in building a robust safety culture (Yiannas, 2009).

It is important to ensure clear visibility and daily demonstration of proper attitude towards food safety. Leaders at every level influence employees through their actions, either directly or non-intentionally. For instance, a manager not following hygiene practices leads a negative example, while leader who model positive food safety behaviors inspire employee to act the same. In this kind of environment, attitudes towards food safety are often "caught than taught" (Yiannas, 2009). Another approach is using social norms to motivate workers. When a leader acknowledges good food safety behavior openly it encourages others to follow these practices. This approach builds a culture where compliance becomes a shared expectation (Yiannas, 2015).

6.1.2 Strategies for improving the understanding of priorities under pressure and leadership presence

To address the issue of feeling the need to prioritize speed over quality, the leadership team should organize a session with employees to participate in defining organization's values, mission and vision together. Based on the analysis, it became clear that quality was not perceived to be a management's goal by workers. These sessions will ensure shared ownership and understanding company's commitment to quality.

A practical example by De Brún et al. would be employees working in small groups and discussing key questions such as: What is important to us as a team? How can our values and goals be reflected in daily work? How do these values translate into behaviors? The discussions will help identify shared values and translate them into actionable behaviors, that align with company's quality standards. Another idea is for employees to contribute to drafting the mission and vision statements, ensuring they reflect the organization's focus on food safety and quality. A draft will be created, shared for feedback, revised, and then displayed publicly to reinforce the shared commitment. This strategy is crucial for aligning leadership goals with employee priorities, fostering a unified approach to maintaining quality while reducing stress caused by conflicting demands (De Brún et al., 2020).

Organizing sessions in the development of shared company values and vision can help increase leadership presence by actively involving them together with non-leaders in discussions and decision-making. That would foster a feeling of being visible and being engaged, especially when leaders participate in group activities and communicate commitment to the agreed-upon goals. Displaying publicly agreed values, mission and vision reinforces leadership presence, thus keeping leaders accountable for their commitment to food safety and employee support (De Brún et al., 2020).

6.2 Communication strategies

6.2.1 Strategies for avoiding unclear instructions

In overcoming the "unclear instructions" barrier, organizations need to focus on clarity, simplicity and inclusiveness of information. The clear, task-oriented messaging reduces misunderstandings, directs employee actions towards company's goals and minimizes errors (Griffith et al., 2010a; Yiannas, 2009). Visual aids like pictograms (pictures, icons, drawings etc.) assist in overcoming the language barriers and improve understanding, making training more accessible and effective for a diverse workforce (Yiannas, 2009). Simplifying training programs and procedures ensure that they are comprehensive and easily followed. Complex instructions are likely to be misinterpreted or ignored, while visualizing ideas solidifies understanding and efficiency (Yiannas, 2009). Tools like safety cards with cartoons and explanations, offer practical, engaging references for employees (Emond et al., 2015).

Practical demonstrations further reinforce theoretical knowledge. The use of safety cards and practical demonstrations to visualize training enhances employee understanding and retention of food safety practices, by making complex procedures simpler using visual aids. Each safety card features a cartoon illustration with a specific behavior on the front and a clear explanation based on standard operating procedures on the back. This visual approach

is effective in making instructions more engaging and accessible, particularly for diverse workforces (Emond et al., 2015).

6.2.2 Strategies for optimizing feedback and departmental gaps

To address the feedback and departmental communication challenges, in the literature different strategies that improve communication and recognition are recommended. One study suggests the use of huddles to allow open communication and collaborative decision-making among employees and leaders. Huddles are short meetings, typically lasting between 5 and 15 minutes, during which employees are encouraged to give feedback and express their opinions. They allow employees to discuss any issues, voice their concerns, celebrate successes and make suggestions for improvement. Unlike traditional top-down meetings, huddles put more focus on the contribution of employees, foster the feeling of trust and ownership for food safety initiative, thus greatly improving communication between and within departments (Caspar et al., 2017).

Another strategy for providing constructive feedback is a structured model called DESC script. It involves four steps: describing the situation, expressing concerns, suggesting alternatives and outlining consequences. This approach helps create open communication atmosphere where employees feel acknowledged and supported, by making feedback clear, respectful and actionable (Hornby and Greaves, 2022).

Furthermore, studies highlight the advantages of posting feedback after inspection, using daily scoring charts or inspection summaries to display results visually and publicly. These charts create transparency among teams and allow for healthy competition between them. Brief follow-up meetings also allow employees to discuss their performance and recognize achievements, motivating them to work with even more enthusiasm to achieve high standards (Nouaimeh et al., 2018).

These strategies together advocate for a two-way communication process: personal interaction, structured feedback and public recognition. The implementation of these approaches will help address concerns of employees about the lack of feedback and recognition, developing a more open and supportive food safety culture.

6.2.3 Strategies for better updates frequency

The literature demonstrated regular and varied communication keeping employees aware and engaged as a way to overcome the infrequent information delivery. Sharing information frequently through different messages and mediums allows food safety topics to be reiterated and to be kept on top of employees' minds while working. Organizations with strong FSC use a more multifunctional approach than just training. They share knowledge,

educate and inspire action from their workers. Using commercial marketing methods, including visual reminders, updates and messages in spoken and written form ensures that food safety remains a priority in daily practices (Yiannas, 2009).

Such frequent updates would bridge the gap between employees who feel that topics in hygiene are not communicated frequently enough and leaders who feel the current level of communication is adequate. This could be assured by increasing the frequency and diversity of the methods of communication so that employees stay informed, motivated and aligned with food safety goals. This helps to foster a culture of continuous awareness and dedication to safety practices.

6.2.4 Strategies for avoiding blame culture

Constructive and respectful communication helps avoid blame culture, where the fear of consequences discourages employees from reporting mistakes. Blame culture gets in the way of identifying root causes and solving problems. Leaders should practice delivering responses to issues respectfully, thus creating a safe environment for employees to view mistakes as learning opportunities and for growth (Griffith et al., 2010a).

Behavioral scientist stress on the fact that positive consequences are much more effective at motivating desired behaviors. Negative consequences, such as disciplinary actions, may be useful, but should be used carefully and sparingly. Leaders should focus on developing immediate, certain and positive outcomes to drive employee behavior toward food safety practices instead. The communication of naturally occurring benefits or implementing management-driven rewards can greatly improve performance and reinforce a positive work environment. By incorporating both positive and, where appropriate, well-controlled negative consequences into a comprehensive behavior-based safety system, organizations can foster accountability while maintaining trust and cooperation (Yiannas, 2009).

6.3 Commitment strategies

6.3.1 Strategies for recognition that improve employee's intrinsic motivation

A balanced approach, which includes financial and non-financial incentives, will help meet employees' demands for greater recognition and rewards. Financial awards, such as performance-based bonuses, can be very efficient in boosting motivation and performance, if distributed fairly, in order to satisfy employees' needs for autonomy and competence. However, non-financial rewards, such as verbal praise, career development opportunities and job security are equally important for developing long-term satisfaction and commitment (Thibault Landry et al., 2017). Ensuring distributive justice is key to building trust and motivation. Employees feel more valued and committed to their work, when they perceive

the reward system as fair. Leaders can implement systems such as health insurance or pension plans, which have a greater influence on retention than perks like onsite facilitates (Renaud et al., 2017).

A practical example of a recognition system is the "Rock Star Wall." Employees can be nominated through a web-based form and a specific example of their excellent service is described. The main judging point is food safety. The nominees can be featured on the Rock Star Wall, a prominent display board located in an area, where it's visible by everyone. This wall recognizes every employee, regardless if they have a leadership role or not, and highlights their specific contributions. A reward or a trophy, combined with detailed feedback about the outcome of their performance, reinforces recognition further. For instance, during an award presentation, comments from peers that have been collected or short videos could be presented by the CEO, which would make the acknowledgment personal and meaningful (Kopelman et al., 2011; Schoonbeek and Henderson, 2011).

Recognizing employees' efforts is essential in keeping them motivated. Research by Griffith et al (2010a) notes that frequent, non-monetary recognition, such as verbal praise or weekly team shout-outs play an important role. These practices are easy to implement and effectively reinforce employees' intrinsic drive and build an appreciative atmosphere. Another powerful motivator is encouraging skill development. Providing opportunities for professional growth through training programs, mentorship or cross-departmental projects fulfills employees' need for competence, keeping them engaged and motivated (Yiannas, 2009).

Combining these approaches with regular verbal praise, skill development opportunities and transparent financial rewards, will go a long way toward ensuring that employees feel recognized, motivating them, building trust and commitment to food safety, and organizational objectives. Recognized and rewarded behavior tends to be repeated, thereby creating a positive performance and motivational cycle (Yiannas, 2009).

6.4 Resources strategies

6.4.1 Strategies for improvement of time management

Time management has been identified as an important barrier to ensuing hygiene and safety tasks are completed effectively within the allocated time schedule. Employees often report insufficient time to focus on hygiene practices, particularly under production pressures, while leaders acknowledge that inefficiencies in task allocation contribute to the issue.

Establishing detailed and well-structured cleaning plans enables consistency in the delivery of hygiene and quality prioritization. Embedding clearly defined cleaning schedules into

production workflow reduces the chances of hygiene tasks being either partially executed or overlooked altogether. The plans must define detailed tasks, their frequency and the time required for finishing the work. For example, assigning specific cleaning activities within a production shift to a concrete time slot, ensures that employees have time blocks dedicated to hygiene and quality. Visualizing these plans through schedules displayed in common work areas can be an effective strategy to manage staff responsibilities more effectively (De Boeck et al., 2015; Griffith et al., 2010a).

