

From Bean to Bin: A Comprehensive Analysis of Waste Management Strategies in the Coffee Shop Supply Chain

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ABSTRACT

This study examined waste management strategies in the coffee shop supply chain, focusing on the environmental challenges associated with waste generated from coffee production and consumption. The research aimed to assess the awareness, agreement, and satisfaction of micro coffee shop owners regarding current waste management practices and to determine the factors influencing their implementation. The study was conducted among 50 micro coffee shop owners located in Manila, San Juan and Valenzuela in Metro Manila, selected through quota sampling. Guided by the Theory of Planned Behaviour (TPB), the research framework included attitude, perceived behavioral control, awareness, social influence, market incentives, and government facilitators as independent variables influencing the adaption of waste management practices. A mixed-method approach was employed, combining survey questionnaires and interviews to collect both quantitative and qualitative data. Quantitative data were analyzed using multiple linear regression, while qualitative responses were examined through thematic analysis. The findings indicate that coffee shop owners generally demonstrate high awareness of waste management practices and recognize their environmental benefits. However, challenges related to implementation remain, particularly concerning operational costs, limited market incentives, and insufficient regulatory support. The study recommends promoting sustainable practices such as reusable packaging, stronger regulatory frameworks, and enhanced market incentives to support waste reduction initiatives. These findings contribute to the understanding of sustainable waste management practices tailored to micro coffee shops and provide insights for improving environmental responsibility within the coffee shop supply chain.

RESUMO

Este estudo foi conduzido para explorar estratégias de gestão de resíduos na cadeia de suprimentos de cafeterias, com foco nos resíduos significativos produzidos desde o cultivo do café até o descarte. O público-alvo são microempresários de cafeterias na região metropolitana de Manila, especificamente em Manila, San Juan e Valenzuela. Os participantes selecionados são limitados a apenas 50 donos de cafeterias, determinados por amostragem por cotas. O estudo adotou a Teoria do Comportamento Planejado (TPB), a partir da qual foi elaborada uma estrutura de pesquisa que se concentrou em variáveis como atitude, controle comportamental percebido, conscientização, influência social, incentivos de mercado, facilitadores governamentais (como variáveis independentes) e disposição/intenção (como variável dependente). Os pesquisadores queriam avaliar sua conscientização, concordância e satisfação com as práticas atuais de gestão de resíduos. As principais descobertas revelam que, embora os proprietários reconheçam o impacto ambiental e os benefícios da gestão de resíduos, desafios como custo, incentivos de mercado e suporte regulatório persistem. As recomendações incluem o fomento da sustentabilidade por meio de embalagens reutilizáveis, melhorias regulatórias e incentivos de mercado aprimorados para alcançar um equilíbrio entre eficiência econômica e responsabilidade ambiental. Esta pesquisa fornece insights sobre a gestão eficaz de resíduos, adaptada para micro cafeterias, eliminando lacunas nas práticas de sustentabilidade no setor.

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Introduction

Coffee is among the most widely consumed beverages in the world, with over 2.25 billion cups consumed daily across different regions (Samoggia & Riedel, 2019; Allen, 2023). The coffee industry plays a significant role in the global economy, providing livelihoods for approximately 125 million people across around 80 tropical countries and producing over nine million tons of fresh coffee beans annually (Krishnan, 2022). Global coffee consumption has continued to rise, reaching approximately 176 million 60-kilogram bags in 2021-2022, compared with 167 million bags in the previous year (Ridder, 2023). As a result, coffee has become deeply embedded in many cultures worldwide, serving not only as daily beverage but also as a social activity that brings people together.

The growing popularity of coffee has also contributed to the expansion of the global coffee shop industry. According to the Global Industry Analyst's 2023 Global Strategic Report on Coffee Shops, the global coffee shop market was valued at US\$165.7 billion in 2022 and is projected to grow at a compound annual growth rate (CAGR) of 4.2%, reaching US\$229.9 billion by 2030 (Research & Markets, 2023). In recent years, shifts in consumer behavior—particularly increased demand for specialty coffee and takeaway beverages—have led to the rapid growth of small-scale and independent coffee shops in many urban areas (De Luca et al., 2020; World Coffee Portal, 2022). While this growth has created new economic opportunities, it has also raised concerns regarding sustainability, particularly in relation to the environmental impact of waste generated throughout the coffee supply chain.

Waste generation is a significant issue in the coffee industry, occurring at multiple stages of the supply chain—from coffee cultivation and processing to consumption and disposal (Barreto Peixoto et al., 2022). The production and consumption of coffee produce various types of waste, including coffee pulp, spent coffee grounds, packaging materials, and disposable cups (Arya et al., 2021). Coffee pulp, for instance, is one of the primary byproducts of coffee processing and poses environmental challenges when not properly managed (Muthamma & Shankarappa, 2020). Similarly, spent coffee grounds are generated during the brewing process and are commonly disposed of as solid waste (Saberian et al., 2021). Studies estimate that approximately 650 kilograms of waste are generated for every metric ton of coffee consumed, highlighting the significant environmental implications of coffee production and consumption (Czekala et al., 2023).

