

The Implementation of HACCP in Supporting Sustainability in the Food and Beverage Service Business

Narendra Duhita^{1*}, Zeilla Nailurrahmi², Fauziyya Hafizh Muslim³

^{1,2,3} Politeknik Pariwisata NHI Bandung, Indonesia

*Corresponding author Email: nad@poltekpar-nhi.ac.id

Keywords:

Food Safety, HACCP,
Sustainability, Triple Bottom Line,
Environmental Cleanliness

Article

Received on 3rd February 2025

Accepted on 20th May 2025

Published on 30th June 2025

Cite this article

Duhita, N., Nailurrahmi, Z., Muslim, F.H. (2025). The Implementation of HACCP in Supporting Sustainability in the Food and Beverage Service Business, *NHI Hospitality International Journal*, 3(1), 31-39.
<https://doi.org/10.34013/nhi.v3i1.1912>

Copyright @Author

Publishing License

This work is licensed under a [Creative Commons Attribution-Share Alike 4.0 International License](https://creativecommons.org/licenses/by-sa/4.0/)



Abstract

Purpose of the study: The aim of this study is to evaluate the impact of implementing the HACCP system on sustainability within the food and beverage service sector in Bandung, Indonesia, using the Triple Bottom Line (TBL) framework to explore the balance between profitability, social responsibility, and environmental sustainability.

Design/methodology: The study utilizes a descriptive, qualitative approach, involving purposive sampling of operational managers, employees, and customers. Tools include interviews, surveys, and data triangulation. Software used for data analysis is adapted from Miles and Huberman's framework, with a focus on the TBL theory

Findings: The implementation of HACCP, personal hygiene, and environmental cleanliness contributes to food safety, enhances profitability by reducing food safety risks, and promotes sustainability by reducing waste and resource consumption, aligned with the Triple Bottom Line framework.

Research limitations/implications: This study is useful for businesses in the food and beverage service sector, particularly in Indonesia, and can benefit industries focused on food safety, sustainability, and corporate social responsibility within the fields of hospitality, tourism, and environmental management.

Novelty/Originality of the study: This study advances existing knowledge by linking the implementation of HACCP with sustainability goals using the Triple Bottom Line framework, highlighting how food safety systems can contribute not only to consumer health but also to environmental sustainability and long-term business profitability in the food and beverage service industry.

INTRODUCTION

Food safety is a critical component of the culinary industry, particularly within the food and beverage service sector, where it directly influences a business's reputation and success (Lee et al., 2023). The increasing awareness among consumers regarding food safety has heightened the demand for effective management systems that not only protect public health but also enhance business sustainability. One internationally recognized method for ensuring food safety is the Hazard Analysis Critical Control Point (HACCP) system. This proactive approach to risk management allows businesses to identify, assess, and control potential hazards throughout the food production process, thereby preventing issues before they arise (Wallace & Mortimore, 2016).

The HACCP system is designed to manage biological, chemical, and physical hazards in food production and service environments. HACCP primary focus is on prevention rather than reaction, necessitating continuous monitoring and verification of food safety protocols from raw material procurement to the final product delivery (Wallace & Mortimore, 2016). In light of the growing emphasis on sustainability, food safety practices are increasingly viewed as essential elements of corporate social responsibility (Malik et al., 2021). Implementing HACCP not only meets consumer expectations but also fosters customer trust and supports long-term business viability (Azevedo et al., 2014). However, the journey toward effective HACCP implementation is fraught with challenges. Businesses often face obstacles such as training requirements, initial costs, and the need for consistent monitoring. These challenges highlight the importance of integrating HACCP into broader sustainability initiatives that encompass economic, social, and environmental dimensions (Wallace & Mortimore, 2016).

The Triple Bottom Line (TBL) framework serves as a guiding principle for achieving this balance by emphasizing the interconnectedness of profit (economic sustainability), people (social responsibility), and planet (environmental stewardship) (Abraham, 2024). In Indonesia, compliance with food safety regulations is mandated

by Law No. 8 of 1999 and other consumer protection laws that underscore the significance of food safety in business operations. Within this regulatory context, adherence to HACCP not only protects consumers but also enhances public trust in food service establishments. Furthermore, it mitigates financial risks associated with non-compliance while promoting sustainable environmental practices.

This study aims to evaluate the impact of implementing the HACCP system on sustainability within the food and beverage service sector in Bandung, Indonesia. By employing the TBL framework developed by Baccarini et al., (1997), this research will explore how HACCP implementation can contribute to achieving a harmonious balance between profitability, social responsibility, and environmental sustainability in this competitive industry landscape.