Inefficiency in processes contributes to wasted time, further limiting chances for employees to complete their food safety tasks. In these cases, workflows need to be examined to identify bottlenecks and opportunities for redistribution of tasks. This helps to ensure that during critical periods, employees are not overwhelmed with work. For example, tasks that are considered non-essential, can be moved to low-pressure periods, thus leaving peak periods for essential hygiene and safety activities. This approach enhances the overall workflow efficiency while providing employees with sufficient time to maintain food safety standards (De Boeck et al., 2015).

Another effective way to eliminate the time management barrier is to equip workers with practical skills to complete tasks more efficiently. Training programs should demonstrate optimized cleaning techniques, allow hands-on practice sessions and show practical videos or diagrams. For instance, teaching employees how to effectively use specialized cleaning tools or products reduces the time required for hygiene tasks without affecting the quality. These programs also emphasize the importance of balancing speed while still doing a thorough work, ensuring food safety and quality remain a top priority, even under time pressure (Yiannas, 2009).

6.4.2 Strategies for avoiding staffing issues

From the analysis it became clear that staffing problems in the organization are issues related to individual competency and motivation, rather than the number of employees. Employees acknowledge adequate staffing levels, but raised questions about their team members possessing the required skills and motivation. Leaders similarly noted the inconsistent performance among individuals, which also contributes to perceived gaps despite sufficient overall staffing levels.

Research shows that competency mapping is an effective strategy that would guarantee identification of individual strengths, weaknesses and areas for further development within the workforce. Propp et al. (2003) emphasize the importance of developing competency matrices that list required skills, such as knowledge, relating to food safety and technical

abilities, combined with a structured framework for training, development and reviewing performance. With the help of this matrix, management could evaluate staff and find areas of competency gaps that need specific programs to address them. This ensures that workers will have the right skills and knowledge to perform consistently and meet organizational expectations. Apart from individual evaluations, knowledge mapping exercises can point out the gaps in corporate expertise. These knowledge audits study the workers' existing skills and comprehension, diagnose the gaps and propose solutions to align their capabilities with organizational objectives. When this mapping is done on a regular basis, it is ensured that the FSMS of the organization are valid and up to date (Manning et al., 2021).

Integrating competency mapping into staffing strategies addresses employee concerns of skill levels and leaders' emphasis on inconsistent performance. Identifying and addressing skill gaps can help the organization build a cohesive and effective workforce, where staffing issues are resolved in a way that supports both organizational goals and employee growth.

6.4.3 Strategies for improving inadequate infrastructure

Inadequate infrastructure, including lack or poor-quality equipment, is one of the major barriers to maintaining food safety standards. While infrastructure is usually considered a priority, it still contains gaps in quality and accessibility that affect operational efficiency and hygiene practices. The following strategies may be considered to help reduce these issues:

A well-maintained and modernized physical infrastructure can play a role in ensuring operational efficiency and compliance with food safety standards. Studies stress on the importance of environmental improvement plans, which include upgrading hardware, improving layouts and ensuring accessibility. In a food facility, this could involve updating outdated equipment, optimizing the layout of the workspace and better accessibility to reduce risks and enhance performance. Scheduling regular maintenance can help prevent equipment failure and establish consistency (Wong et al., 2021). In order for the improvements to be effective, they need to be based on employee feedback and infrastructure audits. Wong et al. (2021) note, that feedback-driven approaches have the ability to make an organization effectively respond to certain needs. For instance, repeated consultations with employees can reveal critical deficiencies in cleaning tools, badly functioning machinery or other issues. Once identified, such problems would have to be addressed through targeted upgrades to ensure that infrastructural investments match the real need of workers and ensure both productivity and compliance (Wong et al., 2021).

Additionally, infrastructure should be designed to assist in achieving the organization's food safety objectives. It is important to provide equipment and layout that minimize contamination risks by investing in adequate cleaning tools, appropriate workspace design

that separates areas in clean and contaminated zones, and ensure sufficient storage capacity to avoid cross-contamination. When infrastructure is well-aligned with food safety goals, it allows employees to perform their tasks effectively without compromising hygiene, safety or overall quality (Griffith et al., 2010a)

6.4.4 Strategies for optimizing budget allocation

Most of the budget limitations arise not due to lack of funds, but from improper prioritization. Organizations should implement a prioritization mechanism systematically to allocate budgets more efficiently. The focus should be on areas with big influence such as hygiene infrastructure and food safety training. In this way, resources will be spent where most needed and can maximize impact on safety and compliance. Regular audits can find areas with insufficient funding and provide justification for budget decisions based on evidence (De Boeck et al., 2015; Griffith et al., 2010a). Handwashing stations and upgraded cleaning equipment are key infrastructure elements, which organizations should invest in, to demonstrate commitment to food safety. Leaders should be considering not only immediate costs but also long-term benefits of preventing hygiene-relate incidents. This can contribute to reducing operational risks and associated financial sanctions (Yiannas, 2009; Griffith et al., 2010a).

6.4.5 Strategies for improving training effectiveness

The effectiveness of training is a key factor in implementing food safety practices consistently. Whereas leaders find the existing program adequate, they also recognize that the training sessions should be more practical and effective, which is also expressed by employees without leadership roles. The following strategies address these gaps.

In order for food safety programs to be effective in influencing behavior, they must balance training with education. Education focuses on the “why” of food safety, teaching employees about hazards, regulations and company policies in a classroom setting. Training, on the other hand, emphasizes the “how” using hands-on, task-specific instructions on the job. A combination of both approaches ensures that employees understand the importance of food safety and know how to perform their tasks correctly (Yiannas, 2009). Practical demonstrations are critical in order to reinforce the “how”-part of food safety practices. Demonstrations allow employees to observe specific tasks performed correctly and practice them, while being guided. Concrete examples to which employees can refer to during daily operations are for example proper handwashing techniques or how to avoid cross-contamination. These hands-on approaches enhance retention of the information and application of food safety practices (Yiannas, 2009).

Therefore, training programs should show the real consequences of poor food safety practices, in order to increase employees' perceived risk awareness and engagement. Personal testimonials or case studies are often more powerful and effective than showing statistical data. For example, a story on a victim of foodborne disease and a severe allergic reaction can make risks more relatable and easier to remember further motivating to work in a food-safe manner. These approaches can help employees become more emotionally connected to food safety (Yiannas, 2015).

Education and training, practical demonstration and incorporating real-world examples are effective approaches for organizations to maximize their food safety programs. Such strategies not only ensure employees to understand the standards for food safety but also to be motivated and have the skills to follow them consistently.

7. Conclusion

This research provides an in-depth analysis of the food safety culture within a mid-sized Austrian food company, focusing on the five critical food safety climate dimensions: leadership, communication, commitment, resources and risk awareness. A mixed-method approach was used, combining a quantitative questionnaire to assess the food safety climate of the company and semi-structured interviews as the qualitative component, revealing barriers in overall food safety culture.

The statistical analysis of the questionnaire revealed an overall food safety climate score of 3.6, which compared to benchmarks in literature is seen as moderately positive. The highest rated dimension was “Risk awareness” with a mean score of 3.74, which indicates that employees have a generally good understanding of the importance of identifying and managing risks. On the other hand, “Resources” received the lowest score (M = 3.41), which shows concerns about inadequate infrastructure, tools and support overall to sustain good food safety practices. Technical departments like Maintenance and Engineering, and departments directly related to controlling food safety like Quality Management and Quality Control, gave generally the highest scores, which reflects a stronger focus on food safety practices. Departments like HR, IT and Marketing rated the dimensions more neutral due to the fact that they do not have much direct control over food safety and quality. In the category “Employment type”, temporary workers consistently scored most categories the highest, which reflects implemented targeted onboarding and training to quickly adapt them to the safety practices of the company.

The qualitative data was collected through open-ended questions in the survey and from the semi-structured interviews, that were carried out with individuals both with and without leadership roles, in order to understand the reasons behind the observed gaps in more depth. Various barriers for food safety culture were found from the interviews, such as unclear communication channels, inadequate infrastructure and inconsistencies in leadership commitment. Employees often expressed feeling unsupported in different aspects, while leaders noted being generally committed to food safety and quality. This trend in variation of perspectives between leaders and non-leaders was found in both the quantitative and qualitative data. Leaders generally viewed the existing safety culture as sufficient, while employees mentioned gaps in training, resources and leadership presence as barriers. Such insights show the need for a more inclusive and proactive approach toward a strong food safety culture.

As the final step of the research, targeted strategies for improvements were developed based on the barriers that emerged from the interviews. These strategies included

enhancing training programs, increasing resource allocation, focusing on a more inclusive communication and many more.

These results provide a benchmark for the company to monitor the effectiveness of improvements and offer practical recommendations on how to address identified food safety barriers. By focusing on both quantitative scores and qualitative insights, the research underscores the importance of integrating human factors into food safety management systems.

7.1 Contribution and implementation

This thesis contributes to the growing research on the topic of food safety culture by demonstrating its different dimensions and emphasizing the importance of employee perception in food safety outcomes. A mixed-method approach was employed to develop an all-inclusive framework for the assessment of food safety culture within an organizational setting. Additionally, it provides an informative view of why measuring and enhancing food safety culture is important, how to do it and what possible improvement strategies are. Finally, it demonstrates how companies can achieve compliance in a way that supports a proactive and sustainable safety culture.