Several studies have explored waste management and sustainability practices within the coffee sector. For instance, Gemechu and Beyene (2020) examined waste management strategies related to coffee production and identified the environmental risks associated with the improper disposal of coffee byproducts. Their findings emphasized that coffee waste, particularly from pulping processes, remains a major environmental concern in coffee-

producing regions. Similarly, Barreto et al., (2022) analyzed sustainability challenges within the coffee supply chain, emphasizing the potential for coffee byproducts to contribute to sustainable practices and economic opportunities. However, despite these findings, previous studies have largely focused on the sustainability of coffee production and processing, with limited attention given to waste generated during the operational stage of coffee shops.

The rapid expansion of coffee shops, particularly micro and small enterprises, has led to increased waste generation from daily operations, including disposable packaging, single-use cups, and food waste. These wastes can contribute to environmental degradation when not properly managed. Despite growing attention to sustainability within the food and beverage sector, limited research has examined how micro coffee shop owners manage waste within their operations and what factors influence their adoption of effective waste management strategies.

Given the increasing consumption of coffee and the corresponding rise in waste production, there is need to examine waste management practices within coffee shop operations more closely. Understanding how coffee shop owners perceive and implement waste management strategies can provide valuable insights into improving sustainability within the coffee shop supply chain. Therefore, this study aims to analyze waste management strategies among micro coffee shop owners in Metro Manila by examining their level of awareness, agreement, and satisfaction with current waste management practices. By identifying the challenges and factors influencing the implementation of these strategies, the study seeks to contribute to the development of more effective and sustainable waste management approaches within the coffee shop industry.

Methodology

This study employed a mixed-method research approach, integrating both quantitative and qualitative methods to examine waste management practices among micro coffee shop owners. A mixed-method approach was considered appropriate because the study aimed not only to measure respondents' levels of awareness, agreement, and satisfaction regarding waste management practices but also to explore their experiences, challenges, and perspectives in implementing such practices. Combining quantitative and qualitative data enabled the researchers to obtain both measurable patterns and deeper insights into the waste management strategies used in coffee shop operations.

The quantitative component of the study utilized a structured survey questionnaire composed of Likert-scale items designed to measure respondents' awareness, agreement, and satisfaction with current waste management practices. These indicators were analyzed statistically to determine relationships among variables related to waste management strategies in the coffee shop supply chain. The qualitative component involved semi-structured

interviews that allowed respondents to elaborate on their experiences, challenges, and strategies related to waste management in their business. This combination of methods provided a more comprehensive understanding of waste management practices among coffee shop owners.

The study was conducted in Manila, San Juan, Valenzuela in Metro Manila, Philippines. These cities were selected because, unlike several other cities in the National Capital Region that have already implemented ordinances restricting or banning single-use plastics, these locations had not yet fully enforced such regulations at the time of the study. Selecting these areas allowed the researchers to examine existing waste management practices among micro coffee shop owners in locations where regulatory restrictions on plastic use were relatively limited. This provided a clearer understanding of how coffee shop owners independently manage waste within their operations.

Participants of the study consisted of micro coffee shop owners and managers, who were selected using quota sampling. A total of 51 respondents participated in the study. Participants were initially contacted through message requests, after which the researchers conducted personal visits to invite them to participate in the survey and interview process. The survey questionnaires were administered using a pen-and-paper format, followed by face-to-face interviews conducted at the respondents' convenience.

The research instrument consisted of a structured questionnaire and an interview guide. The questionnaire included Likert-scale questions that measured respondents' perceptions of waste management practices across several variables, including awareness, market incentives, and government facilitation. The interview guide contained open-ended questions designed to further explore respondents' experiences in managing waste within their coffee shop operations. Prior to data collection, the research instrument underwent expert validation to ensure its reliability and clarity, and validation certificates were secured as part of the research documentation.

The interview were conducted face-to-face and typically lasted approximately 10 to 20 minutes, depending on the availability of the respondent and depth of their responses. The semi-structured format allowed respondents to freely explain their practices, challenges, and perspectives regarding waste management. Interview responses were anonymized and presented using respondent identifiers based on their location and order of participation (e.g., M# for Manila, SJ# for San Juan, and V# for Valenzuela) to ensure participant confidentiality.

