Analysis of Driving and Inhibiting Factors in Used Cooking Oil Management Based on Social and Environmental Responsibility in Catering Businesses

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***Abstract*—The improper disposal of used cooking oil (UCO) poses significant environmental and health risks, particularly when not managed responsibly by food-related businesses. This study aims to identify and analyze the most influential driving and inhibiting factors affecting UCO management in catering businesses, with a particular focus on social and environmental responsibility. The research adopts the Analytic Hierarchy Process (AHP) to systematically assess the priority levels of multiple criteria across 15 catering companies. AHP was chosen due to its strength in structuring complex decision-making problems through pairwise comparisons and eigenvalue analysis. Data were collected using both quantitative questionnaires and qualitative open-ended responses, allowing for a comprehensive understanding of stakeholder perspectives. The results show that among the driving factors, the most dominant is internal policy or management commitment, followed by factors such as enhancing company reputation and increasing profit. Conversely, the top inhibiting factor is the lack of knowledge related to proper oil waste handling, with other significant barriers including high processing costs and insufficient infrastructure. These findings emphasize that managerial awareness, education, and access to resources are crucial for advancing sustainable practices. The study suggests that enhancing knowledge and reinforcing managerial commitment are key strategies to improve oil waste management practices in the catering industry.**

***Keywords*—Analytic Hierarchy Process (AHP), environmental responsibility, social responsibility, catering industry, decision-making, used cooking oil (UCO), waste management.**

I. INTRODUCTION

Yogyakarta is one of Indonesia's major cities, home to approximately 466,950 residents in 2025 [1]. Its dense population and rapid urban development have contributed to the significant growth of the food and beverage industry, which accounts for 13.40% on a quarterly basis of the city's Gross Regional Domestic Product (GRDP) [2]. Within this sector, catering services have become an increasingly popular business due to their ability to serve a wide range of events and institutional needs. However, this growth has also led to mounting environmental and health concerns, particularly related to the disposal of used cooking oil (UCO) or waste frying oil. According to national data in Ahdiat [3], cooking oil consumption in Indonesia from 2019-2023 is displayed in Fig. 1.

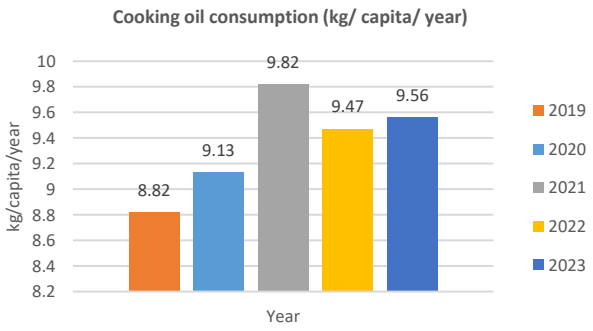

Fig. 1. Cooking oil consumption in Indonesia.

Repeated use of the same oil beyond three to four times is linked to severe health risks such as intestinal damage, cardiovascular diseases, and cancer [4-6]. Additionally, improper disposal practices, including discarding waste oil into drains or the environment, can result in clogged sewer systems and water pollution. In addition to causing water pollution, improperly disposed of UCO can contaminate soil and damage microorganisms that are important for ecosystem balance [7-9]. Furthermore, as in de Albuquerque Landi [10], disposal were found to be around 3 kWh/kg and 0.45 euro/kg.

Despite these known risks, many catering businesses in Yogyakarta still lack proper systems for managing waste cooking oil. Observations, including those at Paprika Catering in Yogyakarta, show that there is currently no structured waste management in place. This gap is largely due to limited awareness, inadequate technology, inconsistent waste volumes, and weak regulatory enforcement [11]. The urgency

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of addressing this issue lies not only in minimizing environmental and health hazards but also in capturing the untapped economic potential of waste oil recycling. For instance, a local innovation by a Yogyakarta resident under the brand "Langis" has successfully converted UCO into environmentally friendly laundry soap, exemplifying how sustainable practices can generate economic value and environmental benefits.

Nevertheless, there remains a research gap in understanding the specific factors that influence catering businesses' intentions to manage UCO. Existing studies do not sufficiently prioritize these factors within the local context, such as that of North Yogyakarta. Therefore, this study seeks to fill that gap by identifying and ranking both the driving and inhibiting factors in waste cooking oil management. The research employs the Analytical Hierarchy Process (AHP) to assess these factors across various catering service types. Ultimately, the objective is to provide actionable insights for business owners and inform more targeted policy strategies, supporting the broader implementation of sustainable supply chain practices in the catering sector.

II. Literature Review

A. Sustainable Supply Chain Management

Sustainable Supply Chain Management (SSCM) is a strategic approach to managing the flow of goods, services, and information by incorporating sustainability dimensions (i.e., economic, environmental, and social) into every stage of the supply chain. As defined by Carter and Rogers [12], SSCM entails the integration of sustainable practices into traditional supply chain management, with the goal of achieving long-term value creation for organizations and stakeholders. The environmental dimension of SSCM focuses on minimizing ecological harm, such as reducing emissions, conserving energy, and managing waste effectively. Economically, it seeks to ensure business profitability and efficiency, while the social dimension emphasizes ethical practices, labor welfare, and community development.

In the context of the catering industry, the implementation of SSCM is particularly relevant due to the sector's significant use of resources and generation of waste, especially in urban centers like Yogyakarta. By adopting SSCM, catering businesses can contribute to broader sustainability goals while enhancing their market competitiveness and operational efficiency. This is increasingly important in the face of rising consumer awareness and regulatory pressures concerning environmental impacts. Thus, SSCM provides a holistic framework for analyzing and improving how catering businesses manage resources like cooking oil, balancing business objectives with ecological and social responsibility. As in Attia [13] who obtained research results from food companies in the United Arab Emirates showing that dedicating resources to SSCM leads to improved operational performance. In addition, [14] underlined the crucial role of sustainability in the food sector, particularly in view of the mounting global demand for food products and the pressing need to tackle environmental issues.

B. Waste Cooking Oil: Health and Environmental Implications

Waste cooking oil, often referred to as used frying oil, is a by-product of repeated frying processes commonly generated in large volumes by catering businesses. When cooking oil is reused multiple times, it undergoes chemical changes that produce harmful compounds such as free radicals and trans fats, which have been linked to various health issues, including cardiovascular diseases, cancer, and damage to the digestive system. Research has shown that excessive reuse of cooking oil degrades its quality and significantly increases health risks [4-6]. Furthermore, the improper disposal of UCO into drainage systems can lead to serious environmental problems, including water contamination and sewage blockages, which can disrupt sanitation infrastructure and harm aquatic ecosystem [7-9]. Despite these risks, many small and medium-sized enterprises (SMEs), especially in the food service sector, continue to dispose of waste oil improperly due to limited awareness, lack of access to treatment technologies, and absence of regulatory enforcement. Addressing this issue is essential not only for safeguarding public health and the environment but also for creating opportunities to convert waste oil into value-added products such as biodiesel or cleaning agents. Therefore, understanding the implications of waste oil mismanagement forms a crucial component of designing sustainable interventions within the catering industry.

C. Analytical Hierarchy Process in Prioritizing Decision Factors

AHP is a widely recognized decision-making tool developed by Thomas L. Saaty that is used to prioritize complex problems involving multiple criteria. This method facilitates structured analysis by decomposing a decision problem into a hierarchy of more easily comprehensible sub-problems, each of which can be analyzed independently. AHP enables decision-makers to assign weights to various criteria based on pairwise comparisons, ultimately yielding a ranking of alternatives or factors according to their relative importance. In the context of managing waste cooking oil in catering businesses, AHP provides a valuable framework for identifying and prioritizing the key drivers and barriers that influence sustainability practices. It allows stakeholders to objectively assess factors such as cost, availability of technology, regulatory support, consumer awareness, and internal business motivations. Several studies have demonstrated the usefulness of AHP development in environmental and supply chain applications [14-16], helping businesses and policymakers focus on the most impactful interventions. By using AHP in this research, the goal is to produce a clear hierarchy of influencing factors that can guide practical strategies for waste oil management, especially in regions like North Yogyakarta where diverse catering business models and operational constraints exist.

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III. Material and Methods

A. Research Design

This research employed a descriptive quantitative approach using the AHP to determine the priorities of factors influencing sustainable UCO management among catering businesses in North Yogyakarta. AHP is chosen for its structured framework in analyzing complex decision-making processes by comparing factors pairwise and generating consistent priority rankings.

B. Research Location and Time

The research was conducted in Yogyakarta, Indonesia, focusing on catering businesses operating in that region. Data collection was carried out over two months, from January to February 2023. This area was selected based on its high density of small and medium-scale catering businesses that frequently generate UCO waste, making it a relevant setting for a sustainable waste management study.

C. Respondent Criteria and Sample

The respondents selected were owners or key personnel from 15 catering businesses in Yogyakarta. The selection was done using purposive sampling, ensuring that each respondent had decision-making authority and knowledge of the business' operational and environmental practices. These respondents provided data for the AHP pairwise comparison matrices.

D. Data Collection Techniques and Instruments

The study utilized primary data collection through structured questionnaires and interviews with business owners or key decision-makers in catering services. The questionnaire was designed based on AHP principles, consisting of pairwise comparisons of factors influencing UCO management. Respondents were asked to rate the importance of each factor using a Saaty scale from 1 to 9, where 1 indicates equal importance and 9 indicates extreme preference of one element over another (Table I).

TABLE I. Saaty Scale for Pairwise Comparisons

Intensity of Importance	Definition
1	Equal importance
3	Moderate importance
5	Strong importance
7	Very strong importance
9	Extreme importance
2, 4, 6, 8	Intermediate values

E. Data Analysis Procedures

Data obtained from the pairwise comparison matrices were processed using the AHP method developed by Thomas L. Saaty. The stages of analysis included:

1. Constructing a hierarchical structure of the problem, with the goal at the top level, criteria and sub-criteria in the middle, and alternatives at the bottom.
2. Creating a pairwise comparison matrix for each level.
3. Calculating the priority vector (eigenvalue) for each factor.
4. Checking the Consistency Ratio (CR) to ensure logical consistency. A CR less than 0.1 (10%) indicates acceptable consistency.

The results were then used to rank the factors according to their level of priority in contributing to sustainable UCO management. See Table II for the analysis steps.

TABLE II. AHP Analysis Steps Summary

Step	Description
Hierarchy Construction	Define goal, criteria, and alternatives
Pairwise Comparisons	Compare each factor using Saaty's scale
Priority Calculation	Determine the local and global weights of each factor
Consistency Check	Calculate CI and CR to validate logical consistency

The process of constructing the pairwise comparison matrices was carried out using inputs from 15 respondents who are experts or practitioners in catering and environmental management. Each respondent independently completed a pairwise comparison matrix based on the AHP scale. To derive consensus scores, the individual matrices were aggregated using the geometric mean method, which is a standard approach in AHP to synthesize group judgments. This method preserves the reciprocal property of comparisons and reduces the effect of extreme values.

The AHP calculations were performed using Expert Choice software, incorporating built-in formulas to compute normalized matrices, consistency ratios, and final weights.

F. Limitations

Although AHP is suitable for small expert samples due to its emphasis on judgment quality over quantity, the sample size in this study (n = 15) limits the generalizability of the findings. This relatively small pool may introduce bias or restrict the diversity of perspectives, especially in the context of diverse catering operations across different regions. Future studies should consider involving a broader set of stakeholders, including policymakers, customers, and logistics providers, to enrich the analysis.

IV. Results and Discussion

A. Catering Business Location

Information about the catering businesses and the map of the distribution of their locations used as research objects can be seen in Fig. 2.



Fig. 2. Business locations.

B. Respondent's Demographics

Table III presents demographic information of 15 respondents involved in the catering industry. It includes their initials, age, gender, education level, type of catering business, job position, and years of work experience. The respondents hold various roles such as owners, chefs, and equipment managers, representing diverse educational backgrounds and experience levels.

TABLE III. RESPONDENT DEMOGRAPHICS

Name	Age (Gender)	Education	Catering	Position	Work (year)
A.P.	26 (F)	Bachelor	PC	Owner	7
I.S.	56 (F)	High School	CIS	Owner	22
G.M.	33 (M)	Vocational	CC	Warehouse & Equipment	6
K.A.	29 (F)	Bachelor	CBR	Food & Beverage	5
H.	37 (M)	Vocational	NC	Chef & Manager	8
S.	28 (F)	Bachelor	SK	Owner	4
D.A.	31 (F)	Bachelor	MCJ	Equipment & Manager	5
B.	46 (M)	Bachelor	AC	Owner	9
E.Y.	27 (M)	Bachelor	PIC	Owner	5
T.A.	29 (F)	Bachelor	CJ	Owner	6
A.P.	32 (M)	Bachelor	MC	Owner	7
A.F.	35 (M)	Bachelor	HC	Owner	5
K.A.	30 (F)	Bachelor	ACJ	Food & Beverage	3
A.F.	27 (F)	Bachelor	DMC	Food & Beverage	5
A.N.	32 (M)	Bachelor	CDN	Owner	3

Table IV lists the key driving and inhibiting factors affecting reverse logistics practices in catering businesses. Driving factors include environmental awareness, social awareness, and internal/external policies, while inhibiting factors cover lack of awareness, high costs, and insufficient infrastructure.

TABLE IV. DRIVING AND INHIBITING FACTORS

Symbol	Driving Factors	Symbol	Inhibiting Factors
DF1	Increasing environmental awareness	IF1	Lack of environmental awareness
DF2	Increasing social awareness	IF2	External policies (Government regulations)
DF3	External policies (Government regulations)	IF3	Lack of knowledge
DF4	Internal policies (Management commitment)	IF4	Cost
DF5	Creation of product innovation	IF5	Lack of commitment in implementing reverse logistics
DF6	Improved company reputation	IF6	Lack of company management commitment
DF7	Increased company profit	IF7	Unavailable infrastructure
DF8	Public health reasons	IF8	Lack of stakeholder socialization
DF9	Availability of facilities in the company		

Table V shows a pairwise comparison of nine identified driving factors influencing reverse logistics, specifically for the PC catering business. Each factor is compared against the others, with calculated eigenvalues and weights indicating their relative importance. The most influential factors are DF3 (external policies) and DF1 (environmental awareness).

Table VI provides a pairwise comparison of eight inhibiting factors for the PC catering business. The eigenvalues and weights show the relative impact of each factor on the implementation of reverse logistics. The top inhibiting factors are IF4 (cost), IF7 (unavailable infrastructure), and IF6 (lack of management commitment).

C. Driving Factors

External Policy (Government Regulations)

External policy is one of the dominant driving factors in the management of UCO, as indicated by its high eigenvalue in PC (0.286) and CIS (0.229). According to research by Song et al. [17] one effective strategy in managing UCO is government involvement through subsidies to promote the refining of waste cooking oil into biofuel. Another strategy implemented by the government is through the promotion of the 3R (i.e., Reduce, Reuse, Recycle) approach. As explained by Nampira and Pramestyawati [18] reducing waste requires open implementation of the 3R principles. Zhang et al. [19] also suggested that a sustainable way to promote the recycling of UCO is through some forms of incentives.

Increasing Company Profit

Increasing company profit is a dominant factor in driving UCO management, supported by eigenvalues in several business units: CC at 0.261, CBR at 0.174, ACJ at 0.216, and CDN at 0.280. Increasing profit also requires building consumer trust by setting standards for food safety and quality, encouraging repeat purchases and positive promotion, which in turn increases company profit. This potential for increased income influences business owners' intentions to manage waste oil, turning it into valuable products. Consequently, company revenue can increase through active waste utilization practices. Research definitively shows that converting waste cooking oil into biofuel will increase profits [20-22]. Furthermore, Suryani et al. [23] stated, managing UCO opens up economic opportunities in the community, ranging from households and SMEs to large industries.

Internal Policy (Management Commitment)

Internal policy, particularly management commitment, is a key driving factor in UCO management, indicated by high eigenvalues in NC at 0.284, SK at 0.178, PIC at 0.294, CJ at 0.284, SC at 0.267, and DMC at 0.245. Internal policy plays a crucial role in coordinating supply chains while considering economic, environmental, and social aspects of the company. Its implementation should include skills, knowledge, and capabilities specifically in UCO management. Integrating Sustainable Supply Chain Management (SSCM) within the company can influence intentions related to waste oil management by making production lines more efficient and effective. Research by Özçelik and Öztürk [24] emphasizes that developing employee skills and training can generate innovative ideas that benefit the company. Meanwhile, Liu et

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al. [22] posited that to facilitate the management of UCO, the industry must employ personnel of the highest calibre to oversee this process.

Public Health Reasons

Public health concerns are a major motivating factor in UCO management, with a high eigenvalue of 0.262 in HC. Catering services should consider the health impacts of reusing cooking oil, as it directly affects consumer well-being.

TABLE V. PAIRWISE COMPARISON MATRIX OF DRIVING FACTORS WITH EIGENVALUES AND WEIGHT

Fact.	DF1	DF2	DF3	DF4	DF5	DF6	DF7	DF8	DF9	Eigen	Weight
DF1	1	3	0.25	3	5	4	4	5	6	0.209	2.17
DF2	0.33	1	0.33	2	4	3	3	5	5	0.144	1.43
DF3	4	3	1	3	5	4	4	5	6	0.286	3.01
DF4	0.33	0.5	0.33	1	4	2	3	4	5	0.116	1.13
DF5	0.2	0.25	0.2	0.25	1	0.33	0.5	3	3	0.047	0.43
DF6	0.25	0.33	0.25	0.5	3	1	2	4	4	0.083	0.79
DF7	0.25	0.33	0.25	0.33	2	0.5	1	3	3	0.06	0.57
DF8	0.2	0.2	0.2	0.25	0.33	0.25	0.33	1	2	0.031	0.29
DF9	0.16	0.2	0.16	0.2	0.33	0.25	0.33	0.5	1	0.024	0.23

TABLE V. PAIRWISE COMPARISON MATRIX OF DRIVING FACTORS WITH EIGENVALUES AND WEIGHT

Factor	IF1	IF2	IF3	IF4	IF5	IF6	IF7	IF8	Eigen	Weight
IF1	1	3	2	0.5	8	0.5	0.5	2	0.14	1.226
IF2	0.33	1	2	0.25	2	0.5	0.5	2	0.076	0.676
IF3	0.5	0.5	1	0.2	2	2	0.25	2	0.081	0.742
IF4	2	4	5	1	6	2	2	7	0.279	2.446
IF5	0.13	0.5	0.5	0.17	1	0.25	0.2	2	0.039	0.33
IF6	2	2	2	0.5	4	1	0.5	5	0.15	1.314
IF7	2	2	4	0.5	5	2	1	6	0.2	1.8
IF8	0.5	0.5	0.5	0.14	0.5	0.2	0.17	1	0.035	0.306

Increasing Environmental Awareness

Environmental awareness is another significant driving factor for managing UCO, with a notable eigenvalue of 0.206 in the Management and Community Judgment (MCJ) category. Companies, particularly catering businesses, must promote environmental responsibility among all employees. Özçelik and Öztürk [24} noted that industries should be accountable for minimizing their environmental, health, and safety impacts. Follow-up studies are necessary to explore how the catering industry, in particular, can reduce environmental harm. Research by Brilliana et al. [25] supports this notion by highlighting the role of green supply chain management in minimizing environmental impacts caused by several businesses, including food and beverage businesses.

Increasing Social Awareness

Social awareness is also a dominant factor, as shown by an eigenvalue of 0.233 in AC. Efforts to enhance social awareness should not be limited to company operations but should also extend to the broader community through social interaction and hands-on activities. This approach helps encourage the public to see the economic value in UCO. Inayati and Dhanti [26] describe how community education initiatives, such as making aromatherapy candles from UCO with simple materials, can increase product value. Such initiatives can raise social awareness regarding the importance of managing UCO both in catering services and in households. Furthermore, Cantele and Cassia [27] posit that the incorporation of social responsibility in the management process represents a valuable opportunity for the enhancement of corporate performance.

According to Liu et al. [22], food prepared using poor-quality or reused cooking oil can negatively impact consumers, especially at the cellular and tissue level when consumed regularly. Therefore, prioritizing health is essential in waste oil management to ensure better quality and safety for consumers.

D. Inhibiting Factors

Cost

Cost is the most dominant inhibiting factor in the management of UCO, as reflected in the eigenvalue for catering businesses under PC at 0.279. According to open questionnaire responses, catering companies face challenges related to the high costs involved in managing used oil. Goh et al. [28] suggested that collaboration with the government and third-party collectors of UCO can help alleviate some of these financial burdens. In addition, the high cost of management equipment is another challenge. As demonstrated by Naseem et al. [29] cost is a strategic barrier due to its impact on investment in personnel training, infrastructure, and information technology systems.

Lack of Management Commitment

A lack of commitment from company management is another dominant inhibiting factor, with high eigenvalues in CIS at 0.270, CC at 0.290, SC at 0.290, and HC at 0.280. These barriers arise due to limited knowledge about UCO management. Meanwhile, Azadnia et al. [30] state that the issue lies in a lack of interest on the part of management, while Kafrviani et al. [31] refer to it as a lack of involvement and attention on the part of management, and Majumdar and Sinha [32] state that it is due to inadequate management capacity. Centele and Cassia [27] further emphasized that top

management plays a vital role in adopting environmentally friendly practices,

Lack of Knowledge

Lack of knowledge is another significant inhibitor in the management of UCO, with high eigenvalues in CBR at 0.226, NC at 0.287, SK at 0.286, MCJ at 0.288, and ACJ at 0.275. Among the 15 catering businesses studied, lack of knowledge was the most commonly reported factor. Education, particularly through schools, plays an important role in improving food safety awareness. Deo Feo et al. [33] pointed out that educational level significantly affects the implementation of UCO management—higher education levels correlate with better application of waste management practices. This factor, as described by Karviani et al. [31], is characterised by a deficiency in understanding management networks, the advantages of management, the practices and experience associated with it, and an absence of knowledge regarding the environment. Concurrently, Sellitto [34] also describes it as a lack of knowledge about the benefits of management. In contrast, Waqas et al. [35] highlighted a paucity of knowledge in selecting and developing appropriate technology, while Brkljač et al. [36] cited a lack of competence and knowledge among management and employees.

Lack of Environmental Awareness

A lack of environmental awareness is also a significant barrier, with eigenvalues of 0.218 in AC, 0.276 in DMC, and 0.195 in CDN. To overcome this issue, a sense of environmental responsibility is essential, particularly in relation to used oil management. Environmental concern can help prevent actions that harm the ecosystem. This was also conveyed by Govindan et al