LITERATURE REVIEW

HACCP

HACCP (Hazard Analysis Critical Control Point) was established in the 1960s by the Natick Army Laboratory of NASA in collaboration with the Pillsbury Company to create a food safety system for space missions, ensuring the safety of astronaut food. Hazards can be biological, chemical, or physical and may arise from raw materials or finished products. This system has gained international recognition as a vital framework for managing food safety hazards (Wallace & Mortimore, 2016). The Codex Alimentarius Committee has standardized HACCP, which employs a preventive approach to define, preserve, review, regulate, and monitor critical points in food production relevant to safety (Wallace et al., 2014). The seven principles of HACCP guide the hazard analysis process are identifying critical control points, establishing critical limits, setting criteria for monitoring these points, verifying corrective actions, and maintaining documentation. In this context, hazard refers to any condition or agent in food that could potentially lead to adverse health effects (Azevedo et al., 2014).

The assessment of the severity and risk associated with a hazard is termed hazard analysis. Research indicates that HACCP is more effective when integrated with quality control systems and standard operating procedures such as Good Manufacturing Practices (GMP) or Good Hygiene Practices (GHP) (De Oliveira et al., 2016). Despite its advantages, the implementation of HACCP faces significant barriers in the food sector, particularly among small food and beverage services. Common challenges include high implementation costs, limited financial capacity and purchasing power, complexity in food handling procedures, insufficient technological skills, and poor coordination among regulatory authorities (De Oliveira et al., 2016). To effectively manage foodborne illnesses within the HACCP framework, it is essential to focus on preventing incidents before they occur. Successful businesses that have implemented HACCP demonstrate its effectiveness in averting food safety incidents. However, not all establishments have achieved success with HACCP; it is crucial to consider instances where similar issues have persisted despite efforts to prevent them.

Benefit of HACCP in Food and Beverages Services

The implementation of a food safety management system intended to track the entire production system and lead to the development of a safe consumer product with required standard and minimal returns. According to Wallace et al., 2014, The benefit of HACCP is preventing food safety incidents by ensuring compliance through documented processes that can serve as evidence in legal cases (Awuchi, 2023). Effective food safety management relies on Good Hygienic Practices (GHP) to control hygiene and environmental conditions in food production. Personal hygiene is crucial for minimizing the risk of foodborne illnesses and is a prerequisite for HACCP implementation (De Oliveira et al., 2016).

HACCP helps prioritize critical areas in food processing, allowing knowledgeable personnel to make informed decisions. By concentrating on significant control points, businesses can enhance operational efficiency and profitability while ensuring food safety (Awuchi, 2023). Implementing HACCP provides a robust monitoring mechanism for food safety, offering legal protection in many countries against incidents of foodborne diseases (Okpala & Korzeniowska, 2023). Adequate training and supervision for food handlers are vital for effective HACCP implementation. Training should be tailored to the responsibilities of each food handler and refreshed regularly to keep up with best practices and legal requirements (Insfran-Rivarola et al., 2020).

The implementation of HACCP encourages small businesses to develop their workforce's skills and knowledge, fostering teamwork and problem-solving strategies focused on safety rather than solely on profits (Kamboj et al., 2020). Maintaining high standards of hygiene through HACCP not only protects public health but also enhances customer trust and loyalty. Clean and safe food environments encourage repeat business and contribute to overall business growth (Insfran-Rivarola et al., 2020). HACCP supports businesses looking to expand by meeting the documentation requirements often demanded by major retailers and export markets, thus facilitating access to broader markets.

HACCP Implementation in Food and Beverage Services in Indonesia

The Indonesian government has made efforts to ensure food safety by implementing various regulations, such as the Republic of Indonesia Law No. 23 of 1992 on Health (Part Four: Food and Beverage Safeguards), Law No. 7 of 1996 on Food, Government Regulation No. 69 of 1999 on Food Labelling and Advertising, and Government Regulation No. 28 of 2004 on Food Safety, Quality, and Nutrition (Marlinae et al., 2021). Additionally, Law No. 8 of 1999 addresses consumer protection. Despite these legal frameworks, challenges remain, including the circulation of substandard food products, frequent cases of food poisoning, low accountability among food producers and distributors, and limited consumer awareness about food safety (Santriati et al., 2022).