Example interview questions included:

- *What types of waste are commonly generated in your coffee shop operations?*
- *What strategies does your coffee shop implement to reduce or manage waste?*
- *What challenges do you encounter in implementing waste management practices?*

- *What type of support from the government or other organizations would help improve waste management in your business?*

For data analysis, quantitative data were analyzed using Multiple Linear Regression to examine the relationships among variables influencing waste management practices. Meanwhile, qualitative data from the interviews were transcribed and analyzed using thematic analysis, allowing the researchers to identify recurring themes related to challenges, strategies, and support mechanisms for waste management among coffee shop owners.

Ethical considerations were observed throughout the study. Participation was voluntary, and respondents were informed about the purpose of the research before data collection. All responses were treated with strict confidentiality and were used solely for academic research purposes. The collected data were securely stored and will be disposed of after the completion of the study to ensure the protection of participants' information.

Frame 1.

The four-point Likert Scale form where the following range is interpreted

Point	Scale	Descriptive Equivalent	Verbal Interpretation
1	1.00 – 1.75	Strongly Disagree	Not Effective
2	1.76 – 2.25	Disagree	Slightly Effective
3	2.26 – 3.25	Agree	Moderately Effective
4	3.26 – 4.00	Strongly Agree	Highly Effective

The information from the Likert scales will be used for descriptive analysis on issues including cost-effectiveness, compliance with laws, and environmental concerns. Multiple linear regression analysis was used to explore relationships between variables, resulting in effective waste management strategies in the coffee shop supply chain. Moreover, the researchers analyzed thematic data coming from open-ended questions to identify themes and trends that recur concerning challenges, successes, and suggestions for improvement. Using this qualitative method, in-depth thoughts by attendees that would be missed using figures only can be explored.

Ethical considerations were ensured by maintaining the confidentiality of the data obtained, and the interview's sole purpose was to collect data and gain information on these coffee shops' current waste management practices that will help fill the gaps in the study. The participants' responses and results will only be utilized for the study and will be safely disposed of at the end of the research. Furthermore, these ethical considerations will protect participants from emotional, physical, and psychological harm.

Results and Discussion

This chapter discusses the findings from the research study on the practices of waste management by coffee shop owners through an analysis of business profiles, awareness levels, agreement, and satisfaction with waste management practices, together with challenges and support needs.

Table 1
Business Profile of the Coffee Shop

Demographic Profile	Frequency	Percent	
Location of the Coffee Shop	Manila	17	34
	San Juan	17	34
	Valenzuela	16	32
Business Ownership	Partnership	9	18
	Sole Proprietorship	41	82
Number of years in operation	Less than 1 year	12	24
	1-3 years	28	56
	4-6 years	9	18
	7-10 years	1	2
Number of employees	1-3 employees	12	24
	4-6 employees	23	46
	7-9 employees	15	30
Average Gross Monthly Income	Less than ₱5,000	1	2
	₱5,001 - ₱10,000	1	2
	₱10,001 - ₱20,000	5	10
	₱20,001 - ₱50,000	19	38
	More than ₱50,000	24	48

The demographic characteristics of the participating coffee shops provide insight into the structure and operational characteristics of micro coffee shop businesses in selected cities. The results indicate that most coffee shops operate under sole proprietorship ownership, suggesting that the sector is largely composed of independently managed small enterprises. This finding reflects the entrepreneurial nature of the coffee shop industry, where individual owners commonly manage business operations and decision-making processes (Habaradas & Mia, 2021).

In terms of business maturity, many establishments are relatively young businesses, indicating the rapid expansion of small coffee shops in urban areas. The growth of newly established coffee shops may be associated with increasing consumer demand for specialty coffee and the rising popularity of café culture in metropolitan communities.

Regarding workforce size, most establishments operate with a moderate number of employees, reflecting the operational structure of micro enterprises that aim to balance service efficiency with cost management. The staffing structure allows coffee shops to maintain operational flexibility while controlling labor costs (Muthamma & Shankarappa, 2020).

The financial profile of the respondents suggests that a considerable proportion of coffee shops generate stable monthly revenues, which may be attributed to effective marketing strategies, favorable locations, and the continuous growth of coffee consumption among urban consumers (Davies, 2023). Overall, these findings highlight the dynamic and competitive nature of the coffee shop sector, characterized by independent ownership, relatively young business operations, and moderate staffing structures that support business sustainability within the local coffee market.

Table 2
Level of Awareness of Coffee Shop Owners on Waste Management Practices

Level of Awareness	Mean	Std. Deviation	Descriptive Equivalent	Verbal Interpretation
Type of Waste Generated	3.60	0.46	Strongly Agree	Highly Effective
Environmental Impact	3.68	0.41	Strongly Agree	Highly Effective
Benefits	3.67	0.40	Strongly Agree	Highly Effective

The findings indicate that coffee shop owners demonstrate a high level of awareness regarding waste management practices, particularly in relation to waste generation, environmental impact, and the benefits of proper waste management. This suggests that many coffee shop owners recognize the environmental implications associated with their daily operations and acknowledge the importance of implementing sustainable practices within their businesses.