Overall the findings can be of practical use to bridge gaps in food safety practices and contribute to both academic literature and industry practices.

7.2 Recommendations

Future research should concentrate on assessing the long-term effectiveness of the applied interventions aimed at improving food safety culture. It should be investigated if these measures succeeded in addressing the identified gaps like leadership engagement, resource allocation and communication issues. A repetition of the questionnaire after implementing the strategies would be needed to determine if there was any improvement in the food safety climate score.

Another recommendation would be to widen the scope of future research to include more organizations in the same industry but of different sizes, like smaller businesses, larger corporations and multinational companies. This could be an interesting comparison, that could lead to uncovering common barriers or new challenges when trying to build strong food safety culture across different structures. Understanding these variations could make future recommendations for improvement more widely applicable across the industry.

It is also important to involve all levels of staff from all the departments in the discussions. A limitation in the interviews was not having a representative of every department and moreover of every subgroup of the different departments, that may have different

responsibilities. A more inclusive sampling is needed to capture all diverse perspectives, since organizational culture is a collective experience of every employee in the organization, which would ensure more accurate findings.

Including more demographic factors such as age, length of employment or educational background could add more valuable perspectives in future research. It could bring other important barriers and patterns, that could contribute to more detailed improvement strategies. In this case further separating of the groups was specifically avoided in order to maintain the anonymity of participants, due to the small sizes of some departments.

Lastly, future research should measure the techno-managerial aspects of food safety culture, such as audit results, microbial data, training frequency etc., as well. Since food safety culture incorporates both human and technical elements, the full spectrum of factors should be explored in order to gain a comprehensive understanding of the organizational situation and to develop more targeted strategies of improvement.

8. References

Ades, G., Leith, K., & Leith, P. (2016). What Can You Do? Your Role and Its Impact on Positive Culture Change. *Food Safety*, 27–52. https://doi.org/10.1016/B978-0-12-803104-9.00004-1

Baert, K., Van Huffel, X., Wilmart, O., Jacxsens, L., Berkvens, D., Diricks, H., Huyghebaert, A., & Uyttendaele, M. (2011). Measuring the safety of the food chain in Belgium: Development of a barometer. *Food Research International*, *44*(4), 940–950. https://doi.org/10.1016/J.FOODRES.2011.02.005

Ball, B., Wilcock, A., & Aung, M. (2009). Factors influencing workers to follow food safety management systems in meat plants in Ontario, Canada. *International Journal of Environmental Health Research*, *19*(3), 201–218. https://doi.org/10.1080/09603120802527646

Bautista-Bernal, I., Quintana-García, C., & Marchante-Lara, M. (2024). Safety culture, safety performance and financial performance. A longitudinal study. *Safety Science*, *172*, 106409. https://doi.org/10.1016/J.SSCI.2023.106409

Berman Ltd, Wright, M., Leach, P., & Palmer, G. (2012). *A tool to diagnose culture in food business operators: Report from Greenstreet Berman Ltd for the Food Standards Agency*.

Carugi, C. (2016). Experiences with systematic triangulation at the Global Environment Facility. *Evaluation and Program Planning*, *55*, 55–66. https://doi.org/10.1016/J.EVALPROGPLAN.2015.12.001

Caspar, S., Le, A., & McGilton, K. S. (2017). The Responsive Leadership Intervention: Improving leadership and individualized care in long-term care. *Geriatric Nursing*, *38*(6), 559–566. https://doi.org/10.1016/J.GERINURSE.2017.04.004

Cavelius, L. S., Goebelbecker, J. M., & Morlock, G. E. (2023). Legal and normative requirements for food safety culture – a consolidated overview for food companies within the EU. *Trends in Food Science & Technology*, *142*, 104222. https://doi.org/10.1016/J.TIFS.2023.104222

Clayton, D. A., Griffith, C. J., Price, P., & Peters, A. C. (2002). Food handlers' beliefs and self-reported practices. *International Journal of Environmental Health Research*, *12*(1), 25–39. https://doi.org/10.1080/09603120120110031

de Andrade, M. L., Stedefeldt, E., Zanin, L. M., & da Cunha, D. T. (2020). Food safety culture in food services with different degrees of risk for foodborne diseases in Brazil. *Food Control*, *112*, 107152. https://doi.org/10.1016/J.FOODCONT.2020.107152

De Boeck, E., Jacxsens, L., Bollaerts, M., & Vlerick, P. (2015). Food safety climate in food processing organizations: Development and validation of a self-assessment tool. *Trends in Food Science & Technology*, *46*(2), 242–251. https://doi.org/10.1016/J.TIFS.2015.09.006

De Boeck, E., Jacxsens, L., Mortier, A. V, & Vlerick, P. (2018). *Quantitative study of food safety climate in Belgian food processing companies in view of their organizational characteristics*. https://doi.org/10.1016/j.foodcont.2017.12.037

De Boeck, E., Jacxsens, L., Vanoverberghe, P., & Vlerick, P. (2019). Method triangulation to assess different aspects of food safety culture in food service operations. *Food Research International*, *116*, 1103–1112. https://doi.org/10.1016/J.FOODRES.2018.09.053

De Brún, A., Anjara, S., Cunningham, U., Khurshid, Z., Macdonald, S., O'donovan, R., Rogers, L., & McAuliffe, E. (2020). The Collective Leadership for Safety Culture (Co-Lead) Team Intervention to Promote Teamwork and Patient Safety. *International Journal of Environmental Research and Public Health 2020, Vol. 17, Page 8673*, *17*(22), 8673. https://doi.org/10.3390/IJERPH17228673

Emond, Y. E. J. J. M., Calsbeek, H., Teerenstra, S., Bloo, G. J. A., Westert, G. P., Damen, J., Wolff, A. P., & Wollersheim, H. C. (2015). Improving the implementation of perioperative safety guidelines using a multifaceted intervention approach: Protocol of the IMPROVE study, a stepped wedge cluster randomized trial. *Implementation Science*, *10*(1), 1–11. https://doi.org/10.1186/s13012-014-0198-5

European Commission, Directorate-General for Health and Food Safety. (2021). Commission Regulation (EU) 2021/382 of 3 March 2021 amending the Annexes to Regulation (EC) No 852/2004 on the hygiene of foodstuffs as regards food allergen management, redistribution of food, and food safety culture*. Official Journal of the European Union*, L 74, 3–6. https://eur-lex.europa.eu/eli/reg/2021/382/oj/eng

Fleming, M., Harvey, K., & Cregan, B. (2018). Safety culture research and practice: A review of 30 years of research collaboration. *Journal of Applied Biobehavioral Research*, *23*(4), e12155. https://doi.org/10.1111/JABR.12155

Fruhen, L. S., Mearns, K. J., Flin, R. H., & Kirwan, B. (2013). From the surface to the underlying meaning-an analysis of senior managers' safety culture perceptions. *Safety Science*, *57*, 326–334. https://doi.org/10.1016/J.SSCI.2013.03.006

Global Food Safety Initiative (GFSI). (2018). A Culture of Food Safety: A Position Paper from the Global Food Safety Initiative (Version 1.0). Retrieved from https://www.mygfsi.com

Griffith, C. J. (2010). Do businesses get the food poisoning they deserve?: The importance of food safety culture. *British Food Journal*, *112*(4), 416–425. https://doi.org/10.1108/00070701011034420

Griffith, C. J., Jackson, L. M., & Lues, R. (2017). The food safety culture in a large South African food service complex: Perspectives on a case study. *British Food Journal*, *119*(4), 729–743. https://doi.org/10.1108/BFJ-11-2016-0533

Griffith, C. J., Livesey, K. M., & Clayton, D. (2010a). The assessment of food safety culture. *British Food Journal*, *112*(4), 439–456. https://doi.org/10.1108/00070701011034448

Griffith, C. J., Livesey, K. M., & Clayton, D. A. (2010b). Food safety culture: The evolution of an emerging risk factor? *British Food Journal*, *112*(4), 426–438. https://doi.org/10.1108/00070701011034439

Hall, G. B., Dollard, M. F., & Coward, J. (2010). Psychosocial Safety Climate: Development of the PSC-12. *International Journal of Stress Management*, *17*(4), 353–383. https://doi.org/10.1037/A0021320

Harvey, J., Erdos, G., Bolam, H., Cox, M. A. A., Kennedy, J. N. P., & Gregory, D. T. (2002). An analysis of safety culture attitudes in a highly regulated environment. *Work & Stress*, *16*(1), 18–36. https://doi.org/10.1080/02678370110113226

Hornby, G., & Greaves, D. (2022). Teacher-Student Rapport. *Essential Evidence-Based Teaching Strategies*, 15–30. https://doi.org/10.1007/978-3-030-96229-6_2

IFS Management GmbH. (2023). IFS Food Standard version 8: Standard for auditing product and process compliance in relation to food safety and quality. Berlin, Germany: IFS Management GmbH.

International Nuclear Safety Advisory Group. (1992). *The Chernobyl accident: Updating of INSAG-1 (INSAG-7)*. Vienna, Austria: International Atomic Energy Agency.

