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VILNIUS UNIVERSITY

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The Impact of Culturally Contextual Non-Financial Determinants on Food Waste: A Multi-Method Investigation of Consumer and Restaurant Industry Drivers

DOCTORAL DISSERTATION

Social Sciences,
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INTRODUCTION

Relevance and novelty of the topic

The quest for responsible food consumption is arguably the most pressing challenge of the 21st century, standing at the junction of environmental preservation, food safety, and social equity (Hoek et al., 2020). As much as economic features of the transition, usually encapsulated in debate over the "green premium," have been vastly prominent, mounting evidence supports that expense to the customer is merely one facet of a problem infinitely more intricate. Cultural values embedded in non-monetary hindrances, cognitive biases, social customs, and infrastructural shortcomings are increasingly being understood as the root hindrances to the mass adoption of responsible food consumption habits. Of these, reducing food waste is a priority objective and a gargantuan inefficiency of the global food system, where an estimated one-third of all food generated for human use is not consumed or goes uneaten and wasted, and with potentially major ethical and environmental consequences (Sarker et al., 2024).

Academic work on food waste has traditionally been defined by techno-managerial and economic accounts, and theoretical frameworks that assume a high degree of consumer rationality (Hadfield et al., 2025; Roy et al., 2023). However, the pervasive characteristics of the problem suggest that these attempts are insufficient. This has consequently meant looking at the behavioral and socio-cultural drivers of waste. The Theory of Planned Behavior (TPB), for instance, has been widely applied to explain pro-environmental behavior in terms of attitudes, subjective norms, and perceived control over the behavior (Correia et al., 2021). As helpful as these models are, they risk overgeneralization and fail to consider the profound but generally unconscious influence of cultural context and the situation-specific working realities of differing segments of the food chain. Therefore, researchers are arguing ever more forcefully that food waste behavior cannot be accounted for simply by rational cost-benefit analysis but is rooted in a deep history of customs, social norms, practice traditions, and situational constraints.

The conceptual framework underpinning this research extends the TPB by embedding it within a cultural contextual ecosystem. This model (Figure 1) shows how cultural dimensions work along dual pathways: directly influencing behavioral intention and food waste behavior, while simultaneously moderating the relationships between traditional TPB constructs. This theoretical extension positions culture as both an independent driver and a contextual lens that systematically shapes how psychological factors translate into responsible food consumption behaviors, providing the foundation for investigating non-financial hindrances to food waste reduction.
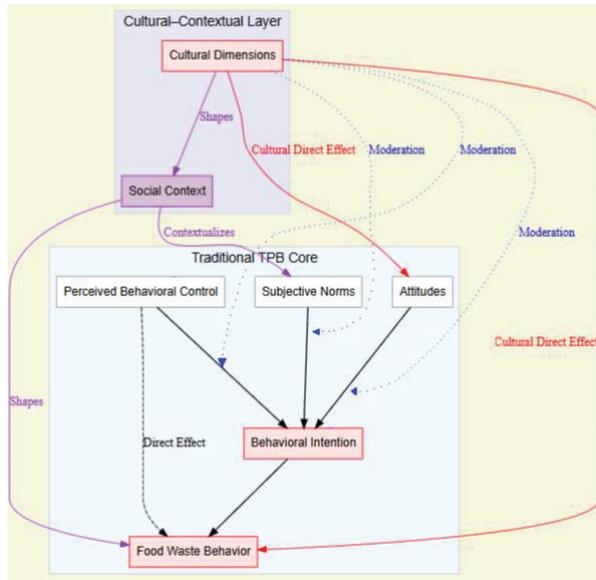
Figure 1. Extended TPB Integrating Cultural Dimensions for Food Waste Behavior Prediction

Among these non-monetary determinants, culture is particularly influential but notoriously difficult to quantify. It operates as an invisible hand that shapes every part of our food relationship, ranging from production and procurement to preparation and consumption, and finally, disposal (Enriquez & Godinez, 2021). One significant gap in current literature has been a lack of creating a synthesized understanding of this relationship and reliance on assumptions that the strategy might be generalizable. Similarly, while the food services industry is among the biggest contributors to global food waste, the specific non-economic drivers within this industry—that are precisely not merely financial inefficiency—have remained unaddressed and inadequately charted, relegated beneath a cost-saving rhetoric rather than cultural or social-psychological ones.

This dissertation fills such critical lacunae through an integrated and multi-faceted research agenda. Its core argument is that non-cash hindrances, specifically those based in culture and context-bound operational practices, are under-researched primary drivers of food waste, and that reducing waste effectively necessitates a sophisticated, multi-level comprehension of the hindrances. The aim of this dissertation is therefore to systematically identify, investigate, and explain the contribution of these non-cash hindrances—with specific reference to determinants of a cultural nature and industry-specific operational drivers—in order to provide an evidence-based basis for the development of targeted and effective intervention.

To this end, the dissertation is structured around four main studies with varying methodologies to address the problem from complementary angles. The aims and resulting publications are:

1. To map the intellectual landscape and main trends of research at the intersection of large-scale sustainability paradigms and food loss, and hence create the macro-level context for the study of waste reduction. This objective is met by the bibliometric study, "Mapping the landscape of Climate-Smart agriculture and food loss: A bibliometric and bibliographic analysis."

2. In order to integrate global evidence to develop a baseline understanding of the very specific processes through which social expectations, traditions, and cultural norms influence food waste behavior. Such an objective is fulfilled by the systematic review, "Systematic literature review on the nexus of food waste, food loss and cultural background."

3. To empirically examine, ascertain, and rank the specific non-financial causes of food wastage in the food service industry, moving from abductive cultural generalities to actionable, context-specific knowledge. This objective is achieved by the industry-focused study, "What really drives food waste in the restaurant industry? Evidence from Lithuania."

4. To present an empirical cross-country comparative analysis that quantitatively tests and validates the impact of some cultural dimensions on consumer attitudes and behaviors regarding food waste. This purpose is served by the empirical paper, "What/who is to blame for the food waste: a cross-country investigation of the role of cultural background on food waste behavior."

The selection of the four publications constituting this dissertation was guided by the paramount principle of thematic cohesion and narrative integrity. Taken together, the selected papers constitute a logical, sequential, and cumulative research chain leading directly and exclusively to the dissertation's central thesis on the influence of non-financial and cultural hindrances on food waste. The sequence moves from macro-level mapping via theoretical synthesis to context-specific empirical investigation, finally reaching cross-cultural validation. This order is deliberately chosen to construct a multi-level argument.

While these studies were in the process of being published, we were working on three other publications from our research portfolio that do not form part of this dissertation narrative in order to preserve a focused thesis. The game theory paper in the Games journal, while exploring consumer choice,

develops theoretical models that are tangential to the core behavioral and operational hindrances considered here. The study that appeared in Energies Journal considers the relationship between environmental awareness and energy use in agriculture, another complementary pathway to sustainability but one which does not contribute directly to understanding the socio-cultural and operational drivers of food waste. Lastly, the paper featured in Business, Management and Economics Engineering addresses elements of the same thematic scope, but it was judged to represent findings that would create redundancy without adding a new dimension to the sequential argument presented by the four chosen studies. It was for this reason, the preservation of a clear, consistent, and impactful dissertation narrative, that these works have been excluded.

In addition, the keywords were chosen strategically to reflect the core theoretical, methodological, and contextual dimensions of the research. "Responsible food consumption" denotes the overall conceptual framework of the study. The ultimate goal of this dissertation is to understand hindrances to environmentally and socially responsible food consumption patterns. "Food waste," on the other hand, represents the particular behavioral outcome under investigation, positioning this research within the sustainability challenge that affects economic, environmental, and social systems on a global scale.

Adding "non-financial hindrances" intentionally diverts attention from the well-studied economic determinants toward the less explored cultural and emotional, as well as operational hindrances, which this dissertation claims are equally consequential. Specifically, "cultural hindrances" draws attention to the new contribution the study makes by examining how these deeply ingrained values, traditions, and social norms drive consumption behavior systematically at levels independent of price signals.

Methodologically, "Theory of Planned Behavior" grounds the research in established behavioral theory while showing how this study extends traditional models via cultural dimensions. The operational context is provided by "restaurant industry" and "cross-cultural comparison," which both refer to the empirical settings that provide the unique laboratory for the analysis of such complex interactions.

The additional keywords applied are "behavioral drivers," "operational inefficiencies," and "socio-emotional factors" in order to comprehensively capture the hindrances identified at multiple levels through the sequential use of mixed-methods approaches. These conscious choices regarding the portfolio of keywords enable appropriate academic indexing and correctly reflect the theoretical innovations and practical contributions that this study makes to the literature on responsible food consumption. Keywords are shown in Table 1.

Table 1: Keyword Taxonomy with Definitions and Rationale Conceptual Foundation Keywords

Keyword	Definition	Research Role
Responsible Food Consumption	Conscious food choices and practices that minimize waste and environmental impact while emphasizing cultural and behavioral aspects	Overarching research paradigm and ultimate application
Food Waste	Avoidable loss of edible food throughout the consumption stages	Core problem domain and dependent variable
Non-financial hindrances	Cultural, social, emotional, and operational obstacles to responsible behaviors	Primary independent variables and theoretical contribution

Theoretical Framework Keywords

Keyword	Definition	Research Role
Cultural Determinants	Shared values and practices influencing group behaviors	Key explanatory mechanism extending traditional models
Theory of Planned Behavior	Attitude-norm-control framework for behavior prediction	Foundational theory being culturally extended
Behavioral Drivers	Multi-level factors motivating human actions	Integrative concept bridging psychology and sociology

Methodological Keywords

Keyword	Definition	Research Role
Cross-Cultural Analysis	Comparative study of cultural variations	Validation approach for generalizable findings
Bibliometric Analysis	Quantitative mapping of research landscapes	Methodology for gap identification
Systematic Review	Protocol-based evidence synthesis	Methodology for theory building
Fuzzy AHP	Uncertainty-handling prioritization method	Methodology for driver ranking
PLS-SEM	Variance-based structural equation modeling	Methodology for hypothesis testing

Contextual Keywords

Keyword	Definition	Research Role
Restaurant Industry	Food service sector as an empirical laboratory	Research context providing operational transparency
Climate-Smart Agriculture	Climate-resilient agricultural approaches	Broader systems context and production-side considerations

Structure of the Dissertation

The dissertation is presented as an integrated, sequential research effort that moves from acquaintance with the macro-level research setting to the provision of verified, micro-level conclusions regarding the non-financial hindrances to responsible food consumption. The four published papers that form its content are not standalone research efforts but the logical and cumulative research experience, each leveraging the findings of the last to develop an argument that is synthesized in all respects.

It begins by mapping the research landscape. The inaugural study, "Mapping the landscape of Climate-Smart agriculture and food loss: A bibliometric and bibliographic analysis," is the foundation chapter. It establishes the macro-context by scientifically mapping the intellectual terrain at the intersection of climate change adaptation and food loss. This research reiterated that food loss is a key element in broader sustainability programs, yet also discovered that the drivers at the consumption level, which are socio-cultural, were not the central priority of this field.

This identified gap necessitated a deeper study of the specific role that culture plays. Therefore, the second study, "Systematic literature review on the nexus of food waste, food loss and cultural background," was carried out. This research consolidated data from all over the globe to solidify that cultural attitudes, social norms, and traditions are the root, but under-explored, determinants of food wastage conduct. It identified powerful constructs like guilt, social norms, and attitudes towards leftovers, thus shaping culture as a significant non-monetary setback to be explored.

Based on this theoretical platform, the research then required a shift from global theory to local practice. To accomplish this, the third study, "What really drives food waste in the restaurant industry? Evidence from Lithuania," zooms in for a micro-examination of the food service industry. This decision to focus the empirical research on the mid-range casual dining restaurant sector is both conscious and strategic. While it is true that a considerable amount of food is consumed at home, the restaurant industry provides a

uniquely transparent microcosm for observing the interplay of non-financial hindrances. Under this context, both operational inefficiencies (kitchen-generated waste) and socio-emotional consumer drivers (customer-generated waste) are immediately visible and directly measurable. Moreover, this setting allows for the clear observation of how cultural scripts and social norms, such as feelings of shame associated with doggy bags or the performative aspects of hospitality, translate into tangible waste outcomes. From a pragmatic research point of view, the mid-range casual dining segment in Lithuania represents an accessible, highly relevant laboratory in which to do so. Such establishments are common in key tourist destinations, thus enabling a comparison between local and international consumer bases, while their operational scale is optimal for identifying and prioritizing context-specific drivers of waste. This focus does not belittle the issue of food waste in the household but offers a controlled, observable environment where the complex behavioral and operational mechanisms that this dissertation aims to understand can be adequately examined. This empirical research moved beyond broad cultural assumptions to find and prioritize the precise, context-defined drivers of waste and discover that the most important interplay between kitchen operational inefficiencies and socio-emotional factors among consumers was the most important.

The findings based on the restaurant case study, while interesting, raised a critical question: are the drivers, and more so the cultural drivers, generalizable? To ascertain this and verify the theory at scale, the fourth study, "What/who is to blame for the food waste: a cross-country investigation of the role of cultural background on food waste behaviour," provides the conclusion of its evidence. This cross-national, large-scale study tests and confirms empirically the manner in which specific cultural dimensions (e.g., consumerism as opposed to collectivism) clearly and directly shape consumer-level waste behaviors and shows that the impact of culture is universal in its applicability but specific in its expression.

As such, the dissertation scales down its scope from a general systemic level all the way to a pinpoint empirically established knowledge base, integrating them into a harmonious narrative which irrefutably establishes the ruinous impact of non-financial hindrances on food product responsible consumption.

Definition of Core Concepts. Throughout the dissertation, a defined set of key terms is used for conceptual clarity and consistency. The overall investigated phenomenon concerns 'non-financial hindrances' to 'responsible food consumption.' In this context, 'non-financial hindrances' are defined as the cultural, social, emotional, and operational obstacles, beyond direct

economic cost, that prevent the adoption of environmentally and socially responsible patterns of food consumption. The objective of overcoming those hindrances is the promotion of 'responsible food consumption.' The dissertation will operationalize it through the reduction of its antithesis, which is 'food waste,' or the avoidable loss of edible food that is meant for human consumption.

While related, broader terms such as 'sustainable consumption' are used only sparingly when referring to the wider paradigm. The research has intentionally focused on 'non-financial hindrances', rather than the more general 'determinants' or 'drivers', in order to highlight their nature as impediments to change. This provides the precise words for cutting through the complex interplay between 'cultural determinants' such as shared values and traditions, 'operational drivers' such as context-specific inefficiencies, which are very relevant in the restaurant industry, and 'socio-emotional factors' such as guilt, shame, and social norms that together shape food waste behavior.

Methodological and Hypothetical Connection. This dissertation applies a sequential mixed-methods research approach to conduct a rigorous and comprehensive research study, as shown in Figure 2.
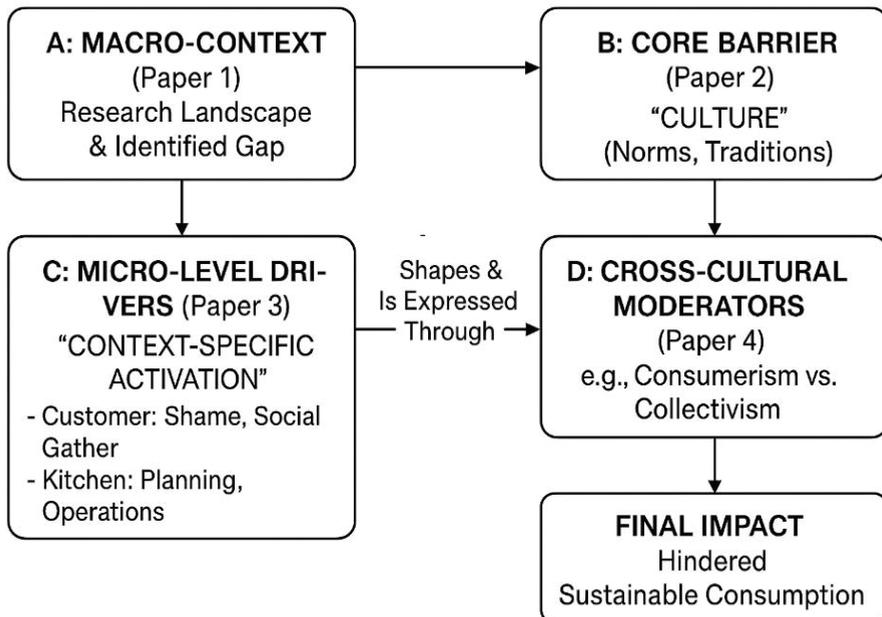

Figure 2. The Integrated Multilevel Framework of Non-Financial Hindrances to Responsible Food Consumption

The research process commenced with research cartography, where

bibliometric analysis mapped the overall intellectual landscape of Climate-Smart Agriculture and food loss. The macro-level scoping study was a foundational study important in confirming the existence and relevance of research clusters and significantly identifying a critical gap around consumption-stage, culturally-driven hindrances. This paper, thus, fully addresses the working objective of placing the research context. It establishes the macro-environmental setting for the dissertation, confirming that food loss is indeed a pivotal topic in sustainability thinking and recognizing a relative under-emphasis towards consumption-stage, culture-driven hindrances, thus deserving the attention of the subsequent studies. This paper was published in the Sustainability Journal.

This gap, therefore, deserved an exploratory, more detailed stage. The systematic literature review was conducted to inductively identify and conceptualize the exact non-financial hurdles, like cultural norms, social emotions, and operational inefficiencies, which the initial map identified as being under-researched. The paper fully addresses the objective of consolidating knowledge to hypothesize culture as a non-monetary barrier. It sets the necessary theory of the "why"—the most crucial cultural constructs limiting responsible food consumption—that the subsequent empirical sections aim to test in specific contexts. This paper was published in the International Marketing Review.

Building on this foundation, the qualitative fuzzy AHP research was conducted next, to order these non-financial hurdles by their relative importance, hence providing a prioritized understanding of the hindrances that would inform subsequent empirical investigations. This section addresses the intention of empirically examining context-specific drivers. It brings the dissertation down from abstract cultural principles to the "how" by identifying and prioritizing the tangible operational and socio-emotional hindrances in an actual industry setting, thus offering actionable, micro-level recommendations.

The results and measures of these exploratory analyses directly informed the subsequent confirmatory phase. More specifically, the cross-national large-scale survey measured these constructs identified and examined the expected relationships quantitatively via Partial Least Squares Structural Equation Modeling (PLS-SEM). This paper fulfills the objective of conducting a systematic cross-cultural comparative study. It is the capstone validation of the dissertation's overall thesis, providing quantitative, generalizable support that cultural dimensions are reliable predictors of waste behavior, thereby answering the "so what?" and confirming the impact of non-financial hindrances worldwide. This paper was published in the Journal of Strategy and Management.