The strong awareness observed among respondents may reflect the growing emphasis on sustainability within the food and beverage industry. As environmental concerns continue to gain attention, business owners are increasingly encouraged to adopt responsible practices that reduce environmental impact while maintaining operational efficiency (Bocken et al., 2021)

Furthermore, awareness of waste management practices can influence the willingness of business owners to adopt environmentally responsible strategies, such as waste segregation, recycling initiatives, and the reduction of single-use materials. Previous studies emphasize sustainable business practices and promoting environmental responsibility within small enterprises (Budžaki et al., 2022; Alfarizi et al., 2023). Therefore, strengthening awareness

through education, training programs, and policy initiatives may further enhance the adoption of sustainable waste management strategies among coffee shop owners.

Table 3
Level of Agreement of Coffee Shop Owners on Waste Management Practices

Level of Agreement	Mean	Std. Deviation	Descriptive Equivalent	Verbal Interpretation
Awareness	3.56	0.50	Strongly Agree	Highly Effective
Market Incentive	3.36	0.60	Strongly Agree	Highly Effective
Government Facilitator	3.35	0.70	Strongly Agree	Highly Effective

Coffee shop owners show strong awareness of waste management, with mean scores of 3.56 for recognizing its importance for effective waste segregation. Coffee shop owners show strong agreement on their knowledge of waste management methods, indicating a positive trend in sustainable practices. This collective awareness fosters a sustainable culture that benefits both the environment and the economy (Muthamma & Shankarappa, 2020; Pandey & Gupta, 2022). The coffee shop sector is well-positioned to continue promoting sustainability in waste management, contributing to local and global progress.

With a score of 3.36, these waste management practices are both environmentally friendly and commercially viable. coffee shop owners share a progressive outlook on incentive-driven waste management practices, demonstrating a strong commitment to sustainability. This focus also aligns with evolving consumer expectations, ensuring that sustainability remains a long-term priority. Coffee shops recognize that adopting green practices, alongside waste management improvements, enhances customer loyalty and satisfaction, supporting the shift toward conscious consumption (Lotfi et al., 2019). This approach integrates sustainability into daily operations, fostering environmental stewardship while attracting eco-conscious consumers.

An average score of 3.35 indicates that owners believe government support significantly impacts their waste management practices. There is a positive response to joint projects between municipalities and cafes on waste management, highlighting the importance of stakeholder involvement. Effective waste management requires collaboration from diverse stakeholders across the supply chain to drive sustainable practices.

With a mean score of 3.31, owners report that their waste reduction efforts, such as reducing single-use products and optimizing packaging, are leading to positive financial results. Alfarizi et al. (2023) and Martin-Rios et al. (2022) suggest that sustainable waste management practices enhance customer loyalty and improve the business's reputation, Table 4.

Table 4
Level of Satisfaction of Coffee Shop Owners on Waste Management Practices

Level of Agreement	Mean	Std. Deviation	Descriptive Equivalent	Verbal Interpretation
Cost Efficiency	3.31	0.74	Strongly Agree	Highly Effective
Waste Reduction	3.23	0.76	Agree	Moderately Effective
Environmental Impact	3.26	0.71	Strongly Agree	Highly Effective

The coffee shop owners surveyed display a moderately effective view of their waste management practices, with a mean satisfaction score of 3.23. The findings suggest that while coffee shop owners are committed to waste reduction, they recognize that improvements in recycling programs and reducing single-use materials are necessary for achieving higher levels of sustainability (Korhonen et al., 2019).

Coffee shop owners generally rate their waste management strategies as effective, with a mean satisfaction score of 3.26, although perceptions of specific practices vary. Coffee shop owners acknowledge the effectiveness of their waste management efforts, they recognize areas that need further attention, particularly in community involvement and environmental impact monitoring, to enhance sustainability in the industry (Barreto Peixoto et al., 2022).

Table 5
Significant Effect between the Level of Agreement of Coffee Shop Owners and their Satisfaction with the Current Waste Management Practices

Model Coefficients - LevelSatisfaction

Predictor	Estimate	SE	95% Confidence Interval		t	p	Stand. Estimate
			Lower	Upper			
Intercept	-0.183	0.437	-1.062	0.697	-0.418	0.678	
LevelAgreement	1.007	0.126	0.753	1.261	7.970	<.001	0.755

The regression analysis indicates a strong positive correlation between coffee shop owners' satisfaction with current waste management systems and their agreement level with these practices, with a coefficient estimate of 1.007 ($p < 0.001$). This suggests that an increase in proper waste management practices leads to higher owner satisfaction.

The findings reinforce the critical role of aligning management practices with owner perceptions to improve satisfaction, supporting the view that sustainability in coffee shops relies on effective waste management (Borrella et al., 2021; Muthamma & Shankarappa, 2020).