Jespersen, L., Butts, J., Holler, G., Taylor, J., Harlan, D., Griffiths, M., & Wallace, C. A. (2019). The impact of maturing food safety culture and a pathway to economic gain. *Food Control*, *98*, 367–379. https://doi.org/10.1016/J.FOODCONT.2018.11.041

Jespersen, L., Griffiths, M., Maclaurin, T., Chapman, B., & Wallace, C. A. (2016). Measurement of food safety culture using survey and maturity profiling tools. *Food Control*, *66*, 174–182. https://doi.org/10.1016/J.FOODCONT.2016.01.030

Jespersen, L., & Wallace, C. A. (2017). Triangulation and the importance of establishing valid methods for food safety culture evaluation. *Food Research International*, *100*, 244–253. https://doi.org/10.1016/J.FOODRES.2017.07.009

Johnson, M., Tennant, B., Newsome, J., Verrill, L., Lando, A., Liggans, G., Wu, F., Salter, M., & Mcnamara, K. (2022). *FDA New Era of Smarter Food Safety Food Safety Culture Systematic Literature Review In collaboration with FDA Food Safety Culture Research Subgroup*. https://www.fda.gov/media/163588/download.

Kopelman, R. E., Gardberg, N. A., & Brandwein, A. C. (2011). Using a Recognition and Reward Initiative to Improve Service Quality: A Quasi-Experimental Field Study in a Public Higher Education Institution. *40*(2), 133–149. https://doi.org/10.1177/009102601104000204

Landry, A. T., Gagné, M., Forest, J., Guerrero, S., Séguin, M., & Papachristopoulos, K. (2017). The relation between financial incentives, motivation, and performance: An integrative SDT-based investigation. *Journal of Personnel Psychology*, *16*(2), 61–76. https://doi.org/10.1027/1866-5888/A000182

Luning, P. A., & Marcelis, W. J. (2007). A conceptual model of food quality management functions based on a techno-managerial approach. *Trends in Food Science & Technology*, *18*(3), 159–166. https://doi.org/10.1016/J.TIFS.2006.10.021

Luning, P. A., & Marcelis, W. J. (2009). A food quality management research methodology integrating technological and managerial theories. *Trends in Food Science & Technology*, *20*(1), 35–44. https://doi.org/10.1016/J.TIFS.2008.09.013

Macheka, L., Manditsera, F. A., Ngadze, R. T., Mubaiwa, J., & Nyanga, L. K. (2013). Barriers, benefits and motivation factors for the implementation of food safety management system in the food sector in Harare Province, Zimbabwe. *Food Control*, *34*(1), 126–131. https://doi.org/10.1016/J.FOODCONT.2013.04.019

Manning, L., Morris, W., & Birchmore, I. (2021). Organisational forgetting: The food safety risk associated with unintentional knowledge loss. *Trends in Food Science & Technology*, *118*, 242–251. https://doi.org/10.1016/J.TIFS.2021.08.028

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

Neal, A., Griffin, M. A., & Hart, P. M. (2000). The impact of organizational climate on safety climate and individual behavior. *Safety Science*, *34*(1–3), 99–109. https://doi.org/10.1016/S0925-7535(00)00008-4

Nouaimeh, N., Pazhanthotta, R. T., Taylor, J. Z., & Bulatovic-Schumer, R. (2018). Measuring and improving food safety culture in a large catering company: a case study. *Worldwide Hospitality and Tourism Themes*, *10*(3), 358–368. https://doi.org/10.1108/WHATT-02-2018-0011

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. https://doi.org/10.1016/J.FOODCONT.2017.07.038

Nyarugwe, S. P., Linnemann, A. R., Ren, Y., Bakker, E. J., Kussaga, J. B., Watson, D., Fogliano, V., & Luning, P. A. (2020). An intercontinental analysis of food safety culture in view of food safety governance and national values. *Food Control*, *111*, 107075. https://doi.org/10.1016/J.FOODCONT.2019.107075

Powell, D. A., Erdozain, S., Dodd, C., Costa, R., Morley, K., & Chapman, B. J. (2013). Audits and inspections are never enough: A critique to enhance food safety. *Food Control*, *30*(2), 686–691. https://doi.org/10.1016/J.FOODCONT.2012.07.044

Powell, D. A., Jacob, C. J., & Chapman, B. J. (2011). Enhancing food safety culture to reduce rates of foodborne illness. *Food Control*, *22*(6), 817–822. https://doi.org/10.1016/J.FOODCONT.2010.12.009

Propp, D. A., Glickman, S., & Uehara, D. T. (2003). ED leadership competency matrix: an administrative management tool. *The American Journal of Emergency Medicine*, *21*(6), 483–486. https://doi.org/10.1016/S0735-6757(03)00164-5

Redmond, E. C., & Griffith, C. J. (2003). A comparison and evaluation of research methods used in consumer food safety studies. *International Journal of Consumer Studies*, *27*(1), 17–33. https://doi.org/10.1046/J.1470-6431.2003.00283.X

Renaud, S., Morin, L., & Béchard, A. (2017). Traditional Benefits Versus Perquisites., *16*(2), 91–103. https://doi.org/10.1027/1866-5888/A000180

Schein, E. H. ., & Schein, P. A. . (2017). *Organizational culture and leadership: Vol. Fifth edition*. John Wiley and Sons, Inc.

Schoonbeek, S., & Henderson, A. (2011). Shifting workplace behavior to inspire learning: A journey to building a learning culture. *Journal of Continuing Education in Nursing*, *42*(1), 43–48. https://doi.org/10.3928/00220124-20101001-02

Sharman, N., Wallace, C. A., & Jespersen, L. (2020). Terminology and the understanding of culture, climate, and behavioural change – Impact of organisational and human factors on food safety management. *Trends in Food Science & Technology*, *96*, 13–20. https://doi.org/10.1016/J.TIFS.2019.12.005

Spagnoli, P., Jacxsens, L., & Vlerick, P. (2023). Towards a food safety culture improvement roadmap: diagnosis and gap analysis through a conceptual framework as the first steps. *Food Control*, *145*, 109398. https://doi.org/10.1016/j.foodcont.2022.109398

Ungku Fatimah, U. Z. A., Strohbehn, C. H., & Arendt, S. W. (2014). An empirical investigation of food safety culture in onsite foodservice operations. *Food Control*, *46*, 255–263. https://doi.org/10.1016/J.FOODCONT.2014.05.029

Watson, D., Yap, S., Pandi, S., Husband, J., & Tekelas, F. (2018). BREXIT and the Implications of Food Safety Cultural Compliance in the Food Manufacturing Sector. *ACTA SCIENTIFIC MICROBIOLOGY*, *1*(4), 54–62. https://doi.org/10.31080/ASMI.2018.01.0039

Wiegmann, D.A., Zhang, H., Thaden, T.L., Kulshreshtha, K., & Mitchell, A.A. (2002). A Synthesis of Safety Culture and Safety Climate Research.

Wilcock, A., Ball, B., & Fajumo, A. (2011). Effective implementation of food safety initiatives: Managers', food safety coordinators' and production workers' perspectives. *Food Control*, *22*(1), 27–33. https://doi.org/10.1016/J.FOODCONT.2010.06.005

World Health Organization. (2024). *Food safety*. Retrieved January 19, 2025, from https://www.who.int/news-room/fact-sheets/detail/food-safety

Yee Wong, S., Chak Lun Fu, A., Han, J., Lin, J., & Cheung Lau, M. (2021). Effectiveness of customised safety intervention programmes to increase the safety culture of hospital staff. *BMJ Open Quality*, *10*, 962. https://doi.org/10.1136/bmjoq-2020-000962

Yiannas, F. (2009). *Food Safety Culture: Creating a Behavior-Based Food Safety Management System (Food Microbiology and Food Safety)*. https://doi.org/10.1007/978-0-387-72867-4

Yiannas, F. (2015). *Food safety = behavior: 30 proven techniques to enhance employee compliance*. Springer Science+Business Media. https://doi.org/10.1007/978-1-4939-2489-9

Zanin, L. M., Luning, P. A., da Cunha, D. T., & Stedefeldt, E. (2021). Influence of educational actions on transitioning of food safety culture in a food service context: Part 1 – Triangulation and data interpretation of food safety culture elements. *Food Control*, *119*, 107447. https://doi.org/10.1016/J.FOODCONT.2020.107447

Zanin, L. M., Stedefeldt, E., & Luning, P. A. (2021). The evolvement of food safety culture assessment: A mixed-methods systematic review. *Trends in Food Science & Technology*, *118*, 125–142. https://doi.org/10.1016/J.TIFS.2021.08.013

Zhu, Y., & Akhtar, S. (2014). How transformational leadership influences follower helping behavior: The role of trust and prosocial motivation. *Journal of Organizational Behavior*, *35*(3), 373–392. https://doi.org/10.1002/JOB.1884

Zohar, D. (2004). Safety climate: Conceptual and measurement issues. *Handbook of Occupational Health Psychology.*, 123–142. https://doi.org/10.1037/10474-006

9. Appendices

9.1 Einverständniserklärung

Einverständniserklärung zur Teilnahme an einer Fokusgruppe im Rahmen einer Masterarbeit

Sehr geehrte/r Teilnehmer/in,

Vielen Dank, dass Sie bereit sind, an dieser Fokusgruppe teilzunehmen. Ziel dieser Diskussion ist es, wertvolle Einblicke und Meinungen zur Lebensmittelsicherheitskultur in unserem Unternehmen zu sammeln. Die Ergebnisse aus der Diskussion werden als Hilfestellung zur Entwicklung von Maßnahmen für eine bessere Lebensmittelsicherheitskultur in der Firma dienen und als Teil einer Masterarbeit verwendet werden.