Consequently, the methodological trajectory is apparent: from field mapping to the exploration and definition of the key concepts, and finally, verification and generalization of the findings. This creates a rigorous methodological chain where each study logically and empirically primes the next, thereby maximizing the validity, solidity, and resonance of the conclusions of the dissertation.

Overall Contribution. The overall contribution of this dissertation is threefold, comprising theoretical, methodological, and practical advancements.

To begin, it has a strong theoretical impact by deductively establishing and stringently demonstrating culture and operational context as salient but poorly researched non-financial hindrances to responsible food consumption. It challenges the prevalence of economic modeling and rational choice theory in the field, effectively synthesizing cultural theory and nuanced behavioral understanding with established frameworks like the Theory of Planned Behavior.

Second, it makes a significant methodological contribution in demonstrating the power of a multi-method research design. The dissertation is based on a rich array of analysis tools—from bibliometrics, systematic review, fuzzy AHP, and cross-cultural PLS-SEM—each of which was chosen to engage as best it can with a specific level of the research question. It presents a comprehensive, multi-level analysis that moves from the macro-intellectual environment to micro-industry drivers and macro-sociological validation.

Finally, the dissertation has a compelling applied contribution. The findings provide clear, evidence-based recommendations to policymakers to develop culturally-sensitive and context-sensitive campaigns of awareness; to restaurant managers and industry associations to implement operational interventions targeted at the individual, ranked drivers of waste; and to NGOs and international agencies to develop targeted interventions that have the capacity to significantly reduce food waste across different cultural regions and regions of the world. By bridging the cost to address the deeply rooted non-financial reasons behind the problem, this study sets the stage for more effective and responsible food consumption patterns worldwide.

1. MAPPING THE LANDSCAPE OF CLIMATE-SMART AGRICULTURE AND FOOD LOSS: A BIBLIOMETRIC AND BIBLIOGRAPHIC ANALYSIS

Research Question of the Paper. What is the intellectual structure and thematic progression of study at the intersection of climate-related issues and food loss?

Main Theoretical Findings. To address the pressing challenge of feeding a growing global population while minimizing environmental impact, the concept of sustainable intensification has emerged as a pivotal strategy (Petersen & Snapp, 2018). However, the definition of sustainable intensification remains ambiguous, as perceptions among agricultural experts vary widely. Despite initiatives by organizations such as the United States Agency for International Development and the United Nations advocating for sustainable intensification, a lack of consensus persists regarding its precise meaning (Findlater et al., 2019). Sustainability in the context of this paper refers to the integration of environmental, social, and economic considerations within agricultural practices to ensure that food production systems meet the needs of the present without compromising the ability of future generations to meet their own needs (Patel et al., 2020; Singh & Singh, 2017). It emphasizes the use of regenerative agriculture as a pathway to enhance ecosystem health, increase the resilience of food systems to climate change, and maintain the overall integrity of the environment (Giller, Hijbeek, et al., 2021; LaCanne & Lundgren, 2018). Moving beyond conceptual debates, organic agriculture has been touted as a sustainable alternative to conventional farming practices (Morkūnas & Labukas, 2020; Meemken & Qaim, 2022). Integrating water resource management with agricultural policies can enhance efficiency and mitigate environmental impacts (Singh et al., 2021). In the end, transitioning from traditional agricultural practices to responsible approaches requires understanding the underlying drivers of adoption and diffusion of innovations.

Methodology. The data for this study were gathered from the Web of Science (WoS), recognized as the foremost citation database worldwide, encompassing over 10,000 influential journals across the sciences and social sciences. Renowned for its reliability in bibliometric research, WoS was utilized to collect data spanning from 2014 to 2024-03-12. This period is notable for significant advancements and shifts in agricultural research and practice, including increased attention to sustainability, climate resilience, and food security, driven by escalating concerns over environmental degradation, climate change impacts, and global food insecurity. Additionally, the emergence of new technologies during this timeframe played a pivotal role in

shaping agricultural landscapes and addressing these pressing challenges. (Konfo et al., 2023).

In line with established practices in literature studies utilizing the WoS search engine, the selection of target articles typically involves the title, keywords, and abstract. Following this approach, the advanced search feature of WoS was initially employed to collect data based on the specified keyword string: ("sustainable agriculture" OR "sustainable farming" OR "agroecology" OR "regenerative agriculture") AND ("climate change" OR "climate resilience" OR "climate adaptation" OR "climate variability") AND ("food security" OR "environmental sustainability" OR "agricultural sustainability" OR "ecosystem services"). The search yielded a total of 977 articles.

Inclusion criteria were established to encompass (a) research published in peer-reviewed English journals exclusively, (b) no temporal restrictions between 2014 and 2024, (c) studies focusing on regenerative agriculture, climate-smart agriculture, sustainable farming, or agroecology, and (d) research within the domains of management, economics, environment, nutrition, agriculture, and sustainability. Exclusion criteria comprised (a) incomplete articles, duplicate research, meeting archives, guidelines, review articles, book chapters, and dialogue/discussion records, and (b) grey literature.

Following the exclusion of review articles, early access publications, book chapters, and conference proceedings, as well as the manual removal of literature that did not emphasize the relationship between agriculture and climate resilience, 685 relevant articles remained.
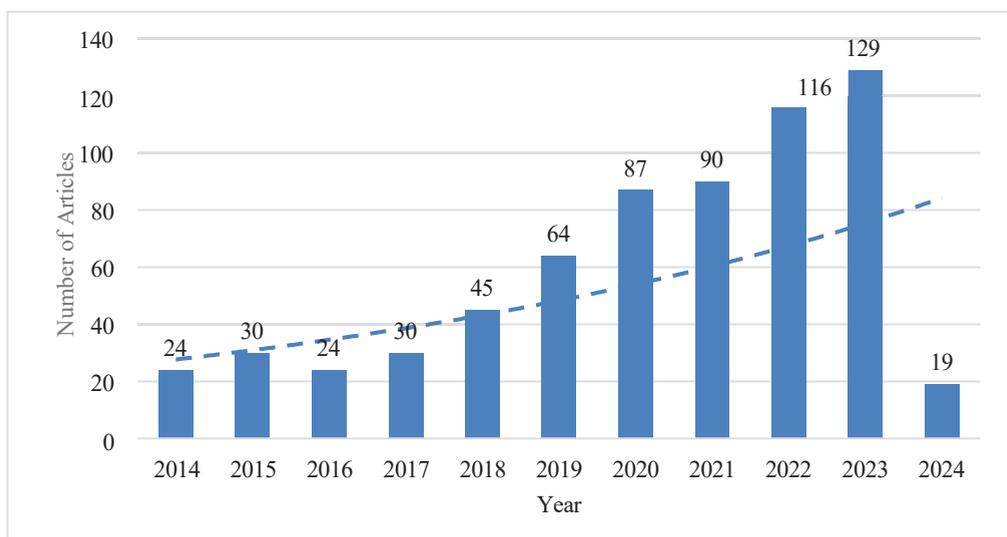

Figure 3. Research Trend in the Sustainable Agriculture Domain

Time Span: Fig. 3 reveals a varied distribution of articles from 2014 to 2024, with notable fluctuations observed in certain years. In 2019, there was a noticeable increase in the number of publications from 64 to 87, signifying a surge in research activity within this area of study. This uptick may be attributed to several factors, including heightened awareness of climate change issues, increased funding for research initiatives, and growing interest in sustainable agricultural practices (Bergquist et al., 2019). Similarly, in 2022, the number of articles experienced a notable rise from 90 to 116, indicating another period of heightened research activity. This increase could be influenced by evolving global climate trends, policy shifts emphasizing sustainability, and advancements in agricultural technologies aimed at enhancing climate resilience. Overall, these fluctuations underscore the dynamic nature of research in the field of sustainable agriculture and climate resilience, reflecting evolving priorities, emerging challenges, and shifting scholarly interests over time.
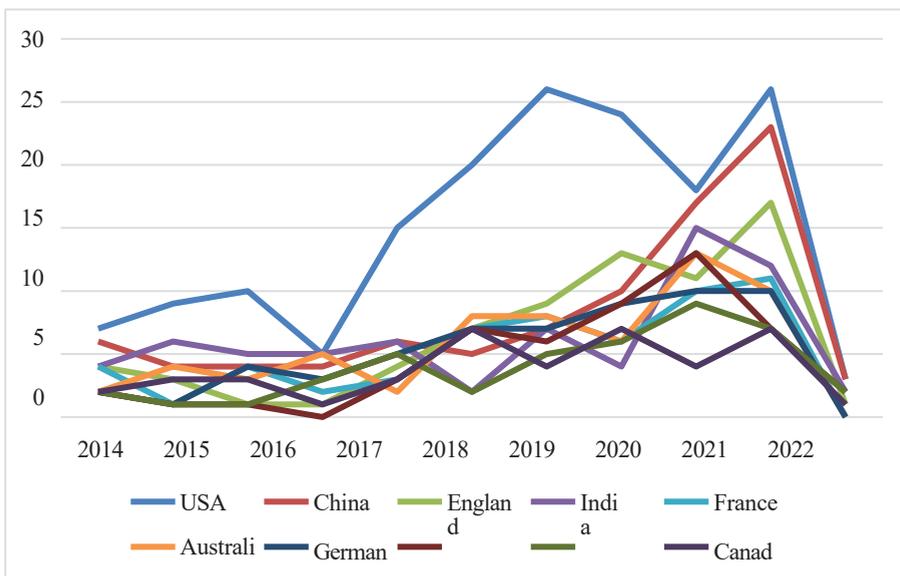

Figure 4. Geographical Distribution and Research Productivity Analysis

Figure 4 illustrates the publication timeline of literature across various countries.

In cases where literature was authored by individuals from multiple countries, the continent was determined based on the nationality of the maximum number of authors. By establishing the following criteria for

inclusion, we could ensure a comprehensive representation of international research efforts: when authors from multiple countries are involved in a publication, we attribute the credit to the country that represents the majority of authors. Nevertheless, in the case where no single nation could reach a majority, in which all authors are equally distributed across different nationalities, we then include all such publications. By doing so, we could determine the multinational nature of the research and reflect the international efforts to address challenges in the topic of sustainable agriculture and climate resilience.
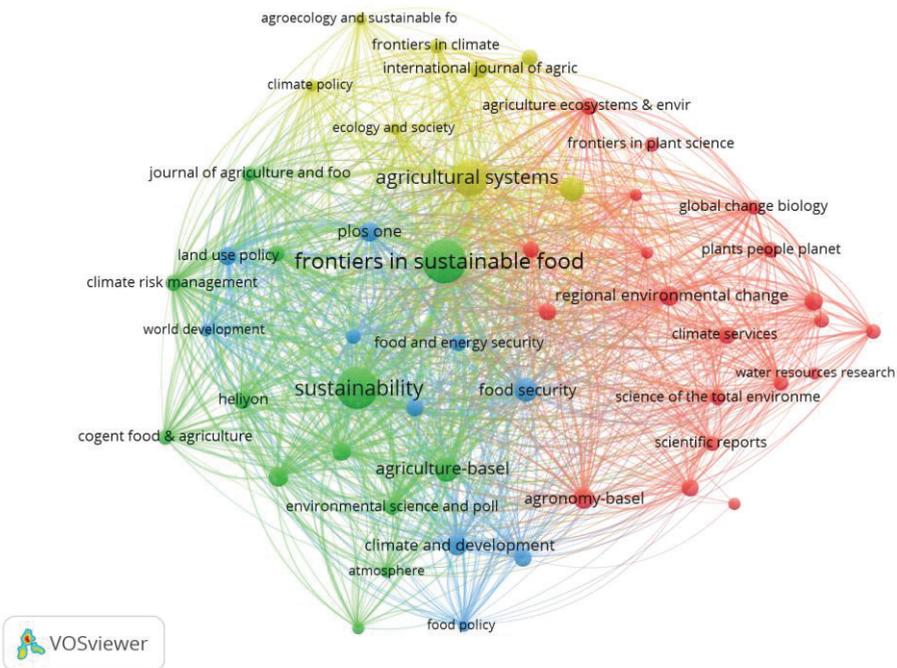
Figure 5. Co-citation analysis in the domain of CSA and Food Loss

In the framework of co-citation analysis, four clusters with specific thematic foci were distinguished within the CSA and food loss journals, along with their interconnections. The most outstanding was the green cluster, whose center is Frontiers in Sustainable Food Systems, with a high total link strength of 6323 and 56 documents. The cluster indicates a strong emphasis on sustainability in CSA scholarly discourse. The red cluster, on the contrary, represents Agronomy-Basel to focus attention on specialized research efforts within the domain. Thus, even though its total link strength of 1640 was relatively low, reflecting a specific thematic scope, this cluster depicts an in-depth analysis of certain areas in agriculture. In spite of the small number of

18 documents, this cluster is rich in scholarly discourses, including valuable insights and contributions into the CSA domain. This high concentration of research expertise points out the commitment of Agronomy-Basel to the advancement of knowledge and innovation in agriculture; it allows the journal to play a vital role in the scholarly landscape. Conversely, the yellow cluster, centered around Agricultural Systems, has shown robust inter-linkages; the total link strength of 5599 points out the cohesive network of the journals contributing to the wider discussions of agricultural systems and practices. Last but not least, the blue cluster, similarly centered around Food Security, expressed an important linkage of food security and CSA with a total link strength of 2405, and with 16 documents. The cluster as such underlines the pressing need for addressing food insecurity through sustainable agricultural interventions. Since CSA research cuts across various disciplines, research on this subject is done in a multi-disciplinary manner. By focusing on keywords related to the aspects of food security and policy, the blue cluster depicts the multidimensionality of the challenge and multiple approaches toward effective intervention. Interdisciplinary research within the CSA and food loss domain published in these journals in the blue cluster; the cluster depicts the critical linkage of sustainable agricultural practices for current and future food security.

Discussion and conclusions. The co-citation clusters reveal that the dominant intellectual structure of this field of Climate-Smart Agriculture and food loss is anchored in production-oriented paradigms. Indeed, the scholarly discourse is richly populated by themes directed at overcoming biophysical and technical challenges: critical production-side issues such as soil degradation and carbon sequestration (Lal 2015), developing climate change resilience through adaptive crop varieties and farming practices (Reynolds et al. 2015), overcoming various hindrances to technological adoption (Qaim 2020), and crafting effective policy interventions along with interdisciplinary collaborations in support of sustainable intensification (Petersen & Snapp 2018; Wainaina et al. 2016). This collective focus amply maps technological innovations and supply-chain efficiencies aimed at reducing food loss from farm to gate.

This study reveals the profound interplay between regenerative agriculture and the global food resilience system under climate change. After a comprehensive analysis of the literature from 2014 to 2024, this study sheds light on agricultural practices and their role in addressing environmental degradation, climate change impacts, and global food insecurity.

Soil health management, carbon sequestration, and these kinds of regenerative agricultural practices are essential to climate resilience and

sustainable food production.

It emphasizes that the transformation to regenerative agriculture is necessary; policies, practices, and research need to be aligned to make agriculture environmentally sustainable and climate-resilient.

The above findings call for efforts towards the adoption of regenerative agricultural practices and the development of policies that create enabling conditions through sustainable land management and climate-smart technologies. This study also calls for interdisciplinary collaboration that shall bridge the gap between natural and social sciences. The intellectual structure itself reveals that work at this intersection is dominated by production-focused technological solutions, while the consumption-stage cultural drivers have had significantly less representation. This thematic progression suggests a gap in how, although much climate-smart agriculture literature has focused on improving production efficiency and supply chain losses, it ignores the cultural and behavioral drivers at consumption levels that lead to food waste, thus identifying the critical research gap this dissertation addresses.

This is the landscape that intellectual cartography has achieved in this initial exploration of discourses on sustainable food systems, which overwhelmingly remains anchored in production-oriented paradigms. The scholarly terrain amply maps technological innovations and efficiencies in supply chains while clearly overlooking the human dimensions of consumption. This exercise in mapping thus reveals a critical terra incognita, the cultural and behavioral topography of food waste at the consumption interface, that identifies both the necessity and direction for the subsequent investigative journey into the non-financial hindrances to responsible food consumption patterns.

2. SYSTEMATIC LITERATURE REVIEW ON THE NEXUS OF FOOD WASTE, FOOD LOSS AND CULTURAL BACKGROUND

Research Question of the Paper. How do different cultural backgrounds influence food waste behavior, as reflected through norms, traditions, and social expectations globally?

The aim and scope of the research. The present paper aims to reveal how different cultures, as reflected by cultural norms, traditions, and social expectations, influence food waste behaviour in different regions of the world. A systematic multifaceted literature review was employed as a main research tool. The focal role of education and awareness campaigns in reducing household food waste and promoting responsible food consumption behaviours is revealed. The importance of guilt, behavioural control, negative attitudes towards leftovers, and social norms are among the most important factors predicting intentions to reduce food waste. Cultural beliefs significantly shape food attitudes and waste. Tailoring responsible practices to traditions helps to ensure food security. Embracing cultural diversity can lead to the development of effective and responsible food consumption patterns across different parts of the world.

Restaurants were selected because they represent an ideal microcosm in which both operation and consumer behaviors come into play, thus clearly elucidating those non-financial hindrances to change, such as cultural and emotional elements. This context presents the opportunity to directly observe the whole food-waste ecosystem while offering actionable pathways for intervention and policy application. This work has been published in the Journal of Quality Assurance in Hospitality & Tourism.