Food poisoning has severe consequences, such as economic losses, illness, fatalities, reduced productivity, and long-term public health risks (Malik et al., 2021). In Indonesia, food safety standards are largely voluntary under the supervision of the National Standardization Agency (BSN). The Food and Drug Supervisory Agency (BPOM) mandates food safety only through certifications such as the Good Manufacturing Practices (GMP) certification). Food safety is crucial for the food production industry to ensure consumer trust, enhance competitiveness, and meet export requirements. Alongside attributes like appearance, taste, and price, consumers increasingly demand safe food products (Kamboj et al., 2020). Therefore, food and beverage service providers must prioritize meeting consumer expectations for food safety.

Triple Bottom Line (TBL)

In the context of sustainability, food safety is an integral part of the social and environmental responsibilities expected by consumers. The application of HACCP can meet consumer expectations, build customer trust, and support long-term business sustainability (Awuchi, 2023). However, the implementation of HACCP faces challenges, such as the need for training, costs, and consistent monitoring.

Businesses must not only pursue financial profits but also contribute positively to society and the environment. The Triple Bottom Line (TBL) framework emphasizes the importance of balancing these three aspects to achieve long-term sustainability (Baccarini et al., 1997). In line with TBL theory, sustainability in food service management involves operations that support environmental, economic, and social well-being. This concept, often guided by the TBL framework, encompasses three pillars:

Economic sustainability

HACCP reduces the risk of foodborne illness, product recalls, and lawsuits, protecting businesses from financial losses. It also enhances operational efficiency by reducing waste and optimizing resource use, supporting long-term profitability (Focker & van der Fels-Klerx, 2020).

Social sustainability

HACCP protects consumer health by ensuring food safety, aligning with corporate social responsibility. Businesses that implement HACCP contribute to public health, build consumer trust, and ensure compliance with food safety regulations (Pedroso et al., 2021).

Environmental sustainability

HACCP helps optimize the use of resources, such as water and energy, by streamlining production processes and preventing contamination. This reduces food waste, conserves natural resources, and lowers the carbon footprint of food businesses (Azevedo et al., 2014).

According to Law No. 8 of 1999 and several other regulations, the Indonesian government has established consumer protection laws that include food safety standards. These laws emphasize the importance of food safety in business operations. Within the TBL framework, compliance with food safety regulations is crucial for protecting consumers and building public trust (People). This compliance also helps businesses avoid potential fines (Profit) and promotes more efficient and sustainable environmental management (Planet).

The complexity of the HACCP system often poses challenges for businesses in the food and beverage sector, and the initial implementation costs can be high. Additionally, there remains a lack of understanding and awareness among some industry players regarding the benefits of long-term sustainability. This study evaluated the impact of implementing the Hazard Analysis and Critical Control Points (HACCP) system on sustainability in the food and beverage service sector. The assessment was carried out using the Triple Bottom Line framework developed by Elkington, (1997) which highlights the importance of balancing three key business elements: Profit (Economic), People (Social), and Planet (Environmental).

Bandung City: A Culinary and Economic Hub

With a population of 2.5 million, Bandung is Indonesia's third-largest city after Jakarta and Surabaya. As the capital of West Java, Bandung is located approximately 140 km from Jakarta and serves as a strategic center for political, economic, and social activities in the country. Known for its fashion, food, and entertainment, Bandung is a prominent player in the tourism sector (Tarigan et al., 2016). Over recent decades, the city has attracted

significant domestic and foreign investment, fostered infrastructure development and bolstered industries such as tourism, food, and entertainment (Windarti, 2022).

Bandung has gained a reputation as a trendsetter, attracting visitors from other regions with its innovative culinary offerings. The city is often described as a culinary paradise, where the food business thrives due to the fundamental human need for nourishment (Fadillah & Fayza, 2024). However, competition in Bandung's culinary scene is intense, requiring business owners to adapt to evolving market trends and focus on customer demands, particularly regarding food safety.

Despite its vibrant culinary sector, many small food and beverage businesses in Bandung face challenges, such as poor hygiene practices, unappealing or uncreative products, inadequate service, and infrastructure issues (Fadillah & Fayza, 2024). These shortcomings often lead to declining customer numbers. To stay competitive, businesses must prioritize not only the quality of their food and beverages but also service excellence and customer comfort. Adopting strategies that address these factors is crucial for retaining customers and maintaining a strong market position.

METHODOLOGY

This study employs a descriptive method, focusing on the collection of facts and the identification of data. A qualitative approach is used to describe the actual phenomena related to HACCP implementation and to analyze its contribution to sustainability in the food and beverage service industry presented through word-based descriptions and language in a natural context, utilizing various qualitative methods (Kuckartz, 2014).

The sampling technique employed in this research is purposive sampling, with the following criteria for selecting participants:

- Operational managers or business managers in the food and beverage service sector who are responsible for HACCP implementation.
- Employees directly involved in the food production process and HACCP implementation.
- Customers with first-hand experience with services that practice sustainability and food safety.

The research was conducted in Bandung, with several establishments representing different types of food and beverage service businesses, such as:

- Hotels: Venues that frequently implement high standards in food safety and sustainability to meet guest expectations.
- Restaurants: Businesses that must consistently manage food quality and safety, with the potential to apply sustainable practices.
- Cafés: Establishments often focused on presenting food and beverages creatively, including the integration of sustainable practices.

Data analysis in this study follows four stages data analysis method which are data collection, data reduction, data presentation, and conclusion drawing (Miles et al., 2014). Data triangulation strengthens the research findings by verifying results from different perspectives, reducing bias, and increasing the reliability of the data (Bush, 2012). This approach is also relevant in linking the data with theoretical frameworks, such as the Triple Bottom Line (TBL) theory, in the context of the food and beverage industry.

FINDINGS

In the food and beverage (F&B) industry, hygiene standards and the implementation of food safety systems, such as Hazard Analysis and Critical Control Points (HACCP), play a crucial role in ensuring the safety of products served to consumers. Through a triangulation approach involving key stakeholders such as head chefs, restaurant supervisors, managers, owners, employees, and customers. This study provides a comprehensive understanding of the importance of HACCP implementation and hygiene in F&B business operations. This analysis is linked to the Triple Bottom Line (TBL) theory, which emphasizes three main pillars: People, Profit, and Planet.

Based on interviews with various stakeholders in the F&B industry, it can be concluded that the implementation of HACCP, personal hygiene, and environmental cleanliness are critical to the success of small businesses. This research highlights the connection between food safety practices and the Triple Bottom Line (TBL) concept, which encompasses three key aspects: People, Profit, and Planet.

According to the Head Chef Perspective, knowledge of HACCP is essential for employees handling food. This knowledge enables them to analyze potential hazards and take necessary preventive measures. It contributes to

consumer health (People) and reduces losses due to food safety issues, thereby enhancing profitability (Profit). Additionally, HACCP implementation supports resource efficiency and waste reduction (Planet).

This study found that five perspectives in implementing HACCP, first is restaurant supervisor perspective by Maintaining personal hygiene is key to preventing contamination. Good hygiene practices help create a positive reputation among consumers and build trust in the products (Profit). Hygiene also contributes to the health of employees and customers (People) and supports environmentally friendly practices (Planet).

Second is manager perspective, by strict hygiene procedures protect the health of all stakeholders and maintain product quality. With structured procedures, businesses can reduce costs related to hygiene issues (Profit) and minimize excessive resource use (Planet). Employee Perspective: Personal hygiene directly impacts product quality. Good hygiene practices not only protect consumers but also strengthen the business's reputation (People). Moreover, they can prevent financial losses from food safety issues (Profit) and support environmental sustainability (Planet).

Third is owner perspective, said that challenges in HACCP implementation can be overcome through team commitment. Involving all employees in maintaining food safety increases collective awareness (People) and prevents business losses (Profit). HACCP implementation also contributes to waste reduction and minimizes negative environmental impacts (Planet).

Finally, from the customer perspective, the cleanliness of the restaurant environment significantly influences customer satisfaction and trust. A clean environment creates a positive experience (Profit) and enhances consumer safety (People). Cleanliness also supports environmentally friendly practices (Planet).

From this analysis, it is clear that integrating HACCP, personal hygiene, and environmental cleanliness forms a critical foundation for the success of small businesses in the F&B industry. The application of the TBL framework allows businesses to focus not only on financial profits but also on the well-being of employees and consumers while contributing to environmental sustainability. The combination of these three elements provides a solid foundation for long-term growth and sustainability.

DISCUSSION

This study demonstrates the significant role of the Hazard Analysis Critical Control Point (HACCP) system in fostering sustainability within the food and beverage (F&B) industry. By aligning with the Triple Bottom Line (TBL) framework, which focuses on People (social sustainability), Profit (economic sustainability), and Planet (environmental sustainability), the findings underscore HACCP's holistic contribution to sustainability. Despite its substantial advantages, challenges such as high initial implementation costs, technical complexities, and limited awareness remain significant barriers, particularly for small businesses. This discussion analyses the findings in the context of economic, social, and environmental sustainability, compares them with existing research, and outlines their broader implications.