Die wichtigsten Punkte zur Teilnahme:

1. **Aufnahme der Gespräche**:
   Die Diskussion wird vollständig aufgezeichnet. Dies dient ausschließlich dazu, die Inhalte präzise zu transkribieren und später zu analysieren.
2. **Verwendung der Daten**:
   Die transkribierten Inhalte werden im Rahmen der Masterarbeit verwendet. Die Ergebnisse der Analyse sollen Maßnahmen und Empfehlungen entwickeln, die zur Verbesserung der Lebensmittelsicherheitskultur in unserem Unternehmen beitragen.
3. **Vertraulichkeit**:
   Alle aufgenommenen und transkribierten Daten werden streng vertraulich behandelt. Persönliche Informationen, die eine Rückverfolgung Ihrer Person ermöglichen, werden weder in der Masterarbeit noch in anderen Berichten erwähnt.
4. **Freiwillige Teilnahme**:
   Ihre Teilnahme an dieser Diskussion ist freiwillig. Sie können jederzeit ohne Angabe von Gründen Ihre Zustimmung zurückziehen.

Durch Ihre Unterschrift erklären Sie sich mit der Aufnahme der Diskussion, der anschließenden Transkription und der Analyse der Daten einverstanden.

Einverständniserklärung:

Ich, _____ (Name), bestätige, dass ich die oben genannten Punkte verstanden habe und freiwillig an der Fokusgruppe teilnehme. Ich bin damit einverstanden, dass das Gespräch aufgenommen, transkribiert und für die Analyse im Rahmen der Masterarbeit verwendet wird.

Unterschrift: _____
Datum: _____

Vielen Dank für Ihre wertvolle Unterstützung!

9.2 Food safety climate questionnaire

9.2.1 Questionnaire in English

Food safety and hygiene

Department

- ○ Warehouse + Material Management + Purchasing
- ○ Production
- ○ Quality Management, Product Development, and Quality Control
- ○ Maintenance and Engineering
- ○ HR + IT + Marketing

Sex

○ Female ○ Male ○ Diverse

Type of employment

○ Worker ○ Temporary worker ○ Employee

Do I have leadership responsibilities?

○ Yes ○ No

What is my contribution to product safety and quality?

Answer:

_____
_____
_____
_____

_____

Suggestions for improvement?

Answer:

_____
_____
_____
_____
_____

How important is product safety and quality to me?

1 (very important)	2	3	4	5 (not important)
○	○	○	○	○

1. Leadership in the organization

	Totally agree	Agree	Neutral	Disagree	Totally disagree
The leaders set clear objectives concerning hygiene and food safety.	○	○	○	○	○
The leaders are clear about the expectations concerning hygiene and food safety towards employees.	○	○	○	○	○
The leaders are able to motivate their employees to work in a hygienic and food safe way.	○	○	○	○	○
The leaders listen to employees, if they have remarks or comments concerning hygiene and food safety.	○	○	○	○	○
Hygiene and food safety **issues are addressed in a constructive and respectful way by the leaders.**	○	○	○	○	○
The leaders strive for a continuous improvement of hygiene and food safety.	○	○	○	○	○

2. Communication in the organization

	Totally agree	Agree	Neutral	Disagree	Totally disagree
The leaders communicate regularly with the operators about hygiene and food safety.	○	○	○	○	○
The leaders communicate in a clear way with the operators about hygiene and food safety.	○	○	○	○	○
It is possible for the operators to communicate about hygiene and food safety **with the leaders.**	○	○	○	○	○
The importance of hygiene and food safety **is permanently present** by means of, for example, posters, signs and/or icons related to hygiene and food safety.	○	○	○	○	○
I can discuss problems concerning hygiene and food safety **with colleagues.**	○	○	○	○	○

3. Commitment in the organization

	Totally agree	Agree	Neutral	Disagree	Totally disagree
The leaders clearly consider hygiene and food safety **to be of great importance.**	○	○	○	○	○
My colleagues are convinced of the importance of hygiene and food safety for the organization.	○	○	○	○	○
Working in a hygienic and food safe way **is recognized and rewarded**.	○	○	○	○	○

The leaders set a good example concerning hygiene and food safety.	○	○	○	○	○
The leaders act quickly to correct problems/issues that affect hygiene and food safety.	○	○	○	○	○
Employees are actively involved by the leaders in hygiene and food safety related matters.	○	○	○	○	○

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4. Resources in the organization

	Totally agree	**Agree**	**Neutral**	**Disagree**	**Totally disagree**
Employees get sufficient time to work in a hygienic and food safe way.	○	○	○	○	○
Sufficient staff is available to follow up hygiene and food safety.	○	○	○	○	○
The necessary infrastructure (e.g. good work space, good equipment …) **is available** to be able to work in a hygienic and food safe way.	○	○	○	○	○
Sufficient financial resources are provided to support hygiene and food safety (e.g. lab analyses, extern consultants, extra cleaning, purchase equipment …).	○	○	○	○	○
Sufficient education and training related to hygiene and food safety **is given.**	○	○	○	○	○
Good procedures and instructions concerning hygiene and food safety **are in place.**	○	○	○	○	○

---

5. Risk awareness in the organization

	Totally agree	**Agree**	**Neutral**	**Disagree**	**Totally disagree**
The risks related to hygiene and food safety **are known**.	○	○	○	○	○
The risks related to hygiene and food safety **are under control**.	○	○	○	○	○
My colleagues are alert and attentive to potential problems and risks related to hygiene and food safety.	○	○	○	○	○
The leaders have a realistic picture of the potential problems and risks related to hygiene and food safety.	○	○	○	○	○
The operators have a realistic picture of the potential problems and risks related to hygiene and food safety.	○	○	○	○	○

9.2.2 Questionnaire in German

Lebensmittelsicherheit- und Hygiene

Abteilung

- ○ Lager + Materialwirtschaft + Einkauf
- ○ Produktion
- ○ Entwicklung + Qualitätsmanagement + Labor
- ○ Werkstatt + Technik
- ○ Personal + IT + Marketing

Geschlecht

○ Weiblich ○ Männlich ○ Divers

Art der Anstellung

○ Arbeiter ○ Leiharbeiter ○ Angestellte

Habe ich Führungsaufgaben?

○ Ja ○ Nein

Was ist mein Beitrag zu Produktsicherheit und Qualität?

Antwort:

Verbesserungsvorschläge?

Antwort:

Wie wichtig sind für mich die Produktsicherheit und Qualität? (Nach dem Schulnotsystem)

1 (sehr wichtig)	2	3	4	5 (unwichtig)
○	○	○	○	○

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1. Führung in der Firma

	Stimme voll und ganz zu	Stimme zu	Neutral	Stimme nicht zu	Stimme überhaupt nicht zu
Die Führungskräfte setzen klare Ziele in Bezug auf Hygiene und Lebensmittelsicherheit.	○	○	○	○	○
Die Erwartungen der Führungskräfte sind an die Mitarbeiter bezüglich Hygiene und Lebensmittelsicherheit **klar definiert.**	○	○	○	○	○
Die Führungskräfte können ihre Mitarbeiter motivieren, auf hygienische und lebensmittelsichere Weise zu arbeiten.	○	○	○	○	○
Die Führungskräfte hören den Mitarbeitern zu, wenn diese Anmerkungen oder Kommentare zur Hygiene und Lebensmittelsicherheit **haben**.	○	○	○	○	○
Probleme im Bereich Hygiene und **Lebensmittelsicherheit werden von den Führungskräften konstruktiv und respektvoll angesprochen**.	○	○	○	○	○
Die Führungskräfte streben eine kontinuierliche Verbesserung der Hygiene und Lebensmittelsicherheit **an**.	○	○	○	○	○

2. Kommunikation in der Firma

	Stimme voll und ganz zu	Stimme zu	Neutral	Stimme nicht zu	Stimme überhaupt nicht zu
Die Führungskräfte kommunizieren regelmäßig mit den Mitarbeitern über Hygiene und Lebensmittelsicherheit.	○	○	○	○	○
Die Führungskräfte kommunizieren klar und verständlich mit den Mitarbeitern über Hygiene und Lebensmittelsicherheit.	○	○	○	○	○
Es ist möglich, dass die Mitarbeiter mit den Führungskräften über Hygiene und Lebensmittelsicherheit **sprechen**.	○	○	○	○	○
Die Bedeutung von Hygiene und Lebensmittelsicherheit **wird ständig** durch beispielsweise Plakate, Schilder und/oder Symbole **hervorgehoben.**	○	○	○	○	○
Ich kann Probleme bezüglich Hygiene und Lebensmittelsicherheit **mit Kollegen** in meiner Organisation **besprechen**.	○	○	○	○	○

3. Engagement in der Firma

	Stimme voll und ganz zu	Stimme zu	Neutral	Stimme nicht zu	Stimme überhaupt nicht zu
Die Führungskräfte halten Hygiene und Lebensmittelsicherheit **für sehr wichtig.**	○	○	○	○	○
Meine Kollegen sind von der Bedeutung der Hygiene und Lebensmittelsicherheit für die Organisation **überzeugt**.	○	○	○	○	○
Hygienisches und lebensmittelsicheres **Arbeiten wird anerkannt und belohnt.**	○	○	○	○	○
Die Führungskräfte sind ein gutes Vorbild in Bezug auf Hygiene und Lebensmittelsicherheit.	○	○	○	○	○
Die Führungskräfte handeln schnell, um Probleme zu korrigieren, die die Hygiene und Lebensmittelsicherheit beeinträchtigen.	○	○	○	○	○
Mitarbeiter werden von den Führungskräften aktiv in Angelegenheiten bezüglich Hygiene und Lebensmittelsicherheit **einbezogen**.	○	○	○	○	○