Main Theoretical Findings. Over the last few decades, sociological, economic, psychological, and marketing research has increasingly focused on the relationship between man and nature to gain a thorough understanding of pro-environmental behaviour. Steg and Vlek (2009) define pro-environmental behaviour as "behaviour that harms the environment as little as possible or even benefits the environment (p. 309). Numerous theoretical lenses have been developed to explain the adoption of responsible choices by economic agents, among which the best known and most widely used are the Theory of Reasoned Action (Ajzen and Fishbein, 1975) and the Theory of Planned Behaviour (Ajzen, 1991). In particular, the TPB is one of the most widely used models in social science to understand and predict pro-environmental behaviours like recycling, decreasing waste, etc., based on their attitudes and beliefs. The model assumes individuals adopt specific behaviour rationally guided by attitudes, social norms, and perceived behavioural control. In detail:

i) attitude is defined as the "degree to which a person has a favourable or unfavourable evaluation or appraisal of the behaviour in question" (Ajzen, 1991, 188); ii) social norms are defined as "rules and standards that members of a group understand and that guide and/or constrain social behaviour without the force of laws" (Cialdini and Trost 1998, p.152); and iii) perceived behavioural control is understood as the individual's ability to adopt a specific behaviour without any physical or monetary hindrances (Valle et al., 2005). In other words, people who have positive attitudes towards the environment, who are influenced by the society or community to which they belong, and who perceive ease in adopting a certain behaviour are more likely to adopt pro-environmental behaviour. Recently, other theorists have developed new models. Among these, Westaby (2005) develops the Behavioral Reasoning Theory by incorporating into the model proposed by Azjen (1991) two new predictors related to 'for' and 'against' reasons that may influence the adoption of pro-environmental behaviour. And again, Stern (1999) with the value-belief-norm theory of environmentalism emphasises the influence that selfish, altruistic, and biospheric orientations can have on the individual's choice to adopt a responsible choice. Although these theories, in particular TPB and ARF, have been widely used to explain green consumer behaviour, the development of new models and, in particular, the introduction of new predictors such as cultural influence (Chwialkowska et al., 2020) highlight the complexity of analysing human pro-environmental behaviour that is influenced by multiple variables. Cultural differences across Asia, Europe, Africa, and the Americas are characterized by distinct values and traditions. In Asia, Confucian culture, prevalent in countries like China, Japan, and South Korea, places high importance on power distance and collectivism, emphasizing respect for authority and social harmony (Liu, 2018). In Europe, variations range from individualism in Western nations like France to a stronger emphasis on historical traditions in Eastern European countries such as the Czech Republic (Chlup, 2020). The European Union acts as a unifying force, seeking to preserve cultural diversity while fostering cooperation among member states. Africa's rich cultural tapestry is influenced by geography and Hofstede's uncertainty avoidance, as evidenced by North Africa's reflection of Arab and Islamic elements, while Sub-Saharan Africa showcases a multitude of ethnic traditions (Ngonidzashe Mutanga et al., 2023). In the Americas, the United States stands out for its individualism and low uncertainty avoidance, promoting cultural diversity，while countries like Uruguay in South America may exhibit a more homogeneous culture with ties to Latin American traditions (Pineda et al., 2019).

Culture's impact on FW and FL is a global phenomenon evident in studies across the continents. In Asia, Confucian culture shapes attitudes toward FW, requiring tailored policy interventions. In Europe, cultural, social, and emotional factors hinder innovations like doggy bags (Sirieix et al., 2017). In Africa, cultural practices contribute to significant FW, necessitating awareness-raising measures. In the Americas, FW is driven by socio-demographic, cultural, political, and economic factors (Thyberg and Tonjes, 2016). These insights are vital for addressing FW and FL within diverse cultural and societal contexts.

Asia: Confucian culture influences behaviors related to FW; thus, face-saving and group conformity were significant factors in influencing attitudes toward FW reduction. The study suggests recommendations for the government and the catering industry to address these cultural influences. There are various studies aimed at analyzing the effect of policies that prevent FW and FL, for instance, a study reviewed clean plate campaigns worldwide and identified cultural, policy, COVID-19, and behavioral factors that influence FW. Cultural values such as hospitality and face-saving were found to drive FW in China (Wang et al., 2022). Furthermore, research has shown that clean plate campaigns globally and social media marketing campaigns targeting young urban consumers effectively influence FW behaviors. These insights highlight the potential for targeted marketing initiatives to address FW on both local and global scales. Another study was conducted in Turkey to understand the influence of personally and socially determined factors on consumers' intention to reduce household FW. The study identified motivation as a significant driver, influenced by factors such as religiosity, media effects, and good provider identity. These driving forces are typically induced by targeted advertising, persuasive social media campaigns, and educational outreach programs aimed at promoting responsible food consumption practices (Calvo-Porral et al., 2016). Economic consciousness had a strong effect on motivation, while environmental consciousness had a weaker influence on intention.

Europe: A qualitative comparison study of France and the Czech markets revealed that consumers' concerns about FW, culture, social norms, and emotions contribute to attitudes and behaviors related to doggy bags. The study revealed conflicting norms and emotions, with personal norms encouraging not to waste, while social norms encourage leaving leftovers. The promotion of the doggy bag concept and reduction of negative emotions such as shame could be achieved through public campaigns, offering appealing doggy bags in restaurants, and potentially adjusting portion sizes to reduce FW. The study highlights obstacles to the adoption of doggy bags as a social

innovation (Sirieix et al., 2017), which could help to reduce FW. Investigating waste sorting behavior is another method to understand FW and FL. A study in the European Union found that cultural dimensions such as power distance, uncertainty avoidance, and indulgence significantly influenced non-sorting behavior. Efforts to reduce waste positively influenced sorting behavior, while knowledge about waste generation had a negative or insignificant effect (Minelgaitė and Liobikienė, 2019). Looking into the policy processes contributing to sustainable food systems is another focal point for FW and FL. A few studies conducted in Europe assessed the evolution of policy cycles and identified potential synergies and gaps in policy instruments. The authors proposed strategic tools for sustainable food policies, highlighting the obstacles hindering the transition to a policy regime that embodies food and nutrition security, natural capital preservation, and social justice. It can be achieved by implementing measures such as cross-sectoral policy coordination, economic incentives for sustainable food production, and public-private partnerships to address the obstacles and promote a transition to a policy regime focused on sustainable food systems (Zurek et al., 2016). An interview study found that demand forecasting is commonly used by restaurateurs in the UK and the Netherlands to prevent FW, but it is not always effective. When forecasting fails, FW management programs such as repurposing excess food, redistributing surplus food, and consumer choice architecture are often considered commercially unviable. The authors suggest that improving FW management in the food service sector requires making FW mitigation a corporate target for restaurateurs and regularly monitoring progress toward its achievement (Filimonau et al., 2020).

Africa: One study addressing culture and FW in the Near East and North Africa region found that cultural factors such as large family gatherings, religious occasions, and specific preferences for certain types of food can contribute to FW there. These cultural practices can lead to excess food being prepared and potential surpluses, which in turn contribute to FW in this region. Other research explored the influence of cultural practices on FW in South Africa. A study found that cultural practices during social events contribute to significant FW. The need for awareness-raising measures, such as educational programs, community engagement, and targeted messaging, to reduce FW and its environmental impact in South Africa was emphasized (Phasha et al., 2020).

The Americas: In a few studies focusing on developed countries, particularly the U.S., they examined the drivers of FW generation. The impacts of food system modernization were explored and various factors were identified, including socio-demographic, cultural, political, and economic drivers. The research emphasized the significance of

comprehending these drivers to establish effective policies for responsible FW management. The best policies for achieving responsible FW management could include implementing consumer awareness campaigns, incentivizing FW reduction through economic measures such as tax breaks, reward programs, or subsidies, and partnering with food industry stakeholders to develop and promote responsible practices throughout the supply chain (Katare et al., 2017). In the context of Latin America, cultural attitudes and practices can significantly influence FW. For instance, in Uruguay, stakeholders have emphasized strategies to manage surplus or suboptimal foods to reduce waste. These cultural attitudes align with a high degree of urbanization and a focus on the donation of food to the most vulnerable sectors of the population, indicating a cultural inclination towards minimizing waste and supporting those in need. Additionally, organizational culture and food banks in Latin America have been observed to largely influence the characteristics of the donated products (Montoli et al., 2023).

The review concluded that effective interventions need to be culturally tailored, with quite different strategies appropriate for Confucianist societies in Asia, the individualist cultures of the West, and the varied contexts of Africa and the Americas. In Confucianist regions such as Asia, interventions align with dietary preferences and include educational campaigns, workshops, and digital content dissemination. Collaborative efforts with influencers, cultural sensitivity training, and targeted messaging enhance effectiveness, while cultural celebrations involve tailored materials and cooking workshops with traditional recipes. For Europe, considerations involve diversity in meal planning and preservation, implemented through educational campaigns, workshops, and addressing cultural norms. In Africa, addressing cultural variations includes educational campaigns, workshops, and digital content, utilizing targeted messaging and training, especially during cultural celebrations. In the Americas, interventions resonate with diverse preferences, utilizing tailored educational campaigns, workshops, and collaboration with influencers.

Results. Responsible food consumption, as defined for the purpose of this exploration, encompasses conscientious and culturally sensitive practices. These practices extend across various dimensions, including dietary patterns, food knowledge, cultural values, beliefs, and active participation in cultural celebrations and traditions. The interplay of these elements with marketing activities forms a crucial aspect of understanding how cultural backgrounds shape the dynamics of responsible food consumption (Monterrosa et al., 2020).

Understanding the link between culture and responsible food consumption is crucial in addressing FW and FL. This section examines key

components of responsible food consumption within different cultural contexts, drawing insights from research sources. Dietary Pattern: Some research underscores the profound impact of dietary patterns on FW and FL and emphasizes the significant influence of cultural dietary preferences on the types and quantities of food purchased, prepared, and wasted. Different cultures have varying approaches to meal planning, portion sizes, and food preservation methods, all contributing to FW and FL variations. When developing marketing strategies to address FW and FL, it is crucial to consider these cultural dietary preferences and tailor interventions to resonate with diverse cultural approaches to food consumption and wastage (Martin and Danielsson, 2019). Food knowledge: Food knowledge encompassing awareness of food safety, storage techniques, and the understanding of expiration dates, plays a pivotal role in mitigating FW and FL. Cultural variations in food knowledge can lead to differing levels of FW and FL, with some cultures having a deeper understanding of how to extend the shelf life of their food (Wang et al., 2021). Marketing activities such as educational campaigns, interactive workshops, and digital content dissemination can effectively alter and influence food knowledge, contributing to reduced FW and loss in diverse cultural contexts. Cultural Values and Beliefs: Cultural values and beliefs significantly impact individuals' attitudes and behaviors toward food consumption and waste. These cultural norms, such as valuing abundance or frugality, play a crucial role in influencing efforts to reduce FW and FL. Furthermore, cultural taboos and perceptions of FW and FL can either encourage or discourage responsible food consumption practices. Marketing activities such as targeted messaging, cultural sensitivity training for food service providers, and collaboration with cultural influencers can play a vital role in addressing these cultural nuances and promoting responsible food consumption behaviors (Montesdeoca-Calderón et al., 2023). Cultural Celebrations and Traditions: Cultural celebrations and traditions often involve specific food rituals and practices. Phasha and colleagues' work emphasizes how these events can contribute to FW and FL, as elaborate meals and feasts are prepared. Understanding how to balance cultural traditions with FW and FL reduction efforts is crucial for responsible food consumption (Phasha et al., 2020). Marketing actions such as developing culturally tailored meal planning guides, creating educational materials for event organizers, and partnering with cultural community leaders can be particularly effective in promoting responsible practices during cultural celebrations and traditions (Mallinson et al., 2016). Cultural Education and Awareness: Educational campaigns and awareness initiatives tailored to specific cultural backgrounds can significantly impact FW and FL behaviors. Educational campaigns and

awareness initiatives tailored to specific cultural contexts, such as culturally sensitive messaging and targeted education programs, have been shown to significantly impact FW and FL behaviors. (Sirieix et al., 2017). Some marketing actions, such as collaborating with community leaders, using traditional communication channels, and creating culturally relevant educational materials, effectively convey the importance of responsible food practices while respecting diverse cultural perspectives. Cultural Sensitivity in Interventions: Cultural factors play a significant role in shaping FW and FL behaviors. Recognizing and integrating cultural perspectives into interventions can enhance their relevance and impact. Taking into account cultural nuances, preferences, and hindrances can help develop culturally anchored campaigns with tailored messaging, ultimately fostering more responsible food consumption practices (Chammas and Yehya, 2020). For instance, conducting cooking workshops that integrate traditional cultural recipes while emphasizing FW reduction, partnering with local cultural organizations to host awareness events, and utilizing social media platforms to share culturally relevant content and messaging are some of the marketing actions used to effectively promote responsible food practices within specific cultural contexts.

A significant part of the literature has delved into the complexities of reducing FW and FL at the household level. They have focused on the conflict and ambivalence between individuals' intentions to reduce FW and FL and their personal preferences related to food safety, taste, and freshness. These studies emphasize the need to reduce FW and FL at the household level and argue that such reduction should be based on an appreciative and relational understanding of food. They stress the importance of shifting the focus from affluence and individual choice to participatory embeddedness in a more-than-human lifeworld.

Gjerris and Gaiani (2013) advocate reducing FW and FL in Nordic households and promoting a relational understanding of food, emphasizing participatory embeddedness over affluence and individual choice. When examining the psycho-social factors, routines, and socio-demographic characteristics that affect consumers' FW and FL behavior, Stancu et al., (2016) find that perceived behavioral control and routines related to shopping and reuse of leftovers are the primary drivers of FW and FL. Planning routines also contribute indirectly to FW and FL generation. Another study conducted by Stangherlin and Barcello (2016) analyzes drivers and hindrances to reducing FW and FL, categorizing them into societal, personal, and behavioral factors. They emphasize the importance of stimulating behaviors that help reduce waste and loss. Qualitative research in the UK identifies motivations

to minimize waste, including waste concerns and the desire to act responsibly. However, hindrances such as identity, inconvenience, lack of priority, and exemption from responsibility often hinder efforts to reduce waste. These hindrances often stem from a desire to avoid negative emotions associated with FW and FL (Graham-Rowe et al., 2014).

The importance of responsible production and consumption in addressing the global FW and FL issue, particularly in delineating the boundaries between food surplus and waste, is highlighted. Papargyropoulou et al. (2014) proposed frameworks that prioritize FW and FL prevention and management, considering sustainability dimensions and the materiality and temporality of food. Other research emphasizes changing the conversation around FW, destigmatizing food donations, promoting social inclusivity, and re-evaluating surplus food. It sheds light on the impacts of such initiatives, advocating for holistic community food redistribution approaches and

contributing significantly to the literature on FW and poverty, while recognizing cultural influences in developing waste reduction strategies (Edwards, 2020).

In summary, these research papers highlight the conflicts individuals face in reducing FW and FL while considering personal food preferences. They stress the importance of addressing these challenges and finding effective strategies to reduce waste at the household level for environmental sustainability and social well-being.

The selected studies contributed to a better understanding of factors such as guilt, behavioral control, and negative attitudes that have the potential to influence one's intention to reduce FW and FL. They cover a wide range of topics related to waste reduction, hence providing important insights into promoting responsible food consumption and waste reduction strategies.

Principato et al. (2018) have evaluated knowledge of young individuals about FW and FL and factors affecting their behaviors related to waste reduction and shopping planning. From the findings of this study, they have found that as awareness increases, leftovers are reduced, but considerations regarding the freshness of food increase the generation of waste. The study encourages realistic education on waste and educating consumers to recognize the freshness of food. Some of the studies indicate that the behaviors and practices associated with the prevention of FW and FL are complex in industrialized countries, and much research has focused on household wastes. It has been identified that these behaviors are more habit-driven and emotionally driven, and the role of social norms is relatively small. The evidence from the study has been quite useful in successfully designing public engagement campaigns for reducing household waste. Moreover, both

cognitive-oriented and behavioural-oriented nudges reduce FW, and the behaviourally oriented nudges show a greater reduction, especially in public settings (Zhang et al., 2022).

There is also a scientific focus on the drivers and hindrances to FW and FL reduction in the consumption phase, and it identifies pathways to anti-wastage behaviors. Stangherlin and de Barcellos (2018) classify the determinants of FW and FL into the spheres of societal, personal, and behavioral levels. They recommend strategies that involve changing the macro-environment, engaging retailers, increasing awareness, and setting anti-waste social norms, among other initiatives, to facilitate anti-waste behavior. Other works, however, focus on the imperative of adopting multiple approaches to understanding consumer FW and FL better. Scholars have also done work on the volume and composition of FW and FL in the food service sector in Finland. According to them, about 20 % of all food that is handled and prepared in this industry is wasted, with buffet services and overproduction being key drivers of such waste (Silvennoinen et al., 2015). A different set of researchers pursued FW and FL and responsible consumption, with a focus on Lithuania and European countries. They concluded that the majority of the respondents were of the opinion that there is no frequent wasting of food. Besides, Lithuania had slightly lower levels of FW and FL as compared to other European countries. The majority of Lithuanians bought local and organic foods, were less influenced by ads, and had an interest in composting, which explained the very high preference of Lithuanians for sustainability. Such a preference corresponds to the lower levels of FW estimated for the country (Paužuolienė et al.,2022). In fact, such findings provide a good direction for the possible future green policy. In addition, the idea of a circular economy of FW and FL is explored in several other research studies that lean on the concept of "waste as a resource". In fact, the study analyzed the practical challenges and disruptions in waste flows in Sweden, pointing out that circularity was a work in progress. Selling waste as a resource and messaging sustainability efforts also correlate with consumer preferences. Therefore, companies have an opportunity to communicate their initiatives and appeal to environmentally conscious consumers. Two other studies pursue household FW and FL in Italy, with an emphasis on the fact that households are the most prominent contributors to FW and FL. These studies have indeed provided valuable insights into causes and potential drivers of waste, including improper consumer behavior and inadequate policy for waste management (Principato et al., 2018), which could inform future monitoring, policy action, and educational interventions. In light of the findings from these studies, it is necessary to put into perspective any results within the theoretical

framework of predicting individuals' intentions to reduce FW and FL, specifically addressing how feelings of guilt, behavioral control, and negative emotions can be addressed for responsible consumption of food and reduction of food waste.

Various studies have ventured into the field of FW and FL reduction, highlighting effective strategies (Reynolds et al., 2019), cultural influences (Bozzola et al., 2017), and consumer perceptions. These all provide specific insights in a cumulative manner for the development of education and awareness campaigns relevant to reducing FW and FL in a contextually multifaceted approach. Bozzola et al. (2017) present a comprehensive didactic and research experience with the involvement of multi-stakeholders from the cultural, academic, commercial, and social fields. They collaborated on the determination of post-consumption FW and FL in public spaces to design products such as "doggy bags" to make food resources more meaningful and perceived as more valuable. The findings were able to engage students, present a plethora of projects, and result in the creation and commercialization of a selected product. The work not only reduced FW and FL but also increased public awareness of environmental, ethical, social, cultural, and economic issues related to FW and FL. The work by Long et al. (2022), which combined the Norm Activation Model and Chinese cultural values in assessing young Chinese consumers' FW and FL behaviors in a context of dining-out, provides insight across several fronts. Policymakers will find it valuable to learn that Chinese cultural values significantly influence FW and FL practices, a finding that will assist in crafting policies compatible with such cultural values to address the problem of FW and FL in China effectively. For NGOs, the suggestion that the information made public can change cultural values and behavior towards FW and FL makes the study relevant to public awareness campaigns and educational interventions aimed at influencing consumer behavior. Food service providers may be informed that cultural values affect consumers' FW and FL behaviors and thus guide them in strategies to reduce waste in the dining-out context. Individuals may be well-informed that Chinese cultural values shape the personal norms and behaviors of people with respect to FW and FL – a fact that could change the choices and practices of consumers. Hao et al. (2022) addressed the persistent consumer problem of FW and FL in restaurants and canteens in China. They further outlined that consumer perceptions related to FW and FL should be identified and used in social marketing campaigns to reduce FW and FL. According to their findings, perceived food security and environmental concerns are related to reduced FW and FL; therefore, campaigns addressing these issues are of vital importance to enhance responsible food consumption

behavior. In a critical review conducted by Reynolds et al. (2019), multiple interventions at the consumption stage of the food system were identified that claimed to reduce FW and FL. Such interventions consisted of reducing the size of plates, changing nutritional guidelines in schools, and information campaigns. The research suggested the need for better evidence as well as the same standard of guidelines for future intervention studies to prevent or reduce consumption-stage FW and FL effectively. Another national survey-based study by Pocol et al. 2020 explored the consumers' perception related to FW and FL. A cluster of consumers was observed based on attitude and behaviors. Findings of the study indicate the need to create continuous awareness and education campaigns regarding the management of FW and FL at governmental and civil society levels.