Economic Sustainability (Profit)

HACCP contributes significantly to economic sustainability by reducing financial risks, optimizing operational efficiency, and fostering long-term profitability. The study findings reveal that HACCP implementation helps businesses reduce costs associated with foodborne illnesses, product recalls, and legal liabilities. These results align with Mathe's, (2012) research, which emphasizes that preventing contamination and ensuring food safety enhance a business's financial stability. Managers interviewed in this study affirmed that structured hygiene practices and HACCP protocols prevented losses and improved profitability by streamlining resource use and reducing waste.

For example, restaurants adopting HACCP have minimized food waste by ensuring proper handling and storage techniques. This not only reduces costs but also optimizes inventory management, preventing over-purchasing. The study's findings also highlight the indirect financial benefits of HACCP, such as improved customer retention. Satisfied customers tend to become loyal patrons, ensuring steady revenue streams and enhancing brand reputation.

A comparison with prior studies, such as Wallace et al. (2014), underscores similar results, particularly regarding the efficiency gains of HACCP. However, this research provides a nuanced perspective by focusing on small businesses, which often operate with constrained budgets and limited resources. Unlike large enterprises that can absorb the initial costs of HACCP implementation, small businesses face challenges in investing in training, monitoring systems, and compliance procedures. This gap emphasizes the need for targeted interventions, such as government subsidies or industry grants, to support small enterprises in achieving economic sustainability through HACCP.

Social Sustainability (People)

HACCP's alignment with corporate social responsibility (CSR) demonstrates its critical role in achieving social sustainability. By ensuring food safety, businesses protect consumer health, foster trust, and contribute to public welfare. Stakeholders such as chefs, supervisors, and employees in this study emphasized the importance of hygiene practices, noting that proper training and adherence to HACCP guidelines are essential for maintaining high standards of food safety. These practices resonate with findings by Wallace and Mortimore (2016), who highlighted the social impact of food safety in building customer confidence and ensuring employee well-being.

Moreover, the study reveals that HACCP implementation improves workplace morale and fosters a culture of responsibility. Employees trained in HACCP develop a deeper understanding of the importance of food safety, which enhances their engagement and performance. This is particularly evident in small businesses, where close-knit teams often rely on mutual accountability. Supervisors in the study observed that regular training sessions not only enhanced technical skills but also promoted a sense of ownership among employees, contributing to the overall success of the business.

Comparing these findings with Arduser and Brown's, (2005), this study reveals an interesting dynamic. While Arduser and Brown's more focused on the technical aspects of HACCP, this study underscores the human element, particularly the role of education and teamwork in achieving social sustainability. This distinction highlights the importance of integrating HACCP training into broader employee development programs, ensuring that social sustainability extends beyond food safety to encompass overall employee welfare.

Environmental Sustainability (Planet)

The environmental benefits of HACCP are significant, as the system emphasizes resource optimization, waste reduction, and sustainable practices. This study aligns with Azevedo et al. (2014), who identified HACCP's role in conserving water, energy, and raw materials. By preventing contamination, businesses can reduce the amount of food discarded due to spoilage or non-compliance with safety standards.

In this research, managers and owners noted that HACCP's focus on efficiency also supports environmental stewardship. For instance, cafés and restaurants in Bandung have adopted waste segregation practices as part of their HACCP implementation, ensuring that organic waste is composted while recyclable materials are properly processed. This not only reduces landfill waste but also supports local environmental initiatives.

Furthermore, HACCP's emphasis on preventive measures aligns with broader sustainability goals, such as reducing greenhouse gas emissions. By streamlining supply chain operations and minimizing waste, businesses can lower their carbon footprint. The findings suggest that small businesses, despite their limitations, can contribute significantly to environmental sustainability by adopting HACCP, especially when supported by community-driven initiatives.

Implications

While this study reaffirms many established findings, it also offers unique insights, particularly regarding the challenges faced by small businesses in HACCP implementation. Unlike prior research that often focuses on large enterprises with ample resources (Arduser & Brown, 2005; Wallace et al., 2014; and Awuchi, 2023), this study highlights the financial and logistical barriers that smaller establishments encounter. For instance, emphasized the technical efficiency of HACCP, this study sheds light on the human and financial constraints that hinder its adoption in small-scale settings. The study also exploring the broader implications of HACCP on sustainability. By integrating the TBL framework, this study provides a comprehensive view of how HACCP not only ensures food safety but also drives economic growth, social welfare, and environmental preservation. These findings contribute to a growing body of literature that positions HACCP as a cornerstone of sustainable business practices in the F&B industry.

The implications of this research extend to multiple sectors, offering actionable insights for businesses, communities, academia, and policymakers. For the industry, the findings emphasize the importance of investing in HACCP training and integrating food safety into broader operational strategies. Businesses that prioritize these practices are better positioned to meet consumer expectations, enhance brand loyalty, and maintain a competitive edge. Additionally, small enterprises should explore collaborative solutions, such as shared training programs or resource pooling, to overcome financial barriers.

At the community level, HACCP implementation enhances public health by reducing the prevalence of foodborne illnesses. Clean and safe dining environments foster consumer confidence, encouraging repeat patronage and supporting local economies. Furthermore, by promoting environmentally friendly practices, businesses can inspire community-led sustainability initiatives, creating a ripple effect that benefits society at large.

For academia, this study enriches theoretical frameworks by demonstrating the practical applications of HACCP within the TBL framework. Future research can build on these findings by exploring sector-specific challenges

and opportunities, particularly in emerging markets. Collaborative studies involving academia and industry stakeholders can also provide valuable insights into innovative solutions for HACCP implementation.

For government and policymakers, the study highlights the need for supportive measures to facilitate HACCP adoption. Financial incentives, such as grants or tax benefits, can help small businesses overcome initial investment hurdles. Additionally, streamlined regulatory processes and accessible training programs can enhance compliance rates and ensure widespread adoption of food safety standards.

On a macro level, this research underscores the importance of cross-sector collaboration in achieving sustainability goals. Policymakers, industry leaders, and educational institutions must work together to promote awareness and provide resources for HACCP adoption. For instance, public-private partnerships can fund training programs, while academic institutions can develop curricula that integrate HACCP principles into hospitality and culinary education.

Furthermore, the study highlights the global relevance of HACCP as a tool for sustainability. As consumer demand for safe and sustainable food products continues to grow, businesses must adapt to meet these expectations. The integration of HACCP with the TBL framework positions the F&B industry as a key driver of sustainable development, contributing to global efforts to combat climate change, protect public health, and promote social equity.

CONCLUSION

The conclusion of this study highlights that food safety is a crucial element in the culinary industry, particularly in the food and beverage service sector. The implementation of the Hazard Analysis Critical Control Point (HACCP) system has proven effective in managing risks and protecting consumer health, ultimately supporting business sustainability. Within the framework of the Triple Bottom Line (TBL), this research emphasizes the importance of balancing three aspects: profit, people, and planet. Compliance with food safety regulations enhances consumer trust, reduces the risk of fines, and promotes environmentally friendly business practices.

Although challenges such as costs and the need for training exist in the implementation of HACCP, the system plays a significant role in improving operational efficiency and safeguarding public health. The findings suggest that small businesses in the food and beverage sector must prioritize HACCP implementation and hygiene practices not only to meet consumer expectations but also to ensure long-term sustainability and social responsibility. The combination of these elements provides a solid foundation for future business growth and success.

This study provides valuable insights into HACCP implementation within the food and beverage (F&B) industry, analyzed through the Triple Bottom Line (TBL) framework. However, like any research, it has limitations that shape the scope of its conclusions. Recognizing these gaps not only frames the study's context but also highlights areas for future exploration to expand the understanding and practical application of HACCP in fostering sustainability.

First, the geographical scope of this research is limited to Bandung, Indonesia, focusing on small and medium-sized enterprises (SMEs) in the F&B sector. While Bandung is a significant culinary hub, the findings may not fully represent the diversity of challenges and opportunities faced by businesses in other regions with different regulatory, economic, and cultural contexts.

Second, the study employed purposive sampling, focusing on specific stakeholders such as managers, employees, and customers from select establishments. Although this approach provided in-depth qualitative insights, the small sample size limits the generalizability of the findings. Larger enterprises, which may have distinct resources and operational dynamics, were not included in this research.

Third, the research emphasizes small businesses, shedding light on their unique challenges in implementing HACCP, such as high costs and limited training opportunities. However, it does not comprehensively address the experiences of larger organizations, which may encounter different barriers or benefits.

Fourth, this study solely focuses on the F&B sector and does not explore HACCP's applicability in other industries, such as food manufacturing, agriculture, or retail. Cross-industry insights could provide a broader understanding of HACCP's versatility and impact.

Finally, the qualitative nature of this study limits its ability to measure HACCP's direct impact on specific metrics, such as financial performance, customer retention, or environmental outcomes. A mixed-methods approach incorporating quantitative data could strengthen the reliability and depth of findings.

To address these limitations, future research should expand its scope and methodologies. Studies could examine HACCP implementation in diverse geographical regions, exploring the influence of varying cultural, regulatory, and economic factors. This broader scope would enable comparisons across contexts, identifying universal best

practices and localized challenges. Research should also include larger enterprises and multinational corporations, which have different resources and operational structures compared to SMEs. Examining these organizations would provide complementary insights into HACCP adoption across the food supply chain.

Further studies could explore HACCP implementation in other sectors, such as agriculture and retail, to understand its applicability and impact across industries. Additionally, incorporating quantitative analysis into future research could measure HACCP's effects on financial performance, waste reduction, and customer satisfaction, offering data-driven insights. Longitudinal studies would provide a deeper understanding of how HACCP benefits and challenges evolve over time, particularly in response to external factors such as economic disruptions or global crises. Finally, investigating the integration of technologies like artificial intelligence, blockchain, and digital monitoring could reveal innovative solutions to overcome implementation barriers, particularly for SMEs.

CONFLICT OF INTEREST AND ETHICAL STANDARDS

The authors confirm that there is no conflict of interest related to this study. The research was conducted in full compliance with ethical standards, ensuring that no unethical practices, such as plagiarism, animal testing, or human testing, were involved. The study employed qualitative methods, specifically interviews with stakeholders in the food and beverage industry. All participants provided informed consent to share their insights, and their identities have been anonymized to protect confidentiality. The research adhered to ethical guidelines to respect participant rights and maintain data integrity.

All authors listed have made significant contributions to the research, including conceptualization, data collection, analysis, and manuscript preparation. Contributions from individuals or organizations that supported the research but were not directly involved in its development have been appropriately acknowledged in the acknowledgments section. No individuals who did not contribute to the research have been included as authors, and all collaborators have agreed to be associated with this study. The authors affirm that the research was conducted transparently and with integrity, upholding the highest standards of ethical practice.

ACKNOWLEDGEMENT

The authors express their heartfelt gratitude to all friends and stakeholders who supported this study. We thank the operational managers, employees, and customers in the food and beverage industry for sharing their valuable insights, which made this research possible. While no external funding was received, we acknowledge the non-financial support from our institution and professional networks, whose guidance and resources were invaluable. Thank you to everyone who contributed to the success of this work.

REFERENCES

- Abraham, K. T. (2024). Responsible leadership and triple bottom line performance: imperatives for corporate sustainability. *Journal of Global Responsibility*, 15(4), 485-500. <https://doi.org/10.1108/JGR-06-2023-0111>
- Arduser, L., & Brown, D. R. (2005). *HACCP and sanitation in restaurants and food service operations*. Atlantic Publishing Company.
- Awuchi, C. G. (2023). HACCP, quality, and food safety management in food and agricultural systems. *Cogent Food & Agriculture*, 9(1). 1-29. <https://doi.org/10.1080/23311932.2023.2176280>
- Baccarini, D., Backman, J., Bakker, K., Boonstra, A., Wortman, H., Bansal, P., ... & Elkington, J. (1997). *Cannibals with forks—Triple bottom line of 21st century business*. Stoney Creek, CT: New Society Publishers.
- Bush, T. (2012). Authenticity in research: Reliability, validity and triangulation. In *Research Methods in Educational Leadership and Management* (pp. 75-89). SAGE Publications.
- Fadillah, A. P., & Fayza, T. I. (2024). Analyzing the culinary potential in the Bandung region, West Java. *Sociovoyage: International Journal of Social Dynamics in Tourism*, 1(3), 17-25.
- Azevedo, I., Albano, H., Silva, J., & Teixeira, P. (2014). Food safety in the domestic environment. *Food Control*, 37(1), 272–276. <https://doi.org/10.1016/j.foodcont.2013.09.058>
- De Oliveira, C. A. F., Da Cruz, A. G., Tavolaro, P., & Corassin, C. H. (2016). Food Safety: Good Manufacturing Practices (GMP), Sanitation Standard Operating Procedures (SSOP), Hazard Analysis and Critical Control

- Point (HACCP). In *Antimicrobial Food Packaging* (pp. 129–139). Academic Press.
<https://doi.org/10.1016/B978-0-12-800723-5.00010-3>
- Focker, M., & Van Der Fels-Klerx, H. J. (2020). Economics applied to food safety. *Current Opinion in Food Science*, 36, 18-23. <https://doi.org/10.1016/j.cofs.2020.10.018>
- Insfran-Rivarola, A., Tlapa, D., Limon-Romero, J., Baez-Lopez, Y., Miranda-Ackerman, M., Arredondo-Soto, K., & Ontiveros, S. (2020). A systematic review and meta-analysis of the effects of food safety and hygiene training on food handlers. *Foods*, 9(9), 1169. <https://doi.org/10.3390/foods9091169>
- Kamboj, S., Gupta, N., Bandral, J. D., Gandotra, G., & Anjum, N. (2020). Food safety and hygiene: A review. *International Journal of Chemical Studies*, 8(2), 358–368. <https://doi.org/10.22271/chemi.2020.v8.i2f.8794>
- Kuckartz, U. (2014). *Qualitative text analysis: A guide to methods, practice and using software*. SAGE Publications.
- Lee, J. C., Neonaki, M., Alexopoulos, A., & Varzakas, T. (2023). Case Studies of Small-Medium Food Enterprises around the World: Major Constraints and Benefits from the Implementation of Food Safety Management Systems. *Foods*, 12(17), 3218. <https://doi.org/10.3390/foods12173218>
- Malik, S., Krishnaswamy, K., & Mustapha, A. (2021). Hazard analysis and risk-based preventive controls (HARPC): Current food safety and quality standards for complementary foods. *Foods*, 10(9), 2199. <https://doi.org/10.3390/foods10092199>
- Marliane, L., Khairiyati, L., Waskito, A., Rahmat, A.N. (2021). *Buku Ajar-Higiene Makanan dan Minuman*. Mine: Yogyakarta.
- Mathe, K. (2012). Food safety, labor costs, and the effects on quick service restaurant revenues. *Journal of Foodservice Business Research*, 15(4), 398-410. <https://doi.org/10.1080/15378020.2012.734219>
- Okpala, C. O. R., & Korzeniowska, M. (2023). Understanding the relevance of quality management in agro-food product industry: From ethical considerations to assuring food hygiene quality safety standards and its associated processes. *Food Reviews International*, 39(4), 1879-1952. <https://doi.org/10.1080/87559129.2021.1938600>
- Pedroso, C. B., Tate, W. L., da Silva, A. L., & Carpinetti, L. C. R. (2021). Supplier development adoption: A conceptual model for triple bottom line (TBL) outcomes. *Journal of Cleaner Production*, 314, 127886. <https://doi.org/10.1016/j.jclepro.2021.127886>
- Santriati, A. T., Juwita, D. R., & Masruroh, Z. (2022). Perlindungan Hak Konsumen dalam Perspektif Hukum Islam dan Undang-Undang Perlindungan Konsumen Nomor 8 Tahun 1999. *Opinia de Journal*, 2(2), 32-51. <https://doi.org/10.35888/opinia.v2i2.30>
- Tarigan, A. K., Sagala, S., Samsura, D. A. A., & Fiisabiilillah, D. F. (2016). Bandung City, Indonesia. *Cities*, 50, 100-110. <http://dx.doi.org/10.1016/j.cities.2015.09.005>
- Wallace, C. A., Holyoak, L., Powell, S. C., & Dykes, F. C. (2014). HACCP - The difficulty with Hazard Analysis. *Food Control*, 35(1), 233–240. <https://doi.org/10.1016/j.foodcont.2013.07.012>
- Wallace, C. A., & Mortimore, S. E. (2016). HACCP. In *Handbook of Hygiene Control in the Food Industry: Second Edition* (pp. 25–42). Elsevier Inc. <https://doi.org/10.1016/B978-0-08-100155-4.00003-0>
- Wijaya, S. E., & Imran, M. (2019). Transport Policies and Planning in Bandung. In *Moving the Masses: Bus-Rapid Transit (BRT) Policies in Low Income Asian Cities: Case Studies from Indonesia* (pp. 75-113). Singapore: Springer Singapore. https://doi.org/10.1007/978-981-13-2938-8_4
- Windarti, Y. (2022). *Evaluation of the Impacts of Urban Tourism: The Case of Bandung City, Indonesia*. (Doctoral Dissertation: Nagoya University). Japan.