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4. Ressourcen in der Firma

	Stimme voll und ganz zu	Stimme zu	Neutral	Stimme nicht zu	Stimme überhaupt nicht zu
Mitarbeiter erhalten genügend Zeit, um hygienisch und lebensmittelsicher zu arbeiten.	○	○	○	○	○
Es steht ausreichend Personal zur Verfügung, um Hygiene und Lebensmittelsicherheit zu gewährleisten.	○	○	○	○	○
Die notwendige Infrastruktur (z.B. guter Arbeitsplatz, gute Ausrüstung ...) **ist vorhanden**, um hygienisch und lebensmittelsicher arbeiten zu können.	○	○	○	○	○
Ausreichende finanzielle Ressourcen werden bereitgestellt, um Hygiene und Lebensmittelsicherheit zu unterstützen (z.B. Laboranalysen, externe Berater, zusätzliche Reinigung, Anschaffung von Ausrüstung)	○	○	○	○	○
Ausreichende Bildung und Schulung wird im Bereich Hygiene und Lebensmittelsicherheit **angeboten**.	○	○	○	○	○

Gute Verfahren und Anweisungen bezüglich Hygiene und Lebensmittelsicherheit **sind vorhanden**.	○	○	○	○	○

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5. Risikobewusstsein in der Firma

	Stimme voll und ganz zu	**Stimme zu**	**Neutral**	**Stimme nicht zu**	**Stimme überhaupt nicht zu**
Die Risiken in Bezug auf Hygiene und Lebensmittelsicherheit **sind bekannt.**	○	○	○	○	○
Die Risiken bezüglich Hygiene und Lebensmittelsicherheit **sind unter Kontrolle.**	○	○	○	○	○
Meine Kollegen sind aufmerksam und wachsam gegenüber potenziellen Problemen und Risiken im Zusammenhang mit Hygiene und Lebensmittelsicherheit.	○	○	○	○	○
Die Führungskräfte haben ein realistisches Bild der potenziellen Probleme und Risiken im Bereich Hygiene und Lebensmittelsicherheit.	○	○	○	○	○
Die Mitarbeiter haben ein realistisches Bild der potenziellen Probleme und Risiken im Bereich Hygiene und Lebensmittelsicherheit.	○	○	○	○	○

9.3 Interview questions

9.3.1 Questions for non-leaders in English

E3 Commitment: “In my organization, working in a hygienic and food safe way is recognized and rewarded.”

1. How do you think hygienic work is currently recognized?
2. What kind of recognition would you like to see?
3. Would more rewards influence your motivation? If yes, how?
4. Does the current recognition have an impact on how you work?
5. Why do you think hygienic work is often not recognized enough?

RES1 Resources: “In my organization, employees get sufficient time to work in a hygienic and food safe way.”

1. Where do you experience the biggest problems with having too little time?
2. How does time pressure affect the quality of your work?
3. Which tasks do you consider particularly important in terms of time?
4. What would you need to perform your tasks more hygienically?
5. Do you sometimes feel pressured to take shortcuts?
6. What is most important to you when you have little time?
7. What could managers do to give you more time for important tasks?

RES3 Resources: “In my organization, the necessary infrastructure (e.g. good work space, good equipment …) is available to be able to work in a hygienic and food safe way.”

1. What improvements to the equipment would be necessary for your work?
2. Do you lack specific tools or materials for hygienic work?
3. How do you evaluate your workplace in terms of hygiene?
4. Are there devices that could improve hygiene?
5. Where exactly would you like to see better equipment?
6. What hinders you the most from working hygienically?

L4 Leadership: “In my organization, the leaders listen to employees, if they have remarks or comments concerning hygiene and food safety.”

1. Is your feedback regarding hygiene often taken into account?
2. How quickly are your comments addressed?

3. Are there issues that are frequently overlooked?
4. Do you feel comfortable pointing out hygiene deficiencies?
5. Are you taken seriously when you express concerns?
6. What kind of response do you receive to your comments?
7. How could you be better involved in decision-making?
8. What would change if your feedback were given more attention?

RES 2 Resources: "In my organization, sufficient staff is available to follow up hygiene and food safety."

1. Is there enough staff for hygienic work?
2. Where is the most support lacking?
3. How often do you feel overwhelmed due to staff shortages?
4. Which tasks are left undone when people are missing?
5. How could tasks be distributed more effectively?
6. Do you have ideas on how to better handle staff shortages?

L5 Leadership: "In my organization, hygiene and food safety issues are addressed in a constructive and respectful way by the leaders."

1. How often do you receive helpful feedback?
2. Are your mistakes addressed respectfully?
3. How does management handle hygiene mistakes?
4. Are you encouraged to provide helpful feedback?
5. What kind of feedback would you like to receive?

E4 Commitment: "In my organization, the leaders set a good example concerning hygiene and food safety."

1. To what extent are managers role models for you in terms of hygiene and safety?
2. Are there specific examples of good role model behavior?
3. What role does the behavior of role models play in influencing your own actions?
4. What would positively influence your behavior?

L3 Leadership: "In my organization, the leaders are able to motivate their employees to work in a hygienic and food safe way."

1. What motivates you to work hygienically?

2. What actions from management would motivate you more?
3. Are there factors that demotivate you?
4. What could managers do better?

C1 Communication: “In my organization, the leaders communicate regularly with the operators about hygiene and food safety.”

1. How often do you receive communication about hygiene topics?
2. Is the communication clear and understandable?
3. What information do you feel is missing?
4. Do you feel sufficiently informed?
5. How could you be better informed?
6. What would you improve about the communication?
7. Which communication channels do you prefer?

E5 Commitment: “In my organization, the leaders act quickly to correct problems/issues that affect hygiene and food safety.”

1. Are problems resolved quickly?
2. Which problems take the longest to be addressed?
3. How often are hygiene issues overlooked?
4. What steps would you like to see to resolve problems?

9.3.2 Questions for non-leaders in German

E3 Engagement: Hygienisches und lebensmittelsicheres Arbeiten wird anerkannt und belohnt.

1. Wie wird hygienisches Arbeiten deiner Meinung nach aktuell anerkannt?
2. Welche Art von Anerkennung würdest du dir wünschen?
3. Würde mehr Belohnung deine Motivation beeinflussen? Wenn ja, wie?
4. Hat die aktuelle Anerkennung Einfluss darauf, wie du arbeitest?
5. Warum glaubst du, dass hygienisches Arbeiten oft nicht genug anerkannt wird?

RES1 Ressourcen: Mitarbeiter erhalten genügend Zeit, um hygienisch und lebensmittelsicher zu arbeiten.

1. Wo hast du die größten Probleme mit zu wenig Zeit?
2. Wie wirkt sich Zeitdruck auf die Qualität deiner Arbeit aus?
3. Welche Aufgaben sind aus deiner Sicht zeitlich besonders wichtig?
4. Was bräuchtest du, um deine Aufgaben hygienischer zu machen?
5. Fühlst du dich manchmal dazu gedrängt, Abkürzungen zu nehmen?
6. Was ist dir am wichtigsten, wenn du wenig Zeit hast?
7. Was könnten Führungskräfte tun, damit du mehr Zeit für wichtige Aufgaben hast?

RES3 Ressourcen: Die notwendige Infrastruktur (z.B. guter Arbeitsplatz, gute Ausrüstung ...) ist vorhanden, um hygienisch und lebensmittelsicher arbeiten zu können.

1. Welche Verbesserungen an der Ausstattung wären für deine Arbeit nötig?
2. Fehlt dir bestimmtes Werkzeug oder Material für hygienisches Arbeiten?
3. Wie bewertest du deinen Arbeitsplatz in Bezug auf Hygiene?
4. Gibt es Geräte, die die Hygiene verbessern könnten?
5. Wo genau würdest du dir bessere Ausstattung wünschen?
6. Was hindert dich am meisten daran, hygienisch zu arbeiten?

L4 Führung: Die Führungskräfte hören den Mitarbeitern zu, wenn diese Anmerkungen oder Kommentare zur Hygiene und Lebensmittelsicherheit haben.

1. Werden deine Rückmeldungen zur Hygiene oft beachtet?
2. Wie schnell wird auf deine Kommentare reagiert?
3. Gibt es Themen, die häufiger übersehen werden?

4. Fühlst du dich wohl dabei, Hygienemängel anzusprechen?
5. Wirst du ernst genommen, wenn du Bedenken aussprichst?
6. Welche Art von Antwort bekommst du auf deine Kommentare?
7. Wie könntest du besser in Entscheidungen eingebunden werden?
8. Was würde sich ändern, wenn deine Kommentare mehr beachtet würden?

RES2 Ressourcen: Es steht ausreichend Personal zur Verfügung, um Hygiene und Lebensmittelsicherheit zu gewährleisten.

1. Gibt es genug Personal für hygienisches Arbeiten?
2. Wo fehlt die meiste Unterstützung?
3. Wie oft bist du durch Personalmangel überlastet?
4. Welche Aufgaben bleiben liegen, wenn Leute fehlen?
5. Wie könnten die Aufgaben besser verteilt werden?
6. Hast du Ideen, wie man mit Personalmangel besser umgehen kann?