Table 6
Significant Effect between the Level of Awareness of Coffee Shop Owners and their Satisfaction with the Current Waste Management Practices

Model Coefficients - Level Satisfaction

Predictor	Estimate	SE	95% Confidence Interval		t	p	Stand. Estimate
			Lower	Upper			
Intercept	0.780	0.946	-1.123	2.68	0.824	0.414	
LevelAwareness	0.681	0.258	0.162	1.20	2.640	0.011	0.356

The regression analysis reveals that a coffee shop owner's awareness of waste management practices significantly impacts their satisfaction with current practices, with a coefficient of $B = 0.681$ ($p = 0.011$). This finding supports research emphasizing the importance of awareness in developing sustainable business practices, especially in emerging economies (Akpan et al., 2020).

Educated owners are more likely to innovate and implement sustainable solutions, enhancing operational efficiency and meeting consumer preferences for environmentally responsible businesses (Galkina & Martin, 2020; Czekala et al., 2023). This underscores the need for education and training to increase awareness and improve waste management practices, which positively influences customer satisfaction and business sustainability (Ferreira & Ferreira, 2020; Mayson & Williams, 2021).

Table 7
Significant Effect between the Level of Agreement of Coffee Shop Owners and their Awareness with the Current Waste Management Practices

Model Coefficients - LevelAwareness

Predictor	Estimate	SE	95% Confidence Interval		t	p	Stand. Estimate
			Lower	Upper			
Intercept	1.995	0.2512	1.490	2.500	7.94	<.001	
LevelAgreement	0.483	0.0726	0.337	0.629	6.66	<.001	0.693

A positive correlation between coffee shop owners' awareness and agreement with waste management practices was found, with a significant statistical relationship ($p < 0.001$). The study highlights that owners who agree with prevailing practices are also more informed

about them, aligning with literature suggesting that higher awareness supports better waste management strategies and sustainability (Creswell & Clark, 2019; Alfarizi et al., 2023).

Enhanced knowledge encourages small business owners to innovate and adopt more advanced technologies, improving their sustainability efforts (Akpan et al., 2020). This supports the circular economy’s principles of reducing waste and maximizing resource recovery, as greater awareness leads to more sustainable operations (Bigdeloo et al., 2021; Pandey & Gupta, 2020). By fostering a culture of agreement and awareness, coffee shop owners can contribute to both business success and environmental sustainability.

Table 8.

Level of Awareness mediates the Significant Effect between the Level of Agreement of Coffee Shop Owners and their Satisfaction with the Current Waste Management Practices

Type	Effect	Estimate	p	Decision	Remarks
Indirect	LevelAgreement ⇒ LevelAwareness ⇒ LevelSatisfaction	-0.297	0.013	Reject Ho	Significant
Component	LevelAgreement ⇒ LevelAwareness ⇒	0.483	<.001	Reject Ho	Significant
	LevelAwareness ⇒ LevelSatisfaction ⇒	-0.614	0.008	Reject Ho	Significant
Direct	LevelAgreement ⇒ LevelSatisfaction ⇒	1.304	<.001	Reject Ho	Significant
Total	LevelAgreement ⇒ LevelSatisfaction ⇒	1.007	<.001	Reject Ho	Significant

The interaction between coffee shop owners' agreement with waste management practices, their awareness, and satisfaction reveals a complex relationship, suggesting that increased awareness mediates the relationship between agreement and satisfaction. With a negative indirect effect of -0.297, better awareness can lead to improved waste management practices, education plans, and communication (Akpan et al., 2020).

A direct positive effect of agreement on satisfaction (1.304) supports earlier research linking stakeholder alignment with higher satisfaction (Bocken et al., 2021). Awareness plays a crucial role, with a positive relationship to satisfaction, particularly when controlled by levels of agreement, emphasizing the importance of awareness programs for effective waste management (Alfarizi et al., 2023). These findings suggest that raising awareness can lead to better waste management, further supported by innovation programs that improve sustainable practices (Filimonau et al., 2019).

The study highlights that proactive awareness strategies significantly enhance coffee shop owners' satisfaction with waste management, aligning with sustainability goals (Alfarizi et al., 2023). These results can inform future sustainability initiatives in the coffee industry.