Food waste behavior is shaped by cultural background through three major mechanisms: social norms of hospitality necessitating over-preparation; traditions of abundance where the quantity of food is directly related to generosity, as well as emotional hindrances to practical solutions such as doggy bags. Evidence confirms that culture functions as a coherent, measurable non-economic obstacle in many global contexts, manifesting itself in a specific variety depending on regional contexts, but the underlying influence is universally significant.

Building on this identified gap, the systematic synthesis of global evidence constructs a compelling narrative of culture as the invisible architecture of food behavior. The study reveals how deeply embedded cultural scripts, those unwritten rules of hospitality, tradition, and social expectation, systematically engineer environments where waste becomes the unintended byproduct of social cohesion across diverse societies. This theoretical foundation thus underlines that responsible food consumption can only be analyzed by decoding cultural algorithms programming our relation to food from kitchen to table, rather than via economic or technological lenses alone.

3. WHAT REALLY DRIVES FOOD WASTE IN THE RESTAURANT INDUSTRY? EVIDENCE FROM LITHUANIA

Research Question of the Paper. What are the main drivers of customer-generated and kitchen-generated food waste in mid-range casual dining restaurants, and how significant are they compared to each other?

The aims and scope of the research. The present paper embarks on revealing the main driving factors behind the customer-generated food waste (CGW) and kitchen-generated food waste (KGW) in mid-range casual dining restaurants in leading Lithuanian tourist destinations. The international and local tourist destinations were investigated separately. Interviews with restaurant managers were utilised for gathering primary data, and a fuzzy Analytical Hierarchy Process (AHP), a form of multi-criteria decision making (MCDM), was employed for computing the final ranks and Eigenvectors of the driving factors behind the food waste. Feelings of shame and the absence of a child's menu appeared to be among the most important driving factors of CGW in local tourist destinations, while the language barrier, improperly presented traditional dishes, and friend gatherings had the biggest effect on the occurrence of CGW in international tourist destinations. KGW is driven by improper demand planning, deficiencies in operational processes, and a lack of proper infrastructure, particularly storage facilities. We close the paper by proposing techniques to tackle food waste tailored to the driving factors we reveal.

Main Theoretical Findings. The issue of food waste within the restaurant industry has become increasingly salient, due to its significant environmental, economic, and social implications, prompting significant research into the various drivers and mitigating factors of CGW and KGW in restaurants, as well as their complex interaction. In particular, the profound impact of fluctuations in seasonal demand, the influence of consumer behaviour, and the challenges posed by menu complexities have been examined, alongside the potential benefits of leveraging advanced forecasting techniques, responsible procurement practices, and many other possibilities (Caponi, 2022). By examining these factors through the lens of the Theory of Planned Behavior (TPB) (Ajzen, 1991), this literature review aims to provide valuable insights for enhancing demand planning, optimising inventory management, and ultimately reducing food waste within food service operations.

The TPB suggests that individual behaviour is driven by behavioural intentions, which are, in turn, influenced by attitudes toward the behaviour, subjective norms, and perceived behavioural control. Regarding CGW,

consumer attitudes toward portion sizes, willingness to take leftovers, and preferences for responsible dining options play a crucial role in food waste in the restaurant industry (Blešić et al., 2021). Indeed, positive attitudes towards waste reduction can lead to behaviors that minimize food waste, such as choosing smaller portions or taking leftovers home (Betz et al., 2015). Similarly, KGW is influenced by the attitudes of kitchen staff and management towards waste reduction practices, such as efficient inventory management, menu engineering, and responsible procurement. When these attitudes are positive, they can lead to the implementation of practices that reduce food waste (Betz et al., 2015; Principato et al., 2018). Therefore, understanding these attitudes can help in designing effective interventions to reduce food waste in the restaurant industry.

Subjective norms also influence food waste behaviors in the restaurant industry. For CGW, social pressures and norms can significantly impact consumer behavior in restaurants. For example, in some cultures, leaving food on the plate might be considered polite, as consumers focus more on social relationships than on food. Understanding these norms is necessary to design interventions encouraging waste reduction (Syarif et al., 2023). In the context of KGW, norms within the food service sector, including regulatory standards and best practices, influence how kitchen staff and management approach food waste. Adhering to sustainability industry norms can drive behavior changes and reduce waste (Yang et al., 2024).

Finally, perceived behavioral control is a critical factor in determining food waste behaviors. For CGW, this includes the perceived ease or difficulty of engaging in waste reduction behaviors, such as the availability of smaller portion sizes or the convenience of taking leftovers. Enhancing perceived control can encourage consumers to engage in waste-reducing behaviors (Blešić et al., 2021). As regards KGW, the ability of kitchen staff and management to implement waste reduction strategies is influenced by factors such as training, resources, and technology (Montesdeoca-Calderón et al., 2024). Increasing perceived control through better training and technology can lead to more effective waste reduction practices (Filimonau, Zhang, et al., 2020). The research model is shown in Figure 6.
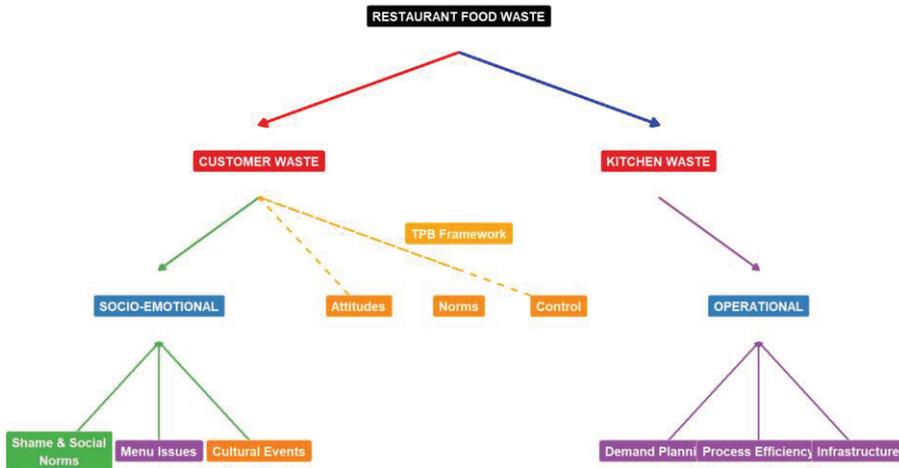
Figure 6. Integrated Framework with CGW and KGW

The TPB is a robust framework to study intentional behaviors in diverse settings, thus highly suitable for studying the decision-making processes underlying food waste behaviors. Despite its extensive use in household consumer behavior studies, there is a notable gap in its application to restaurant contexts. More precisely, few studies have explored its utility in the concurrent analysis of CGW and KGW. This study tries to fill this gap by applying TPB to identify the key psychological and operational factors driving food waste in mid-range casual dining restaurants. By doing so, we contribute to a more detailed understanding of how behavioral intentions at both customer-facing and operational levels drive food waste.

Methodology. With the aim to capture the diverse contexts and customer bases, ensuring relevance to both domestic and international tourist destinations, purposive sampling was used in four principal tourist locations in Lithuania: Vilnius (the capital of Lithuania and a primary destination for international tourists), Druskininkai (a spa and health resort where over of 70% of the guests are international tourists), Palanga (a summer seaside resort, mainly for younger and middle-aged Lithuanians) and Nida (a nature/seaside resort, mainly for middle-aged and older Lithuanians). First, restaurant managers were contacted directly by phone, explaining the purpose of the research and asking for a short meeting or a conversation via an online meeting platform (out of 29 restaurants contacted, 21 agreed to participate in the study. Thus, we had five direct and 16 online meetings). During these meetings, restaurant managers were briefly introduced to the concepts and definitions present in the questionnaire and the rules for filling out a questionnaire (as pair-wise comparisons are rather complicated for unprepared persons). After the meeting, the researchers ensured that

interviewees understood the definitions and questionnaire filling rules correctly, and the pair-wise comparison questionnaires were sent to restaurant managers. The initial meetings with restaurant managers also allowed us to specify better factors that should be included in the questionnaire for both local and international tourists (it mainly concerned the clarification of definitions, etc.). It is worth noting that the delineation between the two types of destinations is somewhat blurred in that locals also use restaurants designed mainly for international tourists, and vice versa. The interviews were taken during a 4.5-month period from mid-November 2023 to the end of March 2024.

We defined mid-range restaurants as those charging the mean price quoted on the Numbeo website for a three-course meal for two people in Vilnius (60 EUR) and extended this by ±15%, as suggested by Morkūnas & Rudiene (2020), so our price range is 51 EUR to 69 EUR. Some restaurants in the investigated localities charge prices outside of this range, placing them outside our casual dining criteria, and were excluded from our sample.

We surveyed 21 restaurants: 11 in international tourist destinations and 10 in local tourist destinations. The managers were presented with two pairwise comparison questionnaires (one for CGW and one for KGW) and asked to think only about international tourists (in the international tourist destinations) or only about local tourists (in the local destinations).

The factors causing the emergence CGW researched in international tourist locations were identified as lack of customisation of the menu, gatherings of friends/acquaintances, language barrier, photographic practices, diners being satiated by appetisers before the main dish, tastes not aligned to tourist expectations, feelings of shame, lack of information about portion size, improperly presented traditional dishes, and absence of a child's menu. In local tourist locations: gatherings of friends/acquaintances, absence of a child's menu, photographic practices, lack of information about portion sizes, lack of customisation of the menu, feelings of shame, lack of a vegan menu, and diners being satiated by appetisers before the main dish. The decision not to include the plate size factor (Reynolds et al., 2015) was based on its scant impact in self-service environments but much weaker impact in other types of restaurants; we focus on mid-range casual dining restaurants where the food is served at the table. The subsequent analysis incorporated quantitative techniques such as the Analytical Hierarchy Process (AHP) to ensure robust and reliable findings. Note that the AHP can only reliably process up to 10 alternatives, so some of the factors from the local destination questionnaire in the international tourist questionnaire were not included. Initial interviews with restaurant managers indicated that the factors causing KGW are nearly identical in both types of destination, so we used a single

version of the KGW questionnaire, which contains the following factors: a lack of infrastructure (storage facilities), supplier relationships (the right packaging), food preparation practices and trim waste, improper demand planning, food safety regulations and compliance (misunderstanding of food safety regulations may lead to emergence of food waste), deficiencies in kitchen operation processes, lack of food labelling and rotation practices (correct labelling and clearly visible ingredients reduce food waste), and shortages of skilled labour.

As mentioned above, we chose the AHP from the multi-criteria decision-making (MCDM) family for data processing, as the nature of our data is rather qualitative and hard to compare using quantitative techniques. A pairwise comparison technique is one of the most sophisticated research approaches to solving scientific problems of this nature (Lee et al., 2008). AHP, employing different scales, and even fuzzy numbers, is considered to be one of the best for deriving robust, accurate, and trustworthy results when comparing different types of data, and has been previously used in studies on renewable energy, vendor selection, barrier prioritisation (Dhingra et al., 2022), investment, and decision making in the tourism industry, among others.

Results and discussion. The CR for all three questionnaires was well below 0.1, and in only one case, with a fuzzy scale, it was equal to 0.02. Thus, all scales in all three questionnaires meet the reliability threshold (Goepel, 2019). The robustness of the research results is assured by a method of triangulation using three different scales in the AHP (generalised balanced, Kozakodaj, and adaptive). The response bias is mitigated using sets of intuitionistic fuzzy numbers that help to target decision uncertainties (Kundu et al., 2022).

The most important factor that causes food waste in international tourist locations in Lithuania is the language barrier. This corresponds to the findings from Michalek et al. (2018) regarding the importance of clear communication, not only in satisfying guests but also in preventing food waste. In Lithuania, this determinant occupies first place because the country attracts tourists both from Western Europe (who typically communicate in English) and former Soviet countries (who often use Russian), and restaurant managers struggle to find waiters fluent in both.

The second most important factor is the improperly presented traditional dishes, which clearly relates to international guests' interest in tasting local cuisine. Local dishes do not always appear attractive when presented to foreign guests (Vuksanović & Demirović Bajrami, 2020); this is the case with one of the most popular Lithuanian summer dishes, šaltibarščiai (cold pink beetroot soup), which international tourists tend not to try or consume only a small portion.

Gatherings of mutually acquainted international tourists typically result in a large amount of wasted food. Organisers of such gatherings typically order appetisers to be served in advance and then order additional meals from the menu (Seržantė & Pakalka, 2022). Such a surplus of food is typically left partially unconsumed.

The lack of customisation of the menu was ranked fourth by experts in terms of the importance of reducing food waste. Typically, in these mid-range casual dining restaurants, meals consist of the main course, side dishes, salads, etc. (Babakhani et al., 2020). If the person is allergic to some of the ingredients or the taste simply does not align, this part of the meal remains unconsumed and is wasted. This is a more frequent occurrence with international tourists who need to be fully aware of some of the ingredients used. They may also be unaware of the portion sizes, as in different parts of the world, they vary significantly (Zlatevska et al., 2014). Persons from other parts of the world coming to Central and Eastern Europe may be surprised by its portion sizes and be physically unable to consume the whole meal.

The second least important factor, unaligned taste, is related to the improper presentation of traditional dishes but has broader implications, as it has been shown that the same dish served in different parts of the world can taste significantly differently. Thus, international tourists who are presented with their favourite dish but with a different taste will not always finish it (Rong et al., 2021).

The remaining factors, such as the absence of a child's menu, feelings of shame, photographic practices, and being satiated by appetisers, have a mean normalised eigenvector of less than 0.1 and are therefore of no great importance.

The main determinant of CGW in local tourist destinations is the feelings of shame, which preclude asking for doggy bags (Giaccherini et al., 2021) or meal sharing among the occupants of the same table (Choi et al., 2020). This implies that international tourists, who are in a social environment free from any social pressure or communal bias (no one recognises them as they are in a foreign country), act differently from local tourists, who are more likely to be recognised or judged. This may result in international tourists more frequently sharing leftovers (especially those of their children) than local tourists.

The second most important factor in local tourist destinations is the absence of a children's menu. In this case, parents are forced to offer meals to their children that are not only too large, thereby guaranteeing food waste, but are also not fully aligned with their taste preferences (Ferrante et al., 2021). The difference in the importance of this factor between international and local tourist destinations can easily be explained. First, in Lithuania, most international tourists

are adults, and family tourism is much less developed. There is also the impact of the above-mentioned role of shame; in international tourist locations, leftovers from children are much more frequently shared among family members compared to local tourist locations (Kirmani et al., 2023).

The third most important factor is the lack of customisation of the menu, as previously discussed. The fourth most important factor—gatherings of friends/acquaintances—is slightly different in local tourist locations where, typically, they are part of a one-night stay to celebrate an important occasion (jubilees, religious occasions, the christening of a child), corporate team building events, and so on. Traditionally, a table full of dishes symbolises the generosity of the host and respect to the guests, and a lot of it is often left unconsumed. It appears that the role of culture in the manifestation of food waste practices during these gatherings is the main factor, with the gathering itself acting only as a proxy. In this case, we disagree with Piras et al. (2022) and support Elshaer et al. (2021) and Aydin and Yildirim (2021) regarding the importance of cultural habits in shaping food waste behaviour.

Other factors, such as diners being satiated by appetisers, the absence of a vegan menu, photographic practices, and a lack of information about portion sizes, appear to have a negligible effect on the production of CGW in local tourist destinations. As photographic practices and diners being satiated by appetisers were also ranked low in international tourist destinations, we conclude that these factors are not relevant and should, therefore, not be prioritised over the more important ones discussed above. The fact that a lack of information about portion sizes ranks lower here than in international tourist destinations is because local guests are typically aware of the portion sizes prevalent in their own country (Okumus, 2020).

Improper demand planning appears to be the most important determinant in KGW in Lithuanian mid-range casual dining restaurants. Although the importance of this factor was picked up by other researchers (Filimonau, Zhang, et al., 2020; Principato et al., 2021; Filimonau, Todorova, et al., 2020), its importance in the Lithuanian context is hard to overestimate. As tourism in Lithuania is hardly dependent on weather conditions, restaurants and other tourism-related service providers expect an influx of tourists when the forecast is good, and restaurants increase their stocks to meet expected demand. If the forecast is inaccurate or the flow of tourists is significantly lower than expected for other reasons, restaurants are left with unconsumed food that is then wasted.

Very few Lithuanian companies operating in the food service industry adopt lean practices, and restaurants are among the outsiders, even in this context. This fact helps to explain the important role of deficiencies in kitchen operation practices in the emergence of KGW. It has been observed that in

casual restaurants (Bertagnolli, 2018) and, to an even greater extent, in fine dining restaurants, it is impossible to fully implement lean or some other standardised procedure due to the relatively heterogeneous nature of kitchen processes. We concur with the arguments put forward by Principato et al. (2021) regarding the need to design kitchen operation processes to reduce KGW.

Lack of infrastructure occupies the third position and may be explained in several ways. First, a significant number of restaurants are located in the main tourist areas (e.g., in the old town), where expanding a kitchen to create additional storage space to keep some products separate is difficult. There is also the purely economic reality that the installation of additional storage equipment to decrease food waste costs significantly more than the relatively marginal cost savings of the decreased food waste (Christ & Burritt, 2017). Additional financial incentives are therefore required to motivate restaurant managers to install storage facilities to tackle KGW.

Lack of food labelling and rotation practices partly relates to deficiencies in kitchen operation practices, but also has other distinct characteristics. Product visibility and transferability not only facilitate a reduction in food waste, as the risk of overlooking older items decreases (Patra et al., 2022), but also help to assure service quality by guaranteeing that all necessary ingredients will be included in the required quantities according to the recipe (Wong et al., 2022). This dual importance should increase the chances of its adoption, as restaurant managers must be fully engaged in increasing and maintaining the quality of their restaurant services (Choi et al., 2020).

Food preparation practices and trimming waste are the last factor with a mean eigenvector higher than 0.1. It is widely accepted that trim waste is inversely proportional to the price of the product (Orr & Goossens, 2024). In other words, restaurant managers try to optimise costs (increased meal preparation time, investment in sophisticated trimming machines, etc.) and reduce trim waste to deliver cost savings. Thus, the current level of trim waste can be considered an economic optimum in terms of a cost/benefit analysis. To incentivise restaurant managers to pay more attention to KGW arising from the food preparation practices, the benefits must be emphasised. The environmental awareness and sustainability concerns of the consumers may be one possible solution, as restaurants that employ responsible food preparation techniques and properly advertise the fact may attract new customers (Thyberg & Tonjes, 2016).