L5 Führung: Probleme im Bereich Hygiene und Lebensmittelsicherheit werden von den Führungskräften konstruktiv und respektvoll angesprochen.

1. Wie oft bekommst du hilfreiche Rückmeldungen?
2. Werden deine Fehler respektvoll angesprochen?
3. Wie geht die Führung mit Hygienefehlern um?
4. Wirst du ermutigt, hilfreiches Feedback zu geben?
5. Welche Art von Rückmeldung wünschst du dir?

E4 Engagement: Die Führungskräfte sind ein gutes Vorbild in Bezug auf Hygiene und Lebensmittelsicherheit.

1. Inwiefern sind Führungskräfte für dich Vorbilder in Bezug auf Hygiene und Sicherheit?
2. Gibt es konkrete Beispiele für gutes Vorbildverhalten?
3. Welche Rolle spielt die Vorbildfunktion für dein eigenes Verhalten?
4. Was würde dein Verhalten positiv beeinflussen?

L3 Führung: Die Führungskräfte können ihre Mitarbeiter motivieren, auf hygienische und lebensmittelsichere Weise zu arbeiten.

1. Was motiviert dich, hygienisch zu arbeiten?
2. Welche Maßnahmen seitens der Führung würden dich mehr motivieren?

3. Gibt es Faktoren, die dich demotivieren?
4. Was können Führungskräfte besser machen?

C1 Kommunikation: Die Führungskräfte kommunizieren regelmäßig mit den Mitarbeitern über Hygiene und Lebensmittelsicherheit.

1. Wie oft erhältst du Kommunikation zu Hygienethemen?
2. Ist die Kommunikation klar und verständlich?
3. Welche Informationen fehlen dir?
4. Fühlst du dich ausreichend informiert?
5. Wie könntest du besser informiert werden?
6. Was könntest du an der Kommunikation verbessern?
7. Welche Kommunikationskanäle bevorzugst du?

E5 Engagement: Die Führungskräfte handeln schnell, um Probleme zu korrigieren, die die Hygiene und Lebensmittelsicherheit beeinträchtigen.

1. Werden Probleme schnell behoben?
2. Welche Probleme brauchen am längsten, um gelöst zu werden?
3. Wie oft werden Hygienemängel übersehen?
4. Welche Schritte wünschst du dir, um Probleme zu lösen?

9.3.3 Questions for leaders in English

E3 Commitment: “In my organization, working in a hygienic and food safe way is recognized and rewarded.”

1. How are the current recognition mechanisms for hygienic and food-safe work in your area evaluated? Is there room for improvement?
2. What specific measures have been implemented so far to reward or recognize employees for hygienic work?
3. Are the existing recognitions for hygienic work perceived by employees? If not, why might that be the case?
4. How is the importance of hygienic and food-safe work, as well as its recognition, communicated within the team?
5. What type of recognition or reward is considered most motivating to promote hygienic work?
6. What could an effective system for rewarding hygienic and food-safe work look like? Are there any suggestions or ideas?

RES1 Resources: “In my organization, employees get sufficient time to work in a hygienic and food safe way.”

1. How is the working time of employees planned to ensure that hygienic and food-safe work is possible? Are there challenges in scheduling?
2. What feedback is received from employees regarding time pressure when maintaining hygiene standards, and how is this feedback handled?
3. What priority is given to hygienic and food-safe work when designing shifts or work schedules in your area?
4. Are there situations where time pressure makes it difficult to maintain hygiene standards? How are such situations handled?
5. What measures could be taken to provide employees with more time for hygienic work?

RES3 Resources: “In my organization, the necessary infrastructure (e.g. good work space, good equipment …) is available to be able to work in a hygienic and food safe way.”

1. How is the current infrastructure for hygienic and food-safe work evaluated, and where is improvement needed?
2. What feedback is received from employees regarding equipment and the workplace? Are there specific complaints or suggestions for improvement?
3. Is the provision of necessary infrastructure sufficiently prioritized? If not, what obstacles exist?

4. What limitations (e.g., budget, time) might hinder the provision of better infrastructure?
5. How could workplaces and equipment be improved to optimally support hygienic and food-safe work?

L4 Leadership: "In my organization, the leaders listen to employees, if they have remarks or comments concerning hygiene and food safety."

1. How often is feedback actively sought from employees to identify potential problems or suggestions for improvement regarding hygiene and food safety?
2. How is feedback from employees handled? Is it systematically documented and followed up?
3. How is an open atmosphere created where employees feel comfortable sharing concerns or comments?
4. What communication channels are used to ensure that employees' comments are heard and taken seriously?
5. How is it ensured that responses to employees' comments are perceived as appropriate and supportive?
6. What actions are taken when employees provide criticism or suggestions for improvement regarding hygiene?

RES 2 Resources: "In my organization, sufficient staff is available to follow up hygiene and food safety."

1. How is it ensured that there is always sufficient staff available in your area to implement hygienic and food-safe work practices?
2. What challenges exist in staff planning, especially regarding the maintenance of hygiene standards?
3. What measures are taken to avoid overwork that could negatively affect hygiene and food safety?
4. What strategies are used to ensure that hygiene and food safety requirements are not neglected during temporary staff shortages?

L5 Leadership: "In my organization, hygiene and food safety issues are addressed in a constructive and respectful way by the leaders."

1. How are issues in hygiene or food safety addressed when identified? Is there a clear process for addressing such problems?
2. How do you ensure that criticism or feedback about hygiene and food safety issues is perceived as respectful by employees?
3. What strategies are used to ensure constructive communication on sensitive topics like hygiene and food safety?

4. How do you collect feedback from employees to evaluate whether addressing issues is perceived as respectful and constructive?
5. How is an open feedback culture fostered, where problems can be directly addressed and solution-oriented?

E4 Commitment: "In my organization, the leaders set a good example concerning hygiene and food safety."

1. How do you ensure that hygiene and food safety standards are adhered to at all times?
2. What specific actions do you take to serve as a role model for employees in hygiene and safety?
3. How often do you review your own work practices and routines in hygiene and food safety to ensure standards are met?
4. How do you respond when employees point out inconsistencies in your own behavior regarding hygiene and food safety?
5. What training or professional development do you utilize to continuously improve your knowledge and behavior in hygiene and food safety?

L3 Leadership: "In my organization, the leaders are able to motivate their employees to work in a hygienic and food safe way."

1. What strategies do you use to actively motivate employees to work hygienically and safely?
2. How often is the importance of hygiene and food safety discussed with colleagues or employees to raise awareness and motivation?
3. How are good performances by employees in hygiene and food safety recognized to promote their motivation?
4. How are employees involved in decisions or measures to improve hygiene and food safety to foster their engagement?
5. What obstacles do you face in motivating employees for hygienic and food-safe work, and how do you address them?

C1 Communication: "In my organization, the leaders communicate regularly with the operators about hygiene and food safety."

1. How is communication with employees planned to regularly discuss topics like hygiene and food safety?
2. What channels and formats are used to ensure that all employees receive information about hygiene and food safety?
3. How do you ensure that messages about hygiene and food safety are clear and understandable for all employees?

4. How do you collect feedback from employees to ensure that communication about hygiene and food safety is effective?
5. What obstacles exist in regular communication about hygiene and food safety standards, and how do you address them?
6. How is it ensured that employees understand and implement the communicated information in practice?

E5 Commitment: “In my organization, the leaders act quickly to correct problems/issues that affect hygiene and food safety.”

1. What steps are taken to immediately implement actions when a problem is identified?
2. How are decisions and actions for problem resolution communicated to the team to ensure transparency?
3. What challenges arise in quickly implementing measures to correct hygiene or food safety issues?
4. How is it evaluated whether the actions taken to resolve issues were successful and have long-term effects?
5. How do you collaborate with other departments to quickly and effectively resolve issues?
6. What resources or processes are lacking to respond even faster and more effectively to problems in hygiene and food safety?

9.3.4 Question for leaders in German

E3 Engagement: Hygienisches und lebensmittelsicheres Arbeiten wird anerkannt und belohnt.

1. Wie werden die aktuellen Anerkennungsmechanismen für hygienisches und lebensmittelsicheres Arbeiten in Ihrem Bereich bewertet? Gibt es Verbesserungspotenzial?
2. Welche konkreten Maßnahmen sind bisher ergriffen worden, um Mitarbeiter für hygienisches Arbeiten zu belohnen oder anzuerkennen?
3. Werden die bestehenden Anerkennungen für hygienisches Arbeiten von den Mitarbeitern wahrgenommen? Wenn nicht, warum könnte das der Fall sein?
4. Wie wird die Bedeutung von hygienischem und lebensmittelsicherem Arbeiten sowie dessen Wertschätzung innerhalb des Teams kommuniziert?
5. Welche Art von Anerkennung oder Belohnung wird als am meisten motivierend angesehen, um hygienisches Arbeiten zu fördern?
6. Wie könnte ein effektives System zur Belohnung von hygienischem und lebensmittelsicherem Arbeiten konkret aussehen? Welche Vorschläge oder Ideen gibt es?

RES1 Ressourcen: Mitarbeiter erhalten genügend Zeit, um hygienisch und lebensmittelsicher zu arbeiten.