Table 9
Thematic: Challenges in Implementing Waste Management

Theme	Codes	Supporting Quotes
Inventory Management	Food spoilage, Over-ordering	"The waste that comes from having too much food on hand... food can go spoiling before we can use it." (M1)
Customer Behavior	Improper disposal, Lack of knowledge	"Some customers don't know how to properly separate their trash, which makes it hard for us to use effective waste management methods." (M4)
Single-Use Plastics	High volume of waste, Customer preference	"The main challenge in implementing waste management is the high volume of single use waste... it's hard to find biodegradable options that are affordable." (V10)
Staff Training	Inconsistency in practices	"The proper implementation is one of the hardest things in terms of practicing effective waste management as some of our employees don't have the full knowledge about it." (M8)
Resource Limitations	Lack of equipment, Financial constraints	"Limited resources make waste management programs difficult to implement. Our biggest challenges are asking customers to sort their trash... high expense of eco-friendly packaging." (SJ7)
Waste Segregation	Mixing of waste, Labeling issues	"The main challenge that my coffee shop is facing is the stray dogs and cats... even though we properly segregate everything." (V3)
Supplier Challenges	Reliability, Cost of alternatives	"The main challenge I have is trying to stay eco-friendly while keeping our costs low. Finding reliable suppliers of these materials is a challenge." (V8)

Note: M = Manila, SJ = San Juan, V = Valenzuela.

Financial constraints and local regulations pose significant challenges to coffee shops in implementing effective waste management practices. Inventory management issues, such as food spoilage and over-ordering, contribute to waste and inefficiency, as shown by previous studies in the coffee sector (Martin-Rios et al., 2022).

Customer behavior also complicates waste management, as lack of awareness leads to improper waste disposal (Bigdeloo et al., 2021). Single-use plastics remain a major issue, with the cost of biodegradable alternatives discouraging sustainable choices (Borrella et al., 2021). Training staff and providing consistent resources for waste segregation are critical, yet financial limitations often restrict the implementation of eco-friendly systems (Martins et al., 2022). Stray animals and supplier-related issues further hinder waste management efforts, pointing to the need for a holistic, integrated approach (Muthamma & Shankarappa, 2020;

Habaradas & Mia, 2021). Addressing these challenges requires collaboration across various stakeholders to enhance sustainability in coffee shops.

Table 10
Thematic: Strategies to Address Challenges

Theme	Codes	Supporting Quotes
Inventory Management	Sales analysis, FIFO strategy	"We have therefore better managed our inventory by more precisely analyzing sales trends and seasonal demand..." (M1)
Customer Education	Signage, Community engagement	"To fix this, we put up clear signs above each bin to show people what to throw away and where..." (M4)
Promotion of Alternatives	Discounts for reusables, Bulk purchasing	"To encourage customers to bring reusable cups by offering small discounts." (M6)
Training and Engagement	Staff training, Customer interaction	"During staff training, we stress how important it is to separate trash, and we also remind them to be extra careful during busy times." (M6)
Improved Waste Segregation	Additional bins, Clear labeling	"To address this issue, we've decided to add an additional trash bin specifically for paper products..." (SJ1)
Sourcing Alternatives	Research eco-friendly options	"We are working hard to teach our customers about how single-use plastics hurt the earth and why they should switch to paper alternatives." (M5)
Community Initiatives	Collaboration with local services	"If our local government would provide seminars & tax incentives for implementing proper segregation, cafes like us would be more encouraged to apply such practice..." (V1)

The proactive strategies employed by coffee shops to tackle waste management challenges are crucial for sustainability. Inventory management, such as the use of FIFO strategies, helps reduce waste by ensuring the use of fresh ingredients and improving operational efficiency (Akpan et al., 2020).

Customer education through clear signage and communication promotes proper waste disposal, enhancing recycling efforts (Alfarizi et al., 2023). Encouraging the use of reusable containers through discounts helps minimize single-use plastic waste and supports circular economy practices (Muthamma & Shankarappa, 2020). Staff training plays a vital role, with

regular sessions fostering a culture of sustainability and proper waste segregation (Filimonau et al., 2019). Improved waste segregation through additional bins and clearer systems boosts efficiency and reduces recycling complexity (Davies, 2023). Community initiatives, such as local government seminars and tax incentives, can further support coffee shops in adopting sustainable practices.

Table 11
Thematic: Financial Considerations and Local Regulations

Theme	Codes	Supporting Quotes
Financial Constraints	High inventory costs	"At first, we bought groceries every day... but this caused high inventory costs because some items went spoil before they could be used." (M1)
	Cost of eco-friendly materials	"The cost of eco-friendly packaging is high, and with no local plastic ban, many competitors don't invest in sustainable alternatives, which put us at a financial disadvantage." (V8)
	Limited budget for sustainable practices	"As a sole proprietor... a tight budget means that every expense counts, and while I want to implement sustainable practices, the higher costs of biodegradable products can be a hindrance." (V7)
	Compliance costs	"Local regulations can be challenging too... compliance with local regulations, especially with segregating recyclables is also tough." (V10)
	Stricter regulations on waste management	"In some locations, there are stricter regulations regarding waste management and the use of eco-friendly materials, which have influenced how we operate." (M8)
Local Regulations	Unpredictable trash collection	"One big problem we have is that the local government doesn't always pick up our trash at the same time. This unpredictable schedule can cause our trash cans to overflow." (M4)
	Adoption of waste segregation	"By keeping different types of waste separate, we can improve our recycling efforts and reduce contamination." (SJ1)
Sustainable Practices	FIFO method usage	"We also started using the first-in, first-out (FIFO) method, which makes sure that older things are used up before newer ones." (M1)
	Transitioning to biodegradable materials	"Transitioning to all biodegradable is costly... yet we managed to have a successful transition." (SJ2)

	Difficulty in obtaining necessary certifications	"Some difficulties I encounter is how hard to get those certificates and even how hard to follow those regulations and ordinance." (SJ3)
	Balancing cost and compliance	"It's a hard to find a good balance between cost-effectiveness and compliance, especially when environmentally friendly packing or waste services cost more." (SJ6)
Challenges in Implementation	Additional training requirements	"Keeping up with changing regulations can also be a challenge, as new rules sometimes require additional training or adjustments in our operations." (SJ6)
	Increased expenses for waste management practices	"Financial factors really affect our waste management since other people like to use things that are easily found around the market like plastics." (V5)
Operational Costs	Ongoing costs related to recycling	"Ongoing costs related to waste segregation, recycling services & green waste disposal can impact the budget." (V4)

Financial and regulatory constraints significantly impact the sustainability practices of small coffee shops. High inventory costs and the expense of eco-friendly materials pose major challenges, with small businesses struggling to balance sustainability with financial viability (Akpan et al., 2020; Allen, 2023).

Local regulations, such as strict recycling segregation rules, can be difficult to comply with, especially with unreliable waste collection schedules (Cullen & De Angelis, 2021). Despite these challenges, many coffee shops adopt sustainable practices like FIFO and biodegradable materials to improve waste management and operational efficiency (Bocken et al., 2021). However, additional support from local governments and industry associations is needed to help businesses meet sustainability standards without excessive financial burdens (Bigdeloo et al., 2021; Martin-Rios et al., 2022).

Financial incentives and training programs can alleviate these challenges and foster a more sustainable industry (Czekala et al., 2023). Addressing these issues will help coffee shops improve waste management while contributing to broader environmental sustainability.

Table 12
Thematic: Waste Management Awareness

Theme	Codes	Supporting Quotes
Importance of Employee Awareness	Employee Training, Knowledge	"My workers' level of awareness is very important to the success of our waste management efforts..." (M4)
	Impact	"When employees understand the importance of waste reduction practices, they are more likely to engage in

Challenges in Maintaining Awareness	Inconsistency, Time Constraints	<p>responsible behavior, such as recycling and minimizing waste." (SJ1)</p> <p>"If everyone understands the importance of sorting waste and reducing waste, it's easier to follow good practices and make a real difference." (M4)</p> <p>"Inconsistency like this can lead to poor dumping, which goes against our goals for sustainability." (M5)</p> <p>"During peak hours, workers usually don't pay attention to sorting or segregating the waste they collected from tables." (M6)</p> <p>"Training takes time and resources, which can be hard to manage in a busy work environment." (SJ6)</p> <p>"Customer awareness... could lead to customer dissatisfaction." (V6)</p> <p>"We try to stay up to date with eco-friendly alternatives cafes in other cities are using and we try to replicate—one step at a time." (V1)</p>
Impact of Community and Customer Awareness	Customer Education, Community Engagement	<p>"The café is very aware of waste management efforts because products like straws and cups are made of paper, but we still use plastic cups." (SJ1)</p>
Operational Practices in Waste Management	FIFO Method, Daily Waste Reporting	<p>"The FIFO method... helps keep them fresh and stops trash from going to waste." (M1)</p> <p>"Management put in place a daily waste report that requires staff to write down any food that is thrown away." (M1)</p> <p>"Our level of awareness led us to properly segregate our waste by identifying the difference between biodegradable and nonbiodegradable waste in our café." (V3)</p>
Cultural and Structural Barriers	Lack of Infrastructure, Limited Support	<p>"Public awareness and behavior, beyond the lack of infrastructure and law implementation... plays a significant challenge." (M2)</p> <p>"Since we don't have access to reliable or affordable composting and recycling services, we've made it a priority to educate everyone on the importance of separating recyclables and minimizing waste." (M7)</p> <p>"Waste management efforts are not usually practiced in each household—it's not embedded in our culture." (V1)</p>
Positive Outcomes	Ownership of Practices,	<p>"When employees know how important it is to separate trash properly and be environmentally friendly, they do a good job." (V6)</p>

from Awareness	Improved Engagement	<p>"Employees are aware of waste management goals, they are more likely to take ownership of the processes and contribute positively." (SJ2)</p> <p>"We are fully aware of this and try to use recyclable or non-single-use items such as cups and cutleries." (V3)</p>
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Awareness plays a critical role in the effectiveness of waste management in coffee shops, as evidenced by the importance of staff training and community involvement. Educating staff on waste reduction and recycling improves the waste management system, aligning with the views of Alfarizi et al. (2023) on the influence of entrepreneurial waste management philosophy. However, operational challenges such as inconsistencies during peak hours can hinder effective waste segregation (Bocken & Antikainen, 2020). Customer awareness also impacts waste management practices, as consumers increasingly demand sustainable practices from businesses (Galkina & Martin, 2020). Operational strategies, such as FIFO and waste reporting, help improve waste management by ensuring proper segregation and reducing waste (Bigdeloo et al., 2021).

Table 13

Thematic: Types of Support Needed for Waste Management Improvement

Theme	Codes	Examples
Education and Training	Workshops, Training programs, Employee education	"I would like a training program or workshops for small business owners that are free or subsidized." (V10)
	Local programs, Partnerships,	"A program like this could make people more aware, not just in our business but also in the community as a whole." (M4)
Community Initiatives	Community engagement	
Policy Support	Government incentives, Tax breaks, Regulations	"More government incentives for using sustainable materials would help." (V8)
	Affordable eco-friendly packaging,	"It would be easier for us to switch from single-use plastics to more eco-friendly methods if our local government could help us find cheap, long-lasting packaging." (M6)
Resource Access	Bulk purchasing options	

Feedback Mechanisms	Customer feedback, Regular reports, Communication	"Our daily waste report helps us adjust inventory and improve practices based on what customers want." (M1)
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Enhancing waste management strategies requires support for businesses to adopt sustainable practices, including community projects, policy support, resource availability, feedback systems, and education. Education and training are vital for equipping businesses with the knowledge to implement sustainable practices, addressing knowledge gaps exacerbated by COVID-19, and offering proactive solutions through workshops and training programs (Akpan et al., 2020).

Community initiatives, like partnership programs and local engagement, promote sustainability by fostering a collective responsibility for waste management, which, according to Alfarizi et al. (2023), can significantly impact both businesses and the broader industry. Government policy support, such as tax relief for eco-friendly packaging, has been instrumental in encouraging businesses to adopt circular economy practices, as noted by Borrella et al. (2021) and Compagnoni (2022). Access to resources plays a crucial role in enabling businesses to affordably transition to sustainable practices, with research by Laari et al. (2020) showing that easy access to environmentally friendly materials boosts adoption of circular economy principles.

Feedback systems, such as customer feedback and business reports, help businesses assess and improve waste management practices, with Chintapalli and Vakharia's (2023) framework emphasizing the importance of real-time feedback in driving effective changes. Ultimately, these strategies—education, community involvement, policy support, resource access, and feedback—create a framework for businesses to adopt and thrive under sustainable practices, supporting both ecological and economic goals.

Conclusion

This study examined waste management practices among micro coffee shop owners in Manila, San Juan, and Valenzuela by assessing their level of awareness, agreement, and satisfaction with current waste management practices, as well as the challenges they encounter in implementing sustainable strategies. The findings reveal that coffee shop owners generally demonstrate moderate to high awareness of waste types, environmental impacts, and the importance of responsible waste management. However, awareness alone does not always translate into consistent implementation due to several operational and financial constraints.

The study also found that the level of agreement among coffee shop owners toward sustainable waste management practices is influenced by factors such as employee awareness, customer behavior, availability of eco-friendly materials, and government support. While

many respondents acknowledge the benefits of proper waste management, the implementation of sustainable practices is often hindered by barriers, including the high cost of biodegradable packaging, limited access to environmentally friendly suppliers, and inconsistent waste segregation practices among employees and customers.

Despite these challenges, the findings indicate that many coffee shop owners are taking steps to improve their waste management practices. Strategies such as implementing FIFO inventory management, promoting reusable alternatives, strengthening employee training, and improving waste segregation systems demonstrate a growing commitment among small business owners to adopt environmentally responsible practices. These initiatives highlight the potential of micro enterprises to contribute to broader sustainability efforts when adequate support and resources are available.

Based on the findings of this study, it is recommended that government agencies, local authorities, and industry stakeholders strengthen support mechanisms for micro coffee shop businesses. This may include providing training programs, sustainability awareness campaigns, financial incentives, and improved waste management infrastructure. Such initiatives may help address the operational and financial barriers faced by small businesses while encouraging the wider adoption of sustainable waste management practices in the coffee shop sector.

This study is limited by its focus on a specific geographical area and a relatively small sample of micro coffee shop owners. Additionally, the reliance on self-reported responses may introduce potential bias in the reported practices and perceptions of respondents. Future research may expand the scope of the study by including a larger sample size and examining waste management practices across different types of food service establishments. Further studies may also explore the long-term effectiveness of sustainability initiatives and emerging technologies that support waste reduction and environmental responsibility in small businesses.

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