The remaining factors, namely supplier relationships, shortage of skilled labour, and food safety regulations, are of little importance in determining the level of KGW.

Factors are summarized in Table 2.

Table 2. Comprehensive Intervention Framework for Restaurant Food Waste Reduction

Category	Specific Factor	Intervention Strategy	Implementation Level	Expected Impact
INTERNATIONAL TOURIST DESTINATIONS	Language Hindrances	1. Multilingual digital menus with customization options 2. Staff language training for key tourist languages 3. Visual menu aids (photos, icons, portion size indicators)	Staff Training, Technology	High - Directly addresses communication gaps
	Improperly Presented Traditional Dishes	1. Cultural presentation training for servers 2. Visual storytelling of dish origins and significance 3. "Tasting portions" for unfamiliar traditional dishes	Service Protocol, Marketing	Medium-High - Increases acceptance and consumption
	Menu Customization Gaps	1. Flexible portion sizing options 2. Ingredient substitution system 3. Allergen and preference flags in the ordering system	Menu Engineering, Operations	Medium - Reduces plate waste from mismatched preferences
LOCAL TOURIST DESTINATIONS	Feelings of Shame	1. Normalize doggy bags through staff recommendations 2. Brand leftover containers as "Chef's Next Meal." 3. Social norm messaging ("9/10 guests enjoy leftovers")	Service Culture, Marketing	High - Addresses key emotional barrier

Category	Specific Factor	Intervention Strategy	Implementation Level	Expected Impact
	Absence of Children's Menu	1. Development of age-appropriate portion options 2. Child-friendly meal customization 3. Family meal sharing promotions	Menu Engineering, Service	Medium - Reduces child plate waste
	Social Gathering Overordering	1. Group menu packages with optimized quantities 2. Server guidance on appropriate ordering for group size 3. Sharing platter options	Service Protocol, Menu Design	Medium-High - Addresses cultural hospitality norms
KITCHEN OPERATIONS	Improper Demand Planning	1. AI-based demand forecasting software 2. Weather and event-based inventory adjustment 3. Daily production planning meetings	Technology, Management	High - Most significant KGW driver
	Kitchen Process Deficiencies	1. Lean kitchen workflow implementation 2. Standardized recipe costing and portions 3. Cross-utilization of ingredients across dishes	Operations, Training	High - Reduces prep waste and inefficiencies
	Storage Infrastructure Limitations	1. Optimized storage equipment investment 2. FIFO (First-In-First-Out) system implementation 3. Temperature monitoring systems	Infrastructure, Systems	Medium - Requires capital investment

Category	Specific Factor	Intervention Strategy	Implementation Level	Expected Impact
	Food Preparation Waste	1. Trim waste reduction training 2. Creative use of food scraps (stocks, garnishes) 3. Precision cutting techniques	Training, Operations	Medium - Incremental efficiency gains
CROSS-CUTTING INTERVENTIONS	Staff Training & Awareness	1. Food waste monitoring and reporting 2. Waste reduction incentive programs 3. Regular waste audit procedures	Management, HR	Foundation for all interventions
	Customer Engagement	1. Sustainability messaging integration 2. Portion choice options at ordering 3. Leftover culture promotion	Marketing, Service	Cultural shift enabler

Conclusion. In international tourist locations, factors such as language hindrances and improperly presented traditional dishes have a significant impact on CGW. Tourists are more likely to waste food when they are unfamiliar with the cuisine or portion sizes, highlighting the importance of catering to their specific needs. Conversely, in local tourist destinations, the feeling of shame can hinder meal sharing and the request for doggy bags due to social recognition concerns. This highlights the cultural dimension of food waste behaviour and the need for interventions that address social norms and perceptions. Additionally, the absence of children's menus, resulting in oversized portions and unmet child taste preferences, is a prominent factor that contributes to CGW. It is important to note that in both destination types, non-personalised menus and meetings with friends or acquaintances are significant contributors to the generation of food waste.

Within kitchen operations, improper demand planning, deficiencies in kitchen operation practices, generating trim waste, inadequate food storage infrastructure, and poor food labelling and rotation practices emerge as the key determinants of KGW. These findings underscore the significance of implementing effective inventory management systems, optimizing storage facilities, and establishing proper food handling procedures to minimise food waste in the back-of-house.

After the analysis of the diverse factors contributing to CGW and KGW in different contexts, this study provides theoretical contributions and practical solutions to reduce waste and promote sustainability in the restaurant sector. Theoretically, the study provides a significant contribution by enhancing the understanding of the drivers of food waste in the restaurant industry, particularly within the Lithuanian context. By integrating TPB into this context, the study emphasizes how behavioral theories can inform tailored, actionable solutions. Indeed, it extends traditional consumer behavior theories by incorporating the significant impact of subjective norms (e.g., emotions such as feelings of shame associated with leaving food uneaten or requesting doggy bags) as well as cultural and societal ones, which drive food waste behaviors. These findings suggest that strategies promoting cultural shifts can be instrumental. In particular, in line with the TPB's emphasis on intention formation to achieve desired outcomes, the research supports the effectiveness of targeted behavioral interventions (such as offering smaller portion sizes and customizable menus) in modifying perceived behavioral control and social norms, thus playing a key role in reducing food waste. While improving consumer perceptions of control over their food choices (e.g., through flexible portions and clear dietary information) encourages waste-reducing behaviours, it also empowers restaurant managers and staff to better plan inventory and

manage different cultural and consumer needs and design interventions that effectively reduce food waste. It extends traditional consumer behavior theories by incorporating the significant impact of cultural factors and emotions, such as feelings of shame and societal norms, which drive food waste behaviors. In particular, the research expands on the TPB by supporting the effectiveness of targeted behavioral interventions (such as offering smaller portion sizes and customizable menu options) in modifying perceived behavioral control and social norms.

Practically, the study outlines actionable, tailored measures that restaurant managers can implement to address food waste challenges effectively and offers valuable insights for policymakers. Restaurant managers can adopt a range of initiatives to effectively reduce food waste generation, promote responsible practices, and improve customer satisfaction. In addressing challenges specific to international tourist locations, measures include implementing digital menu systems for customization and portion control, substituting ingredients, and aligning meals with dietary preferences, reducing uneaten food, thus directly addressing the communication hindrances often encountered with international tourists. Moreover, conducting taste-testing initiatives to cater to diverse palates ensures that menu offerings resonate with diverse palates, minimizing unconsumed dishes, while collaborating with local influencers to promote cultural authenticity and responsible food consumption helps bridge cultural gaps by educating tourists about the authenticity and significance of local dishes, encouraging full consumption. For local tourist locations, strategies involve developing dedicated vegan menus and designing children's menus in collaboration with parenting groups to ensure that meals are appropriately portioned and aligned with dietary preferences and children's tastes. Furthermore, introducing visual aids on menus (such as pictures of dishes) empowers customers to make informed decisions about portion sizes, nurturing a culture of responsible dining. In kitchen operations, actions include: investing in eco-friendly packaging that aligns with operational needs, reducing waste from spoilage and discarded materials, encouraging the use of doggy bags and staff training to promote them, and providing training on efficient food preparation techniques to minimise trim waste and improve overall kitchen efficiency. Finally, advanced operational strategies can significantly improve kitchen efficiency and sustainability. Initiatives like data analytics for accurate demand planning can help restaurants to align their purchasing and production with actual needs, thus minimizing overstocking and waste. At the same time, fostering a culture of continuous improvement in kitchen operations can be achieved by encouraging staff to participate in waste audits and process

optimisation.

The study also provides critical insights for policymakers to promote responsible practices in the restaurant industry through systemic intervention. By introducing measures for food waste reduction, such as tax breaks, subsidies, and awards, they can incentivise the industry to invest in responsible practices, as well as by conducting educational initiatives to shift cultural norms and promote responsible dining habits, addressing root causes of food waste at a societal level. In customer-generated waste, emotional factors drive particularly the shame about doggy bags, supplemented by operational issues such as menu inflexibility, whereas cost-related concerns are less important. For kitchen-generated waste, inadequate demand planning and storage limitations are dominant drivers. A comparison of the significance suggests that the most relevant operational hindrances relate to the kitchen rather than to the customer's side; in the restaurant context, improper demand planning is the single most significant driver in both waste categories.

From theoretical understanding to empirical scrutiny, the restaurant microcosm provides a living laboratory wherein these cultural algorithms manifest in tangible operational realities. It is here that the research uncovers the delicate choreography between kitchen efficiency and dining room sociology, showing ways in which emotional currents, like shame and social pressure, interact with operational constraints to create predictable pathways of waste. Empirical evidence shows that sustainable intervention needs to address both the structural architecture of restaurant operations and the psychological landscape of dining experiences, thereby creating a dual front approach to waste reduction.

4. WHAT/WHO IS TO BLAME FOR THE FOOD WASTE: A CROSS-COUNTRY INVESTIGATION OF THE ROLE OF CULTURAL BACKGROUND ON FOOD WASTE BEHAVIOUR

Research Question of the Paper. How are specific cultural dimensions influencing the theory of planned behavior to forecast food waste behaviour across different nations?

The aims and scope of the research. The aim of this study is to investigate how the role and importance of culture-related determinants of food waste vary among different countries and cultural environments. A questionnaire survey with 1,984 respondents served as a source of primary information. Results were processed using PLS-SEM, evaluating eight hypotheses among cultural constructs and food waste. Cultural dimensions were embedded in the Theory of Planned Behaviour (TPB). Confucian cultures, emphasizing communal relationships and the philosophical nature of food, yielded less waste, while consumerist cultures yielded more waste from convenience behaviors. Ceremonial feasting produced more waste in individualist cultures, yet environmental habits reduced waste when there was institutional support. Social interactions produced twin effects (over-preparation and sharing).

Main Theoretical Findings. Recognizing the connection between consumerism and food waste offers valuable insights into the psychological factors affecting consumption and waste patterns. For example, hospitality practices can lead to overconsumption of food, creating unnecessary waste (Gao et al., 2021). Acknowledging the influence of individuals' aspirations for social status, image, and appearance on their consumption habits further highlights the complex interplay of consumerism and food waste, providing a more comprehensive understanding of the underlying motivations driving wasteful behaviors. Consumerism, characterized by the culture of overconsumption and disposable attitudes toward products, significantly influences food purchasing decisions, portion

sizes, and the disposal of unused or spoiled food items (Morkūnas et al., 2024). Consumerism, driven by the pursuit of material possessions and status, can lead individuals to engage in excessive food preparation on various occasions. This trend, shaped by a desire to display abundance and hospitality, often contributes to food waste behaviors (Stancu et al., 2016).

Previous research has developed significant groundwork to understand cultural impacts on pro-environmental behaviors. Sreen et al. (2018), for instance, applied the TPB to investigate green purchase intentions among Indians by integrating Hofstede's collectivism and Kluckhohn and

Strodtbeck's man-nature orientation. Results showed that collectivist orientation strengthens TPB predictors (attitude, subjective norms, perceived behavioral control), while man-nature orientation impacts purchase intent directly. However, their single-country strategy limited cross-cultural comparison and ignored subtle drivers like philosophical tradition or consumerism. Similarly, Soeyez (2012) compared individualist and collectivist cultures and demonstrated that ecocentric messages were best received in individualist cultures and anthropocentric appeals were best received in collectivist cultures. Although informative, their work privileged value orientations over concrete behavior and did not deal with ritual or ceremonial behavior. This research draws on these studies by theoretically exploring several cultural dimensions across various clusters. Unlike Sreen et al. (2018), we use TPB to food wastage—a behavior with definite cultural taboos and traditions—and compare clusters, rather than individual nations. Unlike Soeyez (2012), we integrate Hofstede's individualism-collectivism with philosophical theories (e.g., Confucian frugality) and ritual practices (e.g., feasting), and reveal how cultural complexity synergizes with TPB processes. To illustrate, while Sreen et al. concluded collectivism enhances TPB predictors, our results show that Confucian communal ethics in particular reduce waste by shared responsibility, an omitted variable in previous models. Weaving these strands together, we produce a cross-cultural model that connects value orientations, cultural rites, and functional reduction strategies.

The study operationalizes cultural constructs through Hofstede's individualism-collectivism index (IDV) to classify societies (e.g., Individualist: the US, Canada; Collectivist: China, Japan) and Triandis's horizontal-collectivism vs. vertical-individualism scale (group harmony vs. status consumption). Consumerism, for example, is built through Triandis's vertical individualism, where the purchase of material objects reflects social status, and rituals surrounding community are consistent with horizontal collectivism's emphasis on group conformity (Germani et al., 2020). These frameworks provide a theoretical fit, relating cultural values (e.g., consumerist norms, Confucian philosophy) to food waste conduct. While CBSFW creates normative standards that promote food waste behavior, they do not causally generate FWB. Following the Theory of Planned Behaviour (Ajzen, 1991), CBSFW is a multidimensional social norm – affecting intentions but requiring mediation through attitudes, control, and context in order to emerge as observable action (Stancu et al., 2016). Hypotheses were reformulated around cultural dimensions rather than country-specific labels to align with established cultural frameworks. Considering this, the following hypothesis was analysed:

H1: Higher levels of cultural behaviors and determinants of food waste (CBSFW) are positively related to more food waste behavior (FWB).

Various cultural and societal aspects are at play, including individual attitudes and behaviors, community expectations, and the broader economic and social landscape (Feng et al., 2022). It is found that individuals wishing to maintain a positive social image are less likely to take surplus food home, which further contributes to food waste. Examining how people manage their public image in relation to food waste (face-saving) reveals the complex interplay between societal, cultural, and individual factors that shape food consumption behaviors. Responsible food consumption behaviors are influenced by various factors, including social interactions, status striving, and group cooperation, which provide valuable insights into the motivations behind food waste behaviors as a means of self-portrayal (Folwarczny et al., 2023). Recognizing and understanding these influences enables the development of more effective strategies for behavior change and waste reduction by considering how impression management and social interactions shape individuals' food-related decisions. Studying social interactions provides insights into the determinants of household waste-related activities. This includes examining the roles of social norms and networks and how they influence behaviors such as food purchasing, consumption habits, and discarding practices (Luo et al., 2020). Furthermore, the presence of real and perceived observers can influence individuals' waste disposal actions and lead to feelings of guilt or shame, ultimately shaping behavioral change (Comber & Thieme, 2012). In light of this, this study explores the following hypothesis:

H2: Societies with a culture of frequent social interaction (SI) have greater CBSFW and cultural behaviors.

Religious and philosophical texts and teachings offer guidance on various aspects of food consumption and waste. For instance, Jewish and Muslim teachings specify foods unsuitable for consumption, potentially contributing to food waste within these communities. Religious teachings generally discourage food waste and promote sharing and minimizing waste.

The Christian New Testament, the Talmudic concept of bal tashchit in Judaism, and the Quran all emphasize the value of frugality and discourage wastefulness. However, despite these teachings, certain religious regulations and practices may inadvertently contribute to food waste. For example, Hinduism's reverence for food as a divine manifestation may clash with modern food safety practices, leading to waste. Similarly, Buddhist teachings on interdependence and mindfulness contrast with observed instances of food waste during Buddhist retreats (Minton et al., 2020).

Like religious beliefs, philosophical values also affect food waste

behaviors. An individual's ethical decision-making process in evaluating food waste behaviors is deeply influenced by their inherent moral values and cultural background. For instance, collectivist individuals who prioritize group decision-making and the pursuit of friendship may be more willing to sacrifice personal needs for the benefit of the majority, impacting their approach to food waste reduction strategies. Peer influence, social stigma, and social punishment can guide individual choices toward cooperative outcomes, especially in public settings (Piras et al., 2022). Individualist societies prioritize personal preference over group dynamics, potentially leading to food waste influenced by individual desires rather than collective norms. In collectivist cultures, individuals align their food choices with group expectations and social norms, guided by peer influence and a desire to maintain group harmony and avoid social repercussions (Bhatti et al., 2019).

The importance of material acquisition, the pursuit of happiness through material wealth, and the belief that wealth symbolizes achievement and personal image all influence how individuals perceive and interact with food and food waste (Saracevic et al., 2022). Confucian culture, for example, is deeply rooted in Chinese and other East Asian societies, significantly influencing behaviors related to food waste in the region. Confucian values such as group conformity are pivotal in shaping attitudes and behaviors related to food consumption and waste.

The emphasis on group conformity and the societal importance of appearances and perceptions of food shapes attitudes and behaviors related to food consumption and waste in Confucian cultures. Psychological consciousness—including values, knowledge, perceived risk, face concepts, and negative mood—significantly reduces suboptimal food waste. Additionally, Confucian culture's emphasis on group conformity and respect for tradition often leads to communal dining practices and large, elaborate meals, creating an environment where leftovers are common. The cultural value placed on avoiding waste can result in a reluctance to discard excess food, further contributing to the generation of leftovers (Christensen, 2017). As a result, the following hypotheses are proposed:

H3: Strong CBSFW cultural/philosophical significance (CPSF) reduces FWB through mindful consumption

H4: Cultures whose religious or philosophical traditions emphasize elaborate ceremonial feasts and communal rituals are expected to exhibit a higher tendency toward food waste.

H5: A reduced tendency toward food waste is anticipated among individuals who adhere to religious or philosophical teachings that regard food as a sacred resource.

H6: Communities where adherence to traditional food taboos is prevalent due to religious or philosophical traditions are expected to show a reduced tendency toward food waste.

Analyzing the reuse of food leftovers goes beyond the immediate act of consumption, as it is not simply a disconnected final step in the consumption process but rather a practice that influences previous and subsequent consumption behaviors (Cappellini, 2009). For instance, some authors highlight how pre-purchase and pre-consumption behaviour can substantially reduce food waste. Bravi et al (2020) find that shopping behaviour and managing food at home are among the main predictors of wasted food in households. On the one hand, unplanned buying, or buying driven by promotions, or the symptom of good providers to meet different needs of the household, leads to buying food in abundance, fuelling waste (Stancu et al., 2016). In line with this, Diaz-Ruiz and co-authors (2018) find that more disciplined consumers who plan their purchases and buy only what they consume generate little food waste. On the other hand, the mismanagement of food or leftovers due to inadequate storage influences food waste generation. The state of food storage, its appearance or smell are, in fact, factors affecting the individual decision whether to consume the product or consign it to waste (Aschemann-Witzel et al., 2019). Indeed, consumers often perceive leftover food as unhealthy (Aloysins et al., 2023). In the post-purchase phase, reusing food leftovers by transforming scraps and unused food into new dishes can help reduce food waste directly. A prime example of a culture that encourages using leftovers to make new dishes is the Mediterranean culture. Mediterranean culinary traditions strongly emphasize minimizing food waste and maximizing the use of all ingredients. As a result, Mediterranean cooking often involves transforming leftovers into new and flavorful dishes, such as using day-old bread to make Panzanella, a traditional Tuscan salad, or incorporating leftover pasta into frittatas or soups. Northern Europeans also tend to exhibit more responsible food consumption habits, especially when dealing with leftovers. For example, the Finnish government launched an experiment known as the

"leftover lunch" service to reduce food waste and its environmental impacts. The program provides meals made from surplus food to retired and unemployed individuals, reducing waste while giving social dining opportunities. Reusing leftovers has cultural significance as it is often intertwined with traditions, values, and practical knowledge passed down through generations (Mattar et al., 2018). Hence, the study assumes that a positive attitude toward leftovers will reduce food waste.

H7: In cultures that are more inclined to adopt environmentally

conscious practices, there will be a positive correlation with reduced FWB.

Theoretical principles from the social psychology of collective action highlight several motivations driving individuals to engage in collective efforts, such as food sharing (Schanes & Stagl, 2019). Food sharing reduces food waste by redistributing surplus food to those in need or the wider community, preventing it from being discarded. Alternative distribution formats such as food banks and online platforms facilitate the sharing of excess food, reducing waste and generating positive social impacts. A culture that strongly emphasizes social care for the deprived fosters a sense of responsibility toward the well-being of others within the community. Implicit in the concept of social care is a collective understanding that everyone, regardless of their circumstances, deserves access to nourishment and sustenance. This motivates people to contribute to communal efforts to address food insecurity and ensure that those in need have access to sufficient and nutritious food. A culture of social care thus drives individuals to share resources and foster a supportive environment where the basic needs of all community members are met (Marovelli, 2019). Consequently, this study assumes that those cultures value social bonds and social care and tend to participate in community food access and sharing practices.

H8: Cultures with strong social bonds and social care show lower levels of FWB.

Among the factors that promote or inhibit individuals' food wastage, socio-economic and demographic factors play an important role. Several studies agree that low levels of waste are found among older consumers (Stancu et al., 2016) who, according to Ilakovac et al. (2020), are both disinclined to hoard food and have more time to plan purchases. What emerges is a general lack of awareness among the younger generations of the issue of food waste (Nikolaus et al., 2018). In particular, scholars have shown that young people are driven by a sense of apathy towards food waste as if it were a problem that did not directly affect them and did not believe that their more responsible behaviour could have an environmental and/or social impact (Nikolaus et al., 2018; Clark and Manning, 2018). Rather, Nikolaus et al. (2018) and Clark and Manning (2018) find that money is a factor influencing food waste in relation to the value young people place on food, with a tendency to waste less valuable foods such as fruit and vegetables rather than meat. A somewhat contrasting finding is that of Pandey et al. (2023), who, using the Attitude-Social Influence-Self-efficacy model, find that young people with high self-efficacy towards reducing food waste, i.e., the ability to influence and control food waste, are more likely to adopt behaviours that help solve environmental problems related to food waste. In addition, low levels of food

wastage are found in low-educated people (Ilakovac et al., 2020; Stancu et al., 2016) and low-income households (Stancu et al., 2016).

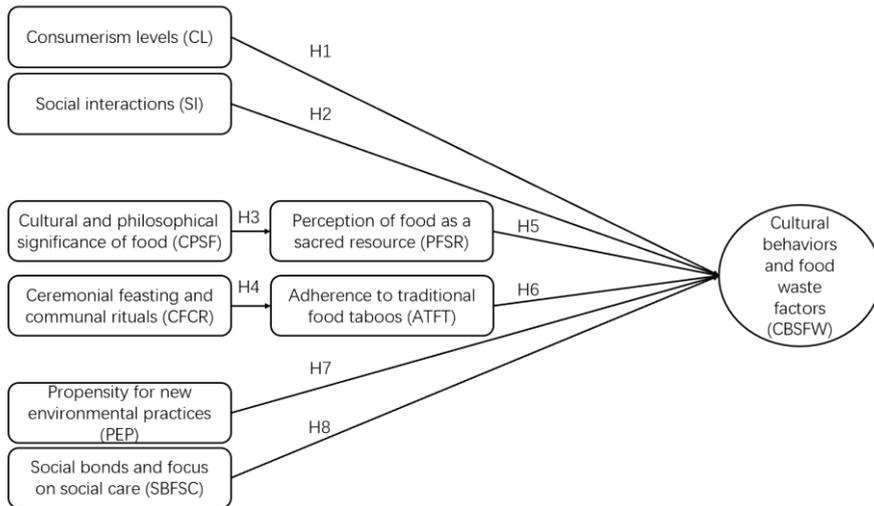Figure 7 depicts the relationship between the constructs.

Figure 7. Research Model

Discussion. This study represents a comparative assessment of how cultural constructs influence food waste behaviors across seven diverse countries, highlighting the complicated interaction of cultural, philosophical, and social levels. The results highlight that cultural values play a pivotal role in shaping food waste behaviors, with each construct exhibiting varying degrees of influence depending on the cultural context. The results show that a society in which food bears deep cultural or symbolic significance will have lower tendencies toward food waste. Constructs such as PFSR and ATFT exhibit strong positive influences on responsible food behaviors, evidencing the importance of framing food as a resource or adhering to traditional norms. Food-related cultural values bear a close relationship with respect for food, leading to conservationist attitudes beyond mere resource management. These results are in line with the findings of Adel and co-authors (2023) that religious beliefs have a significant influence on reducing individuals' food waste. In their study conducted in Egypt, the authors find that a large proportion of respondents feel guilty because their religion commands them not to be wasteful. In light of this, Abdelradi (2018) finds that this effect is mediated by environmental awareness of the potential environmental impact of irresponsible behaviours. In contrast, the more consumerist societies,

dominated by convenience and abundance, tend to generate more food waste. This result is confirmed in the study by Diaz-Ruiz et al. (2018) conducted in Spain with the aim of identifying the different behavioural dimensions affecting food waste. The results show that the higher the materialistic value given to food, synonymous with consumerism, the greater the wastage. Summarizing it can be stated that consumerism significantly impacts food waste behaviors, which is in line with previous literature underlining overconsumption, disposable attitudes, and large portion sizes as causes of waste. For example, the positive association found between CL and food waste in certain contexts echoes Petrescu-Mag et al. (2019)'s assertion that most food waste in developed nations stems from

consumer behavior. Furthermore, the evidence underpins the assertion made by Stancu et al. (2016) that consumerism often encourages people to prepare more food than is needed, especially on occasions meant to show plenty and hospitality. However, our results go further and also demonstrate that consumerism's influence is culturally nuanced. Whereas a higher CL generally engenders waste, this effect was low or even negative in cultures that had efficiency or minimalism ingrained in their values. This divergence adds depth to previous initial studies in the area (e.g., Aschemann-Witzel et al., 2015) by highlighting that consumerism's impact is not universally negative. Instead, cultural frameworks and societal norms can moderate the relationship, either amplifying or mitigating wasteful behaviors. For instance, culturally driven perceptions of portion sizes (Reynolds et al., 2019) or hospitality norms (Gao et al., 2021) may contribute to over-purchasing and waste, but these can be tempered by cultural philosophies emphasizing conservation or frugality.

Similarly, SI and SBFSC revealed the dual nature of communal practices. While social interactions often facilitate food sharing and community responsibility, they can also lead to over-preparation and waste, especially in cultures where abundance is an important cultural ideal. In some countries, cultural norms lead to cooking large quantities of food to meet the expectations of guests and thus as a sign of generosity. Several studies show that leftover food is normal in many cultures, mainly in social meals. On these occasions, the fear of receiving criticism from guests or the desire to fully meet their expectations leads to cooking large quantities of food, favoring food waste (Adel et al., 2023). On the contrary, in other countries, particularly for those with strong conservationist values or minimalist traditions, social interactions and communal practices tend to stress moderation and resourcefulness. In such contexts, the cultural ideal of avoiding waste may override the desire to display abundance. Sharing surplus food or carefully

planning portion sizes, for example, becomes a norm in social gatherings, reflecting broader cultural values of sustainability and community care. These practices not only reduce food waste but also create a sense of shared responsibility and care for the environment, underlining the positive potential of social bonds and interactions in mitigating waste.

The role of environmental awareness, as captured through PEP, was conditional on culture. In countries in which the institutional context supported sustainability, PEP had a significantly greater influence on reducing food waste. In some other contexts, however, environmental awareness was still not enough to make any real changes in behavior without inculcation through deeper levels of cultural values. The result confirms the contrasting findings in the literature on the influence of environmental awareness on reducing attitudes towards food waste. Diaz Ruiz and colleagues (2018) find that environmental concerns do not have a direct effect on waste reduction but mediate through waste prevention. Elsewhere, other empirical evidence finds that consumers who are more aware of the environmental consequences of food waste are more motivated to take action and measures to reduce waste (Pandey et al., 2023).

The constructs, such as CPSF, show how the beliefs of a philosophical and cultural nature can magnify the environmental practices, thus indicating that cultural fit is important for sustainability initiatives to find resonance across cultures. This also supports the theory of cultural ecology, which states that cultural values lead people to care for the environment (Bailey et al., 2019). These findings have some important practical implications, especially in those cultures where food has a philosophical connotation, usually serving as a link between personal acts and social values. For instance, Confucian cultures, as Liao et al. (2018) mentioned, are inclined toward group conformity and respect for tradition, which may elevate the role of CPSF in encouraging collective responsibility for food conservation. Similarly, in societies that have been influenced by religious or philosophical teachings, as pointed out by Hassan et al. (2022), CPSF merges environmental practices with ethical and moral considerations of the sacredness of food resources. This gives further meaning to earlier studies by showing that sustainability initiatives that are embedded in cultural and philosophical importance are more effectively conveyed across various cultural frameworks. Whereas in some contexts, CPSF is strongly related to reduced food waste, results also suggested a more complex relationship in those cultures dominated by ceremonial feasting and communal rituals that often stress abundance, working against the conservationist tendencies of CPSF, as previously suggested by Christensen (2017) and Reynolds et al. (2020). This finding

underlines the tension between traditional values of respect for food, pitted against modern consumption practices that support material abundance and convenience.

This study extends the TPB by linking cultural dimensions through proxies at the individual level for aggregate societal norms. Cultural constructs were implemented through self-measured cultural values (e.g., consumerism, communal rituals), yet these individual orientations were manifestations of national-level cultural structures, where aggregated individual beliefs reflect aggregate societal practice. For instance, acceptance of Confucian values in China or thrift in Lithuania is a social trend through individual response.

Heterogeneity of cultural dimension effects between countries is most likely to result from context moderators and within-country heterogeneity. For instance, collectivism suppressed FWB in China and Japan but continued less vigorously in Lithuania because, arguably, economic factors overshadowed values for some respondents. This agrees with Triandis's argument that syndromes are caught up with situational variables (Chien et al., 2015). Future studies should apply multi-level modeling so as to partition country-level and individual effects.

The findings present culture-specific, actionable recommendations for reducing food loss. Convenience and consumerism contribute to waste in individualist clusters, so excess overconsumption norms must be tackled by policy. For instance, "Right-Size Meals" campaigns can normalize a size reduction at restaurants, and publicity programs can associate materialistic values with carbon footprints. In collectivist clusters, the application of communal values is crucial, where public messages establishing food saving as a group obligation would be consistent with Confucian virtues of frugality and communal harmony, for communitarian societies like Italy, where ritual feasting results in maximum waste, community-led initiatives could challenge cultural excess through sustainability.

This study further develops TPB by adding culturally grounded constructs that extend its focus beyond individual attitudes, subjective norms, and perceived behavioral control. By embedding cultural values like PFSR and CFCR, the study depicts how traditions and philosophies may shape intentions and behaviors related to food waste. These findings underscore the importance of culturally tailored interventions for addressing food waste and highlight that no one-size-fits-all approach would sufficiently capture the diversity of the cultural contexts in question. Where cultural dimensions improve the predictive power of TPB, both the moderation of its core components and direct effects occur. Collectivist values positively enhance

the intention-behavior relationship, while consumerist norms weaken it. In all, cultural dimensions explained up to an additional 42% of variance in food waste behavior beyond traditional TPB variables, hence cultural context is not merely a background but an active determinant that has to be integrated into behavioral prediction models.

This investigative journey culminates in cross-cultural validation that transforms observed patterns into generalizable principles. Quantitative rigor across diverse national contexts positions cultural dimensions as fundamental determinants rather than peripheral influences in the research. How collective values and consumerist orientations function as societal thermostats, regulating the temperature of food waste behavior across different cultural climates, is revealed. Such conclusive evidence positions the cultural context as the primary variable in the responsible food consumption equation and, therefore, requires culturally calibrated solutions rather than universal prescriptions.

CONCLUSIONS

The research strategy undertaken in this dissertation was designed as an orderly, multi-phase investigation to dismantle the complex interrelatedness of non-financial obstacles to responsible food consumption. The episodic character of the studies—moving from the macro to the micro, and from theoretical synthesis to empirical validation—has allowed the construction of a refined and robust conclusion.

The study then started by mapping out a macro-understanding of the research landscape, which emphasized the necessity of food loss in climate-smart agriculture but highlighted a lack of prioritization of consumption-stage cultural drivers. This then transitioned directly into the second phase, where a systematic synthesis of literature definitively settled culture as an overarching, non-economic constraint, serving as the theoretical underpinning for the subsequent empirical work. Guided by these findings, the research subsequently concentrated on a specific industry context, the restaurant industry, with the aim of isolating the tangible operational and social-emotional mechanisms through which these hindrances cause waste. Finally, to ensure the validity and generalizability of the central cultural hypothesis, the odyssey concluded with a large-scale, cross-national verification that quantified the impact of specific cultural dimensions, moving the argument from observed phenomenon to validated theory.

Collectively, this research trajectory of funnels creates the inference that consumption of food products in a responsible manner is halted because of a deeply rooted system of non-monetary hindrances. These hindrances are not random but are systematically influenced by collective cultural values and get activated by some operational contexts and social feelings at an individual level. The most effective strategies for promoting responsible food consumption need, in turn, to be as multi-level and tailor-made as the hindrances themselves, shattering beyond the scope of a one-size-fits-all economic policy to embrace culturally sensitive and context-specific interventions. The four studies, therefore, form an indivisible chain of evidence, each link crucial to maintaining the ultimate, general argument of the dissertation.

The purpose of this dissertation was to investigate the main non-economic hindrances to responsible food consumption, focusing on the multifaceted problem of food waste. Through a reasoned sequence of four interrelated studies, the research was able to conclusively prove that responsible food consumption is hindered by an intricate network of hindrances that extend far beyond the price. The study began by mapping the macro-intellectual landscape, which confirmed the interrelation between climate-smart agriculture and food loss. It then mechanistically integrated literature to solidify culture as a central, yet underexplored, food waste behavioral determinant.

This dissertation successfully fulfilled its aim through the completion of the following objectives:

Objective 1 (To map the climate-related issues and food loss research landscape): This objective was achieved in section 1 through a comprehensive bibliometric and bibliographic analysis. The study did not merely document publications; it established the intellectual landscape of the research, identifying emerging research clusters that were interested in production and climatic adaptation. Notably, this macro-level mapping served as a critical scoping study, rigorously identifying a significant knowledge gap: a seeming relative paucity of research dedicated to the consumption-stage, socio-cultural drivers of food loss. This gap provided the immediate justification for the focused question of subsequent chapters.

Objective 2 (To synthesize evidence to establish fundamental non-financial hindrances): This objective was definitively addressed in section 2 via a systematic literature review. The study aligned fragmented international data into a robust theoretical model, aggregating culture—manifested as the lens of social norms, traditions, and beliefs—not as a cause, but as a constituent, non-monetary barrier. Having derived those key factors such as guilt, behavior control, and social expectations, this chapter provided the necessary theoretical language and causal mechanisms that were tested empirically in follow-up studies.

Objective 3 (To empirically test context-specific drivers in the food service industry): This objective was achieved to a great degree of specificity in section 3, employing a fuzzy AHP analysis of the Lithuanian restaurant market. Well beyond theoretical abstraction, this research pierced the field reality of food wastage. It was capable of separating, analyzing, and ordering the very same non-financial drivers with precision, pointing out the disparity: customer-side wastage is largely accounted for by socio-emotional drivers (e.g., shame, social events), while kitchen-side wastage is mostly a matter of operational and infrastructural constraints (e.g., demand planning). It demonstrated explicit, actionable evidence of how hindrances do indeed exist in the real world.

Objective 4 (To conduct a comparative analysis supporting the impact of cultural dimensions): With robust empirical evidence, this objective was completed in section 4 by a cross-national study employing PLS-SEM. With this study, the grand thesis was tested and supported at a global level quantitatively. It demonstrated that specific cultural dimensions (e.g., consumerism and collectivism) are not background variables but successful moderators with direct effects on how attitudes are translated into food waste behavior. This chapter provided the generalizable, conclusive proof that the non-monetary obstacle of culture has a measurable and significant effect on the direction of responsible food consumption.

This theoretical foundation was subsequently buttressed with powerful empirical analysis. Micro-analysis of the restaurant industry revealed that context-specific operational inefficiencies and socio-emotional drivers constitute the dominant waste drivers, decoupled from mere financial calculations. Finally, cross-country large-scale analysis provided definite quantitative proof that cultural dimensions such as consumerism versus collectivism directly and significantly prescribe consumer-level waste actions. Collectively, these papers demonstrate that silver bullet solutions for alleviating food waste are theoretically condemned. The findings emphatically illustrate that effective approaches must be tailored to specific cultural contexts and industry settings with acknowledgment of the fact that the pathways to responsible food consumption are as diverse as are the cultural and operational contexts in which they are found.

The methodology of this dissertation also mirrors the intricacy of the system it tried to investigate. To begin with a bibliometric study, the research did not merely map a body of research; it affirmatively established that food waste is an intrinsic marker of a broader systemic failure to include sustainability in the very core of agricultural and climate change adaptation strategies. The identified research clusters reflect an academic culture often operating in silos, where technology advancements for Climate-Smart Agriculture (CSA) are argued without much concern for the culture and behavior drivers of loss and waste along the value chain, further upstream. The initial mapping, therefore, is not just a review of literature but also an argument for a more integrated, systems-thinking mentality. It assumes the stance that a production technological advancement—such as a drought-resistant crop type—can be altogether ruled out by cultural activity leading to its wastage at the level of consumption. Thus, the dissertation holds that the definition of "sustainable agriculture" itself needs to be expanded to include "responsible food consumption" as an integral part of its definition; both exist or not based on each other.

The following systematic literature review was the conceptual bridge, connecting the macro-world of food system production and the micro-world of action by consumers. "Mechanistically integrated" is a perfect description, as this paper went beyond summarizing and constructed a framework to demonstrate how culture acts as the transmission mechanism whereby higher-order food systems influence individual action. The critique revealed that cultural norms are not silent backdrops but vivid participants who set cognitive processes into context. The example that "negative attitudes towards leftovers" are culturally conditioned reveals how a possibly responsible action (consuming leftovers) is filtered cognitively and consistently rejected by means of a filter of culture that may associate it with poverty or the absence of hospitality. Similarly, the cultural variation of "guilt" as a motivator: in some cultures, guilt will be an

effective force to minimize waste, but in others, it will be outweighed by more dominating cultural drivers, like the social obligation to feed guests lavishly.

The empirical fieldwork among Lithuanian restaurants provided a dazzlingly neat demonstration of these operational and cultural scripts at work. The findings powerfully unbundle waste in a simple financial sense. For example, the itemization of "feelings of shame" as a significant driver of Customer-Generated Waste (CGW) is detailed. It demonstrates how a social emotion, premised upon cultural norms of decency and consumption, can translate into material waste in a direct way. A customer who feels ashamed to ask for a doggy bag is taking a socially risky, not economically calculated, decision. Similarly, the "language barrier" with international guests is not necessarily a communication issue but a clash of cultures, disrupting proper portion size communication, menu labeling, and cultural norms regarding sharing that leads to wastefulness. On the food preparation side, "inappropriate demand planning" is typically treated as a technical problem, but this research contends that it is also cognitive and cultural, being motivated by convention, aversion to shouldering the perceived risk of stock-outs, and lack of systemic prioritization of minimizing waste. In this research, theoretical frameworks of non-financial obstacles are effectively operationalized, applying them with a tangible, executable form in a specific industrial context.

The cross-national investigation then did the requisite external validation, showing that what one finds in certain contexts is part of a universal but variegated human process. Quantification of how "consumerism versus collectivism" governs waste behavior is the culmination of the argument of the dissertation. It provides definitive evidence that the underlying cultural worldview—whether food is primarily a commodity to serve the convenience of individuals or a food that binds groups—has a visible impact on material results. That "ceremonial feasting produced more waste in individualist cultures" is a strong illustration of this rule. Feasting can be governed by strict customs of reciprocity and redistribution in collectivist societies, and there is less wastage. In consumerist, individualist societies, the same feasting can be governed by a logic of overkill and display, where waste is an undesired but accepted by-product of signalling social status. That sends the policy debate far beyond simple calorie calculators or education and into the treacherous ground of cultural values and social structure.

The overall contribution of this is to lay out a new paradigm for understanding and tackling food waste. It is a model that abjures the "rational actor" model for a "cultural actor" model. It argues that the most formidable hindrances are not economic but socio-cultural and cognitive, based in the very fabric of our daily lives and institutionalized habits. The dissertation confirms that failure to overcome these deeply rooted hindrances will render even the best-intentioned technological or economic interventions useless.

The implications of this are profound. It says policy must not attempt to convert individuals into making slightly better decisions within a broken system, but to productively change the cultural and working contexts in which they are made. This involves a slow, multi-disciplinary process that engages marketers, anthropologists, philosophers, cooks, and policymakers working together to re-script the cultural stories about food. It entails restaurant design where sustainability is the default, social campaigns that frame minimizing waste as a cultural achievement and not a cheapness, and educational programs that build food literacy from the beginning.

In general, this dissertation has been successful in dismantling the monolithic concept of "food waste" and laying bare a rich non-financial ecosystem of obstacles. By moving from macro to micro and from theory to empirically grounded, it has provided a robust template for future action and research. The journey began by outlining the map, building a bridge of understanding with cultural theory, trialing that understanding in the real world, and eventually validating it worldwide. The absolute conclusion is that the way forward to a responsible food future is not one of sameness, but of difference—a multitude of customized pathways that respect and work within the rich diversity of human culture and practice. The solutions, as the hindrances themselves, must be as subtle and context-specific as the cultures they are there to serve. This intellectual journey, from macro-mapping to micro-analysis and to global validation, constructs an integrated understanding of the hindrances to responsible food consumption. This journey shows that the path toward food sustainability winds its way through the complex terrains of human culture and emotion, social practice landscapes within which economic signals so often lose their power to navigate. Evidence makes it clear that effective solutions must be as nuanced, as context sensitive, as hindrances themselves, requiring cultural intelligence rather than technological silver bullets or economic incentives alone. Thus, the dissertation concludes that responsible food futures depend not on overcoming human nature, but on redesigning food environments that are in harmony with our cultural and emotional landscapes, creating systems in which the responsible choice becomes the natural, socially rewarding, operationally seamless path forward.

Practical Implications：
The research findings of this dissertation are explained here in light of their practical uses for policymakers, food business managers, and educators.

1. For Policymakers and Public Awareness Campaigns: National and international governments must move away from generic "stop food waste" messages. Campaigns must be culture-specific, as revealed by the cross-country research. In consumerist societies, messages can be framed in terms of convenience-based solutions and the social status of being a "smart" consumer. Where there are strong community traditions,

campaigns can tap into concepts of shared responsibility and respect for food as a philosophical ideal. There should also be backing for initiatives that update culinary traditions to modern waste-reducing ones. The need for culturally specific policy demands more than the mere translation of messages into a fundamental redesign of communications strategies. For policymakers in consumerist, individual societies, this will involve collaborating with marketers and opinion-formers to rebrand waste reduction as a form of efficient, contemporary lifestyle management. Campaigns could market "smart kitchen" shortcuts, apps that simplify portion planning, and rebrand leftovers as "meal prep" – a term associated with health and efficiency, not thrift. In collectivist cultures, in contrast, policy initiatives need to engage communal institutions. This can involve supporting local leaders, places of worship, and community centers to promote habits of sharing leftover food (e.g., developing official community food sharing schemes) and reviving recipes specifically designed for leftovers, thus situating waste reduction within cultural preservation and social cohesion.

2. For the Food Service Sector (Restaurants, Hotels, Catering): Restaurant owners and hospitality managers can use the ranked drivers from the Lithuanian case study for focused operational changes. To manage customer-generated waste, operational strategies include menu engineering (i.e., flexible portioning, encouraging "doggy bag" culture to remove stigma), and staff training to better manage international tourist expectations. To manage kitchen-generated waste, investment in improved demand forecasting software, inventory control systems, and sufficient storage facilities is needed. The research brings to the forefront that waste elimination is not just a cost-cutting measure but a key component of operational excellence and sustainability branding.

3. For Food Businesses and Supply Chain Stakeholders: The study recognizes the need for businesses to understand their target markets at a more cultural level. Product development, packaging, and marketing of sustainable food products need to be led by an understanding of local food rituals, attitudes towards leftovers, and social eating habits. Such culturally sensitive marketing can overcome the non-financial hindrances of habit and perception that often inhibit the adoption of more responsible products. For agri-food firms, this research provides a blueprint for cultural know-how in product development and marketing. It believes that an environmentally friendly product that is not culturally acceptable will fail, even with its green image. Companies have to pursue ethnographic market studies to become closely acquainted with the "food rituals" of their target markets. For example, where there is a long tradition of home preparation of meals from scratch, advertising pre-cut

vegetables can be considered frivolous and an insult to the cooking process. A better approach would be supplying intact, sustainably produced vegetables with recipe ideas that make use of the whole product (e.g., utilizing the broccoli stems to produce slaw). Packaging is also a powerful lever. In convenience cultures, packaging that retains shelf life without sacrificing transparency can reduce waste by managing consumer expectations of freshness. The marketing message has to be thoughtfully crafted. In convenience cultures, highlight convenience. In traditional cultures, people associate the product with heritage and authenticity (e.g., "the way our grandparents used to have it"). For private-label players, this could mean creating product ranges that are specifically designed for creative leftover reuse, with packaging suggesting "second meal" ideas. By repositioning responsible food consumption as an augmentation of existing cultural practices rather than an offering, companies can effectively overcome the deep-seated, non-economic defenses of habit and perception, making sustainability a compelling value proposition.

Recommendations for future research.
While this dissertation provides a comprehensive multi-level analysis, it also opens several promising avenues for future scholarly inquiry.

4. Extending the Geographical and Cultural Scope: Future research should be capable of replicating the cross-national study in an even wider sample of nations, particularly in relatively under-researched parts of Africa, South America, and Asia. That would enhance the generalizability of the cultural typologies and enhance the precision of the role of sub-cultural and religious variations across countries.

5. Longitudinal and Intervention-Based Research: Longitudinal research is needed in order to track how food waste behavior evolves over time, especially in response to specific policy interventions or public awareness campaigns. Experimental research comparing the effectiveness of various messaging strategies (e.g., guilt-based vs. social norm-based) across various cultural contexts would provide strong evidence to guide the development of the most effective interventions. Longitudinal trials are needed to evaluate the sustainability of behavior change. Of most interest is whether or not interventions stimulate permanent habit formation or compliance that is transitory. Follow-up research subsequently needs to track households or firms for 1-3 years post-intervention, tracking not just waste volume but shifts in underlying attitudes and social norms as well. Parallel to this, Randomized Controlled Trials (RCTs) conducted in partnership with municipalities or retailers would provide compelling evidence. For example, a comparison

of the following: a) social norms framing ("9 out of 10 people who live in your area are lowering their food waste"); b) environmental framing (focusing on carbon footprint); and c) cost savings framing (money saved) between cultural districts would provide a robust, actionable matrix for policymakers. This would shift the science from speculating about what might work to knowing what works, and for whom.

6. Investigating Other Non-financial Hindrances: The present thesis also focused significantly on culture and operational procedures. Future research needs to investigate other noted non-financial hindrances within the agri-food supply chain itself, exploring the behavioral, cultural, and perceptual hindrances faced by farmers, distributors, and processors in adopting responsible practices and reducing on-farm and post-harvest losses. In addition, the "food literacy" barrier warrants detailed exploration. This goes beyond acquaintance with nutritional facts to include practical skills: meal planning, safe storage of food, and creative cooking using leftovers. Research could develop and pilot a "Household Food Literacy Scale" and directly relate this to waste measures. Time pressure, a feature of modern living, is an important barrier. Studies can analyze the overlap between time poverty and waste: Does the reliance on convenience foods and prepared meals, often surrounded by excess packaging and portioning, inadvertently contribute to waste? Furthermore, the cosmetic standards for produce are a huge systemic failure. Measure the volume and dollar amount of "ugly" produce wasted at the farm, wholesale, and retail stages in future studies. It should also test consumer acceptance of imperfect produce through innovative marketing and pricing strategies, including whether discounting "ugly" food devalues it or successfully promotes buying it.

7. Integrating Technological Solutions: As a sequel to the operational hindrances in the restaurant industry, subsequent research could explore integrating certain technological solutions, such as AI-based demand forecasting software or IoT-integrated smart storage facilities, to assess their actual-world performance and payback on kitchen food waste savings. Technology adoption research must be actionable and implementation science-driven. Some of the simple questions are: What is the real ROI of AI-powered demand forecasting solutions for small, independent restaurants versus large chains? What are the primary adoption impediments (cost, technical skill, change resistance)? Future studies ought to employ action research methods, collaborating directly with restaurants to co-design, implement, and evaluate technology solutions. This could include pilot-testing IoT sensors at warehouses, monitoring temperature and stock levels, and issuing automatic alerts to managers. The research must address not only the waste savings but also

second-order advantages like reduced spoilage, improved inventory turnover, and conserving labor hours. This would translate into an end-to-end business case for tech implementation, bridging technical feasibility to practical viability.

8. Interdisciplinary Solutions: Finally, solutions to a challenge that is as complex as food waste require breaking down disciplinary silos. Future research would benefit from combining scholars from anthropology, psychology, supply chain management, and data science to bring together knowledge in a form that synthesizes into holistic models of responsible food practice.

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INFORMATION ABOUT DOCTORAL STUDENT

The doctoral student, Yufei Wang, is an active researcher investigating the non-financial hindrances to responsible food consumption. Having shown a high publication output at the start of their scholarship work, the student has authored or co-authored seven Web of Science and/or Scopus-indexed international journal articles. These include publications in top-level journals like International Marketing Review, Energies, Sustainability, Journal of Quality Assurance in Hospitality & Tourism, Games, and the Journal of Strategy and Management. This corpus of work exemplifies an interdisciplinary research approach that bridges the horizons of marketing, sustainability, hospitality, and strategic management, underscoring the student's capacity to produce high-quality, impactful scholarly research. Doctoral student is also active in the dissemination of his work in scientific conferences (3 presentations at international scientific conferences) and building a collaborative network with researchers from different countries (co-authored publications with Chinese, Italian, and Slovak scholars). During his PhD studies, Y. Wang was also involved in teaching activities, having delivered lectures on Entrepreneurship Fundamentals and Sales Strategies for bachelor's students and on Smart Technology and Digitalization for master's students.

INFORMACIJA APIE DOKTORANTĄ

Doktorantas Yufei Wang yra aktyvus tyrėjas, nagrinėjantis nefinansines kliūtis tvariam maisto produktų vartojimui. Nuo studijų pradžios doktorantas aktyviai įsitraukė į mokslinę veiklą ir yra septynių mokslo straipsnių, indeksuojamų Web of Science ir/ar Scopus DB autorius arba bendraautorius. Y. Wang publikacijos paskelbtos tokiuose aukšto lygio mokslo žurnaluose kaip „International Marketing Review", „Energies", „Sustainability", „Journal of Quality Assurance in Hospitality & Tourism", „Games", „Journal of Strategy and Management" ir "Business, Management and Economics Engineering". Šis straipsnių rinkinys iliustruoja tarpdisciplininį mokslinių tyrimų požiūrį, jungiantį rinkodaros, tvarumo, viešbučių ir strateginio valdymo sritis bei pabrėžia studento gebėjimą atlikti aukštos kokybės, reikšmingus mokslinius tyrimus. Doktorantas taip pat aktyviai pristato savo mokslinius tyrimus tarptautinėse konferencijose (3 pranešimai) bei yra įsitraukęs į mokslininkų tinklus (publikavo mokslo straipsnius kartu su Kinijos, Italijos, Slovakijos mokslininkais). Dokotrantūros studijų metu Y. Wang taip pat dėstė Entrepreneurship Fundamentals ir Sales Strategies dalykus bakalauro bei Smart Technology and Digitalization magistro studijų studentams.

SANTRAUKA

Temos aktualumas ir naujumas

Tvaraus produktų vartojimo siekis yra bene aktualiausias 21-ojo amžiaus iššūkis, susijęs su aplinkos apsauga, maisto sauga ir socialine lygybe. Nors ekonomikos aspektai, paprastai aptariami diskusijose apie „žaliąją naudą", yra labai svarbūs, atsiranda vis daugiau įrodymų teigiančių, jog dėl maisto švaistymo vartotojų patiriamos išlaidos yra tik viena iš daug sudėtingesnės problemos dalių. Kultūrinės vertybės pasireiškiančios nefinansinių kliūčių, kognityvinių šališkumų socialinių papročių ir infrastruktūros trūkumų pavidalu, yra vis labiau suprantamos kaip pagrindinės kliūtys masiniam tvaraus vartojimo įpročių įsitvirtinimui. Taigi, atliekų mažinimas yra vienas prioritetinių tikslų, siekiant sumažinti milžinišką pasaulinės maisto sistemos neefektyvumą, kur maždaug trečdalis viso žmonėms skirto maisto nėra suvartojama arba lieka ir yra išmetamaa, o tai ilgainiui gali turėti didelių tiek etinių, tiek ir aplinkosauginių pasekmių.

Moksliniai darbai maisto atliekų tema tradiciškai apibrėžiami techniniais – vadybiniais, ekonominiais aspektais bei teoriniais modeliais, kurie paremti dideliu vartotojų racionalumu. Tačiau platus problemos mastas rodo, kad šie bandymai yra nepakankami. Todėl verta atsižvelgti į elgsenos ir sociokultūrinių veiksnių nulemtus maisto švaistymo atsiradimo veiksnius. Pavyzdžiui, planuoto elgesio teorija (TPB) buvo plačiai taikoma siekiant paaiškinti aplinką tausojantį elgesį asmens nuostatų, subjektyvių normų ir suvokiamo elgesio kontrolės požiūriu. Nors šie modeliai yra naudingi, jie kelia pernelyg didelio apibendrinimo pavojų ir neatsižvelgia į giluminį, bet paprastai nesąmoningą kultūrinio konteksto ir konkrečių situacijų, susijusių su skirtingų maisto grandinės segmentų veiklos realijomis, poveikį. Todėl mokslininkai vis ryžtingiau teigia, kad maisto švaistymo elgesio negalima paaiškinti vien racionalia kaštų ir naudos analize, mat jis yra įsišaknijęs gilioje papročių, socialinių normų, praktikuojamų tradicijų ir situatyvinių apribojimų hierarchijoje.

Tarp šių nefinansinių veiksnių ypač didelę įtaką turi kultūra, tačiau jos poveikį labai sunku pamatuoti kiekybiškai. Ji veikia kaip nematoma ranka, kuri formuoja kiekvieną mūsų santykio su maistu aspektą, pradedant gamyba ir pirkimu, baigiant paruošimu ir vartojimu ir, galiausiai, utilizavimu. Viena reikšminga spraga šiuolaikinėje mokslinėje literatūroje yra tai, kad trūksta integruoto supratimo apie šį aspektą ir remiamasi prielaidomis, kad asmens elsgesio keitimo strategija gali būti bendra visiems individams. Analogiškai, nors maitinimo paslaugų sektorius yra viena iš esminių pasaulinių maisto švaistymo atsiradimo sričių, konkretūs neekonominiai veiksniai, lemiantys

maisto atliekų susidarymą šiame sektoriuje, lieka neišspręsti ir nepakankamai išnagrinėti; tarsi nustumti į antrą planą prioritetą teikiant kaštų taupymo retorikai, neatsižvelgiant į kultūrines ar socialines-psichologines vaisto švaistymo susidarymo veiksnių priežastis.

Ši disertacija užpildo šias kritines spragas integruotu ir daugialypiu tyrimų rinkiniu. Jos pagrindinis argumentas yra tai, kad nefinansinės kliūtys, ypač susijusios su kultūra, yra nepakankamai ištirtos bei vienos pagrindinių maisto atliekų priežasčių, o norint veiksmingai sumažinti maisto švaistmo fenomeną, būtinas sudėtingas, daugiapakopis šių kliūčių supratimas. Todėl šioje disertacijoje siekiama sistemingai identifikuoti, ištirti ir paaiškinti šių nefinansinių kliūčių įtaką, ypač atsižvelgiant į kultūrinio pobūdžio priežastis ir maitinimo sektoriaus specifinius veiklos veiksnius, tam, jog būtų galima pateikti įrodymais pagrįstą pagrindą tikslingų ir veiksmingų intervencinių priemonių kūrimui.

Šiuo tikslu disertacija suskirstyta į keturias pagrindines studijas, kuriose naudojami skirtingi metodai, tam, kad iškelta problema būtų išnagrinėta iš skirtingų perspektyvų. Tikslai ir jų rezultatas – mokslinės publikacijos, pateiktos žemiau:

1. Nustatyti intelektualinę aplinką ir pagrindines mokslinių tyrimų tendencijas didelio masto maisto švaistymo ir tvarumo paradigmų sankirtoje, taip sukuriant makrolygio kontekstą maisto švaistymo mažinimo tyrimams. Šis tikslas pasiektas bibliometriniu tyrimu „Mapping the landscape of Climate-Smart agriculture and food loss: A bibliometric and bibliographic analysis".

2. Integruoti pasaulinius įrodymus, siekiant sukurti bazinį supratimą apie labai specifinius procesus, per kuriuos socialiniai lūkesčiai, tradicijos ir kultūrinės normos daro įtaką maisto švaistymo elgsenai. Šis tikslas pasiekiamas sistemine literatūros apžvalga „Systematic literature review on the nexus of food waste, food loss and cultural background".

3. Empiriškai ištirti, nustatyti ir įvertinti konkrečias nefinansines maisto švaistymo priežastis maitinimo paslaugų sektoriuje, pereinant nuo kultūrinių bendrybių prie praktinių, kontekstui pritaikytų žinių. Šis tikslas pasiekiamas atlikus maitinimo sektoriaus tyrimą „What really drives food waste in the restaurant industry? Evidence from Lithuania".

4. Pateikti empirinę keleto šalių lyginamąją analizę, kurioje kiekybiškai tikrinamas ir patvirtinamas tam tikrų kultūrinių aspektų poveikis vartotojų požiūriui ir maisto švaistymo elgesenai. Šiam tikslui pasiekti skirtas empirinis straipsnis „What/who is to blame for the food waste: a cross-country investigation of the role of cultural background on food waste behavior".

Disertacijos struktūra

Disertacija pateikiama kaip integruotas, nuoseklus tyrimas, kuris pereina nuo susipažinimo su makrolygio tyrimų aplinka prie patikrintų mikrolygio išvadų apie nefinansines kliūtis tvaraus maisto vartojimui. Keturi paskelbti straipsniai, sudarantys jos turinį, nėra atskiri tyrimai, bet logiška ir kaupiamoji tyrimų patirtis, kur kiekvienas straipsnis remiasi ankstesnio straipsnio išvadomis tam kad būtų suformuluoti daugialypiai visaapimantys argumentai. Pradžioje pateikiama mokslinių tyrimų apžvalga. Pirmasis tyrimas „Mapping the landscape of Climate-Smart agriculture and food loss: A bibliometric and bibliographic analysis" yra esminis skyrius. Jame nustatomas makro lygmens kontekstas siekiant moksliškai apžvelgiant intelektualinę sritį, kurioje susikerta prisitaikymas prie klimato kaitos ir maisto praradimai/švaistymas. Šis tyrimas parodo, jog maisto nuostoliai yra pagrindinis elementas platesnėse tvarumo programose, tačiau taip pat teigia, kad vartotojų lygmens veiksniai, kurie yra sociokultūriniai, nebuvo pagrindinis šio srities prioritetas.

Šis nustatytas trūkumas pareikalavo gilesnio konkretaus kultūros vaidmens tyrimo. Todėl buvo atliktas antrasis tyrimas „Systematic literature review on the nexus of food waste, food loss and cultural background". Šis tyrimas apibendrino duomenis iš viso pasaulio, siekdamas patvirtinti, kad kultūrinės nuostatos, socialinės normos ir tradicijos yra pagrindiniai, tačiau nepakankamai ištirti maisto švaistymo atsiradimo veiksniai. Jame buvo nustatyti esminiai vartotojų elgesį lemaintys elementai, tokie kaip kaltės jausmas, socialinės normos ir požiūris į maisto likučius.

Remiantis šia teorine platforma, tyrimas turėjo pereiti nuo globalios teorijos prie vietinės praktikos. Siekiant šio tikslo, trečiasis tyrimas „What really drives food waste in the restaurant industry? Evidence from Lithuania" išsamiai nagrinėja maitinimo paslaugų sektorių. Šis empirinis tyrimas peržengė plačių kultūrinių prielaidų ribas siekdamas rasti ir prioritetizuoti tikslius švaistymo veiksnius ir atskleidė, jog svarbiausia yra sąveika tarp virtuvės veiklos neefektyvumo ir vartotojų socialinių bei emocinių veiksnių.

Remiantis restorano atvejo tyrimu gauti rezultatai, nors ir įdomūs, iškėlė kritinį klausimą: ar veiksniai, ypač kultūriniai, yra apibendrinami? Siekiant tai nustatyti ir patikrinti teoriją dideliu mastu praktiškai, ketvirtasis atliktas tyrimas „What/who is to blame for the food waste: a cross-country investigation of the role of cultural background on food waste behavior" pateikia neginčytinas išvadas. Šis tarptautinis, didelio masto tyrimas empiriškai patikrina ir patvirtina, kaip konkretūs kultūriniai aspektai (pvz., vartotojiškumas, ar, priešingai, kolektyvizmas) aiškiai ir tiesiogiai formuoja vartotojų elgseną maisto švaistymo aspektu, ir parodo, kad kultūros poveikis

yra universalus taikant, bet specifiškas išreiškiant.

Taigi, šioje disertacijoje kultūros aprėptis sumažinama nuo bendro sisteminio lygio iki tiksliai empiriniu būdu nustatytos žinių bazės, integruojant jas į harmoningą naratyvą, kuris neginčijamai įrodo nefinansinių kliūčių poveikį maisto produktų tvaraus vartojimo srityje.

Metodologinis ir teorinis ryšys. Šioje disertacijoje taikomas nuoseklus mišrių metodų tyrimo metodas, siekiant atlikti struktūruotą ir išsamų tyrimą, kaip parodyta 8 paveiksle.
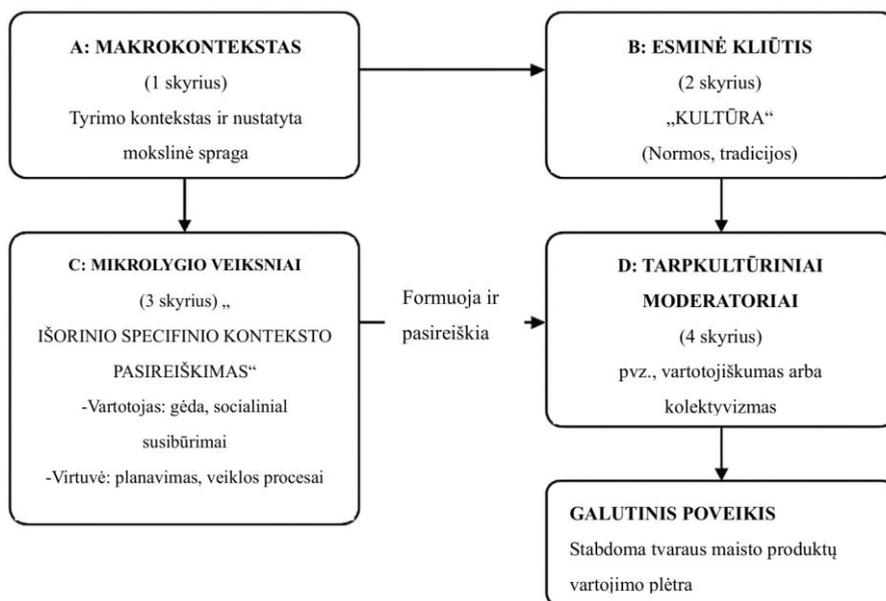
8 pav. Integruota daugiapakopė nefinansinių kliūčių tvariam maisto produktų vartojimui sistema

Tyrimo procesas prasidėjo nuo tyrimų kartografijos, kur bibliometrinė analizė (2 skyrius) padėjo sudaryti bendrą klimato kaitai pritaikytos žemės ūkio ir maisto nuostolių analizės intelektualinio kraštovaizdžio žemėlapį. Makrolygio apimties tyrimas buvo pagrindinis tyrimas svarbus patvirtinant tyrimų grupių egzistavimą ir aktualumą bei aiškiai identifikuojant kritinę spragą, susijusią su vartojimo etapu ir kultūrinėmis kliūtimis.

Todėl šis trūkumas nusipelnė tiriamojo, išsamesnio etapo. Sisteminė literatūros apžvalga (3 skyrius) ir kokybinis neraiškiųjų skaičių AHP tyrimas (4 skyrius) buvo atlikti siekiant induktyviai nustatyti, konceptualizuoti ir suskirstyti tikslias nefinansines kliūtis, pvz., kultūrines normas, socialines emocijas ir veiklos neefektyvumą, kurios, kaip nustatyta pirminiame tyrime,

buvo nepakankamai ištirtos.

Šių tiriamųjų analizių rezultatai ir priemonės tiesiogiai paveikė vėlesnį empirinį etapą, skirtą patvirtinti iškeltas hipotezes, tyrimo klausimus. Tiksliau, keleto valstybių didelio masto apklausoje (5 skyrius) buvo įvertinti suformuoti konstruktai ir kiekybiškai ištirti numatomi tarpusavio ryšiai naudojant dalinių mažiausių kvadratų struktūrinių lygčių modeliavimą (PLS- SEM).

Taigi metodologinė trajektorija yra aiški: nuo tyrimo lauko žemėlapio sudarymo (2 skyrius) iki pagrindinių sąvokų tyrinėjimo ir apibrėžimo (3 ir 4 skyriai) ir, galiausiai, rezultatų patikrinimo bei apibendrinimo (5 skyrius). Tai sukuria griežtą metodologinę grandinę, kurioje kiekvienas tyrimas logiškai ir empiriškai parengia pagrindą kitam, tokiu būdu maksimaliai padidindamas disertacijos išvadų pagrįstumą, patikimumą ir svarbą.

Bendras indėlis

Bendras šio disertacijos indėlis yra trejopas: teorinis, metodologinis ir praktinis.

Pirma, disertacija turi stiprų teorinį poveikį, deduktyviai nustatydama ir griežtai įrodydama, kad kultūra ir veiklos kontekstas yra svarbios, bet nepakankamai ištirtos nefinansinės tvaraus vartojimo kliūtys. Ji meta iššūkį šioje srityje vyraujančiam ekonominiam modeliavimui ir racionalaus pasirinkimo teorijai, veiksmingai sintezuodama kultūrinę teoriją ir specifinį elgesio supratimą.

Antra, autorius daro reikšmingą metodologinį indėlį, parodydamas daugelio metodų tyrimo dizaino svarbą. Disertacija pagrįsta gausia analizės priemonių įvairove – nuo bibliometrijos, sisteminės apžvalgos, neraiškiųjų skaičių AHP pereinama prie tarpkultūrinės PLS-SEM. Kiekviena jų buvo pasirinkta taip, kad kuo geriau atitiktų konkretų tyrimo klausimo sudėtingumo lygį. Disertacijoje pateikiama išsami, daugiapakopė analizė, apimanti makrointelektualinę aplinką, mikroekonominius veiksnius ir makrosociologinį patvirtinimą.

Galiausiai, ši disertacija turi pritaikomą praktinę reikšmę. Tyrimo rezultatai pateikia aiškias, įrodymais pagrįstas rekomendacijas politikos formuotojams tam, kad jie parengtų kultūriškai jautrias informavimo kampanijas. Restoranų vadovams ir pramonės asociacijoms, kad būtų įgyvendintos operatyvinės priemonės, skirtos individualiems, maisto švaistymo mažinimo veiksniams, ir NVO bei tarptautinėms agentūroms tam, kad jos parengtų tikslingas priemones, kurios galėtų žymiai sumažinti maisto švaistymą skirtinguose kultūriniuose ir pasaulio regionuose. Šis tyrimas

būtinas giliai įsišaknijusių nefinansinių problemos priežasčių sprendimui ir sudaro sąlygas veiksmingesniems ir tvaresniems produktų vartojimo modeliams visame pasaulyje.

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Finally, I reserve my most sincere thanks for my wife, Jinzhao Wei. Her encouragement pushed me to attempt this PhD pursuit. Although she initiated her own doctoral study in Macao before me, her words of encouragement have been my pillar. Although it seems that I will be graduating earlier, it is a testament to the encouragement she provided. Without her belief in me, this work would never have been realized.

PRESENTATIONS AND CONFERENCE PROCEEDINGS

1. Wang, Y., Morkūnas, M., & Wei, J. Emerging Trends in Economics, Culture and Humanities (etECH 2025), Riga, Latvia, April 23-24, 2025.
2. Wang, Y., Morkūnas, M., & Wei, J. 15th International Scientific Conference Business and Management 2025, Vilnius, Lithuania, May 15-16, 2025.
3. Morkūnas, M., & Wang, Y., Truth, Lies, and Narrative: Conceptual Framework and Practical Challenges of Information Manipulation in Marketing Management. International Scientific Conference Information and Communication in Organizations: New Forms of Expression, Vilnius, Lithuania, October 9-10, 2025

LIST OF PUBLICATIONS

1. Wang, Y., Morkūnas, M., & Wei, J. (2024). Mapping the Landscape of Climate-Smart Agriculture and Food Loss: A Bibliometric and Bibliographic Analysis. Sustainability, 16(17), 7742. https://doi.org/10.3390/su16177742
2. Morkūnas, M., Wang, Y., Wei, J., & Galati, A. (2024). Systematic literature review on the nexus of food waste, food loss and cultural background. International Marketing Review, 41(3-4). https://doi.org/10.1108/imr-12-2023-0366
3. Morkūnas, M., Wang, Y., & Borsellino, V. (2025). What Really Drives Food Waste in the Restaurant Industry? Evidence from Lithuania. Journal of Quality Assurance in Hospitality & Tourism, 1–38. https://doi.org/10.1080/1528008x.2025.2462651
4. Wang, Y., Morkūnas, M., Hasan, A., Bresciani, S., & Galati, A. (2025). What/who is to blame for the food waste: a cross-country investigation of the role of cultural background on food waste behavior. Journal of Strategy and Management, 1–19. https://doi.org/10.1108/jsma-03-2025- 0081

Not included in the dissertation but published:
1. Morkūnas, M., Wang, Y. & Vilčeková, L. (2025). Culinary Continuity in Flux: Negotiating Tradition, Openness, and Social Norms in Determining Cultural Resilience in Food. Business, Management and Economics Engineering, DOI: 10.3846/bmee.2025.23632
2. Morkūnas, M., Wang, Y., & Wei, J. (2024). Role of AI and IoT in Advancing Renewable Energy Use in Agriculture. Energies, 17(23), 5984. https://doi.org/10.3390/en17235984
3. Wang, Y., Morkūnas, M., & Wei, J. (2024). Strategic Synergies: Unveiling the Interplay of Game Theory and Cultural Dynamics in a Globalized World. Games, 15(4), 24–24. https://doi.org/10.3390/g15040024

CONTRIBUTIONS

1. Mapping the Landscape of Climate-Smart Agriculture and Food Loss: A Bibliometric and Bibliographic Analysis

Personal Contribution: My personal contributions, according to the CRediT taxonomy, were:

Formal Analysis: I performed the scientific mapping and bibliometric analysis using VOSviewer and other software as needed.

Investigation: I managed the methodology and process of the research question investigation and data collection from the Scopus database.

Writing Original Draft: I wrote the complete first draft of the manuscript.

Role of Co-authors:

Prof. Dr. Morkūnas was responsible for:

Conceptualization: Initial research idea and general aims.

Supervision: Control and supervision of the research assignment.

Writing, Review & Editing: Critique, revision, and editing of the manuscript.

Mrs. Wei performed:

Data Curation: Handling and management of the collected bibliometric data.

2. Systematic literature review on the nexus of food waste, food loss and cultural background

Personal Contribution: My personal contributions, according to the CRediT taxonomy, were:

Investigation: I conducted a systematic review of the literature, which involved the creation of the review protocol, literature database searching, screening publications against exclusion/inclusion criteria, and data extraction.

Formal Analysis: I conducted thematic synthesis and analysis of the extracted data to identify the prevailing themes and results.

Writing Original Draft: I wrote the whole first draft of the manuscript.

Role of Co-authors:

Prof. Dr. Morkūnas:

Conceptualization: Formation of the initial research idea and the general intent of the review.

Supervision: Overseeing and managing the research process in addition to the development of the thematic findings.

Writing, Review & Editing: Thorough examination, revision, and editing of the manuscript to enhance its focus and academicity.

Prof. Dr. Galati:

Writing, Review & Editing: Providing critical feedback on the manuscript structure and thematic review.

Mrs. Wei was responsible for:

Writing – Review & Editing: Proofreading and providing feedback on the language and clarity of the manuscript.

3. What Really Drives Food Waste in the Restaurant Industry? Evidence From Lithuania

Personal Contribution: My personal contributions, according to the CRediT taxonomy, were:

Investigation: I was responsible for implementing the research process.

Formal Analysis: I conducted the fuzzy AHP analysis and offered the interpretation of the results.

Writing Original Draft: I drafted the literature review.

Role of Co-authors:

Prof. Dr. Morkūnas was responsible for:

Supervision: Overall leadership and direction of the research activity.

Investigation: Conducted the interviews with restaurant managers.

Methodology: Formulated the interview protocol and established the study design.

Writing, Review & Editing: Critical comment and review of the manuscript.

Prof. Dr. Borsellino was responsible for:

Validation: Verifying expertise to endorse the fuzzy AHP methodology and the analysis process.

Writing – Review & Editing: Assisting in the discussion of managerial implications and reviewing the manuscript for publication.

4. What/who is to blame for the food waste: a cross-country investigation of the role of cultural background on food waste behavior

Personal Contribution:

My own contributions, according to the CRediT taxonomy, were:

Methodology: I integrated cultural constructs into the theoretical framework and developed the survey instrument.

Investigation: I managed and coordinated the cross-country data collection process jointly with Prof. Dr. Morkūnas.

Formal Analysis: I conducted the advanced statistical analysis (PLS-SEM) jointly with Mr. Hasan. I interpreted the results.

Writing Original Draft: I prepared the original draft of the manuscript.

Role of Co-authors:

Prof. Dr. Morkūnas was responsible for:

Supervision: Lead the study design and direct the research effort.

Conceptualization: Contributing to the development of the cross-cultural theoretical model.

Investigation: Coordinated the cross-country data collection process jointly with me.

Validation: Assisting in checking the statistical analysis and methodological framework.

Writing, Review & Editing: Providing significant revisions towards enhancing the manuscript's methodological and theoretical soundness.

Prof. Dr. Bresciani and Prof. Dr. Galati were responsible for:

Writing, Review & Editing: Providing significant revisions towards enhancing the manuscript's methodological and theoretical soundness.

Mr. Hasan was responsible for:

Formal Analysis: Jointly running the PLS-SEM analysis.

COPIES OF PUBLICATIONS