1. Wie wird die Arbeitszeit der Mitarbeitenden geplant, um sicherzustellen, dass hygienisches und lebensmittelsicheres Arbeiten möglich ist? Gibt es Herausforderungen in der Zeitplanung?
2. Welche Rückmeldungen werden von den Mitarbeitenden hinsichtlich des Zeitdrucks bei der Einhaltung von Hygienestandards erhalten, und wie wird mit diesen Rückmeldungen umgegangen?
3. Welche Priorität wird hygienischem und lebensmittelsicherem Arbeiten bei der Gestaltung von Schicht- oder Arbeitsplänen in Ihrem Bereich eingeräumt?
4. Gibt es Situationen, in denen Zeitdruck die Einhaltung von Hygienestandards erschwert? Wie wird in solchen Fällen gehandelt?
5. Welche Maßnahmen könnten ergriffen werden, um den Mitarbeitenden mehr Zeit für hygienisches Arbeiten zu ermöglichen?

RES3 Ressourcen: Die notwendige Infrastruktur (z.B. guter Arbeitsplatz, gute Ausrüstung ...) ist vorhanden, um hygienisch und lebensmittelsicher arbeiten zu können.

1. Wie wird die aktuelle Infrastruktur in Bezug auf hygienisches und lebensmittelsicheres Arbeiten bewertet, und wo wird Verbesserungsbedarf gesehen?

2. Welche Rückmeldungen werden von Mitarbeitenden bezüglich der Ausstattung und des Arbeitsplatzes erhalten? Gibt es spezifische Beschwerden oder Verbesserungsvorschläge?
3. Wird die Bereitstellung der notwendigen Infrastruktur als ausreichend priorisiert angesehen? Wenn nicht, welche Hürden bestehen?
4. Welche Einschränkungen durch Budget, Zeit oder andere Faktoren könnten die Bereitstellung einer besseren Infrastruktur behindern?
5. Wie könnten Arbeitsplätze und Ausrüstung verbessert werden, um hygienisches und lebensmittelsicheres Arbeiten optimal zu unterstützen?

L4 Führung: Die Führungskräfte hören den Mitarbeitern zu, wenn diese Anmerkungen oder Kommentare zur Hygiene und Lebensmittelsicherheit haben.

1. Wie oft wird aktiv nach Feedback von den Mitarbeitenden gefragt, um mögliche Probleme oder Verbesserungsvorschläge zu Hygiene und Lebensmittelsicherheit zu erfahren?
2. Wie wird mit Rückmeldungen von Mitarbeitenden umgegangen? Werden diese systematisch dokumentiert und nachverfolgt?
3. Wie wird eine offene Atmosphäre geschaffen, in der sich Mitarbeitende wohl fühlen, ihre Bedenken oder Kommentare anzusprechen?
4. Welche Kommunikationskanäle werden genutzt, um sicherzustellen, dass Anmerkungen von Mitarbeitenden gehört und ernst genommen werden?
5. Wie wird überprüft, ob die Reaktionen auf die Anmerkungen der Mitarbeitenden als angemessen und unterstützend wahrgenommen werden?
6. Welche Maßnahmen werden ergriffen, wenn Mitarbeitende Kritik oder Verbesserungsvorschläge zur Hygiene äußern?

RES2 Ressourcen: Es steht ausreichend Personal zur Verfügung, um Hygiene und Lebensmittelsicherheit zu gewährleisten.

1. Wie wird sichergestellt, dass in Ihrem Bereich jederzeit genügend Personal verfügbar ist, um hygienische und lebensmittelsichere Arbeitsweisen umzusetzen?
2. Welche Herausforderungen bestehen bei der Personalplanung, insbesondere in Bezug auf die Einhaltung von Hygienestandards?
3. Welche Maßnahmen werden ergriffen, um Überlastung zu vermeiden, die sich negativ auf Hygiene und Lebensmittelsicherheit auswirken könnte?
4. Welche Strategien werden genutzt, um bei temporärem Personalmangel sicherzustellen, dass die Hygiene- und Lebensmittelsicherheitsanforderungen nicht vernachlässigt werden?

L5 Führung: Probleme im Bereich Hygiene und Lebensmittelsicherheit werden von den Führungskräften konstruktiv und respektvoll angesprochen.

1. Wie wird vorgegangen, wenn ein Problem im Bereich Hygiene oder Lebensmittelsicherheit festgestellt wird? Gibt es einen klaren Prozess, um solche Probleme anzusprechen?
2. Wie stellen Sie sicher, dass Kritik oder Rückmeldungen zu Problemen im Bereich Hygiene und Lebensmittelsicherheit von den Mitarbeitenden als respektvoll wahrgenommen werden?
3. Welche Strategien nutzen Sie, um bei sensiblen Themen wie Hygiene und Lebensmittelsicherheit eine konstruktive Kommunikation zu gewährleisten?
4. Wie holen Sie Rückmeldungen von Mitarbeitenden ein, um zu prüfen, ob die Ansprache von Problemen als respektvoll und konstruktiv wahrgenommen wird?
5. Wie wird eine offene Feedback-Kultur gefördert, in der Probleme direkt angesprochen und lösungsorientiert behandelt werden können?

E4 Engagement: Die Führungskräfte sind ein gutes Vorbild in Bezug auf Hygiene und Lebensmittelsicherheit.

1. Wie stellen Sie sicher, dass Sie die vorgegebenen Standards für Hygiene und Lebensmittelsicherheit jederzeit einhalten?
2. Welche konkreten Maßnahmen ergreifen Sie, um den Mitarbeitenden durch Ihr eigenes Verhalten ein Vorbild in Bezug auf Hygiene und Sicherheit zu sein?
3. Wie oft überprüfen Sie Ihre eigene Arbeitsweise und Routinen im Bereich Hygiene und Lebensmittelsicherheit, um sicherzustellen, dass die Standards erfüllt werden?
4. Wie reagieren Sie, wenn Mitarbeitende auf Unstimmigkeiten in Ihrem eigenen Verhalten im Bereich Hygiene und Lebensmittelsicherheit hinweisen?
5. Welche Schulungen oder Weiterbildungen nutzen Sie, um Ihr Wissen und Verhalten in Bezug auf Hygiene und Lebensmittelsicherheit kontinuierlich zu verbessern?

L3 Führung: Die Führungskräfte können ihre Mitarbeiter motivieren, auf hygienische und lebensmittelsichere Weise zu arbeiten.

1. Welche Strategien nutzen Sie, um Mitarbeitende aktiv zu motivieren, hygienisch und lebensmittelsicher zu arbeiten?
2. Wie häufig wird die Bedeutung von Hygiene und Lebensmittelsicherheit mit Kolleg:innen oder Mitarbeitenden besprochen, um das Bewusstsein und die Motivation zu stärken?
3. Wie werden gute Leistungen von Mitarbeitenden im Bereich Hygiene und Lebensmittelsicherheit anerkannt, um deren Motivation zu fördern?
4. Wie werden Mitarbeitende in Entscheidungen oder Maßnahmen zur Verbesserung der Hygiene und Lebensmittelsicherheit einbezogen, um ihr Engagement zu fördern?

5. Welche Hindernisse treten bei der Motivation von Mitarbeitenden für hygienisches und lebensmittelsicheres Arbeiten auf, und wie wird damit umgegangen?

C1 Kommunikation: Die Führungskräfte kommunizieren regelmäßig mit den Mitarbeitern über Hygiene und Lebensmittelsicherheit.

1. Wie wird die Kommunikation mit den Mitarbeitenden geplant, um regelmäßig über Themen wie Hygiene und Lebensmittelsicherheit zu sprechen?
2. Welche Kanäle und Formate werden genutzt, um sicherzustellen, dass alle Mitarbeitenden die Informationen zu Hygiene und Lebensmittelsicherheit erhalten?
3. Wie stellen Sie sicher, dass Botschaften zu Hygiene und Lebensmittelsicherheit verständlich und klar für alle Mitarbeitenden sind?
4. Wie holen Sie Feedback von Mitarbeitenden ein, um sicherzustellen, dass die Kommunikation zu Hygiene und Lebensmittelsicherheit effektiv ist?
5. Welche Hindernisse bestehen bei der regelmäßigen Kommunikation zu Hygiene- und Lebensmittelsicherheitsstandards, und wie wird damit umgegangen?
6. Wie wird überprüft, ob die Mitarbeitenden die kommunizierten Informationen verstanden und in die Praxis umgesetzt haben?

E5 Engagement: Die Führungskräfte handeln schnell, um Probleme zu korrigieren, die die Hygiene und Lebensmittelsicherheit beeinträchtigen.

1. Welche Schritte werden unternommen, um unmittelbar Maßnahmen einzuleiten, sobald ein Problem identifiziert wird?
2. Wie kommunizieren Sie Entscheidungen und Handlungen zur Problemlösung an das Team, um Transparenz zu gewährleisten?
3. Welche Herausforderungen treten bei der schnellen Umsetzung von Maßnahmen zur Korrektur von Hygiene- oder Lebensmittelsicherheitsproblemen auf?
4. Wie wird überprüft, ob die ergriffenen Maßnahmen zur Problemlösung erfolgreich waren und langfristig wirken?
5. Wie arbeiten Sie mit anderen Abteilungen zusammen, um Probleme schnell und effektiv zu lösen?
6. Welche Ressourcen oder Prozesse fehlen, um noch schneller und effizienter auf Probleme im Bereich Hygiene und Lebensmittelsicherheit reagieren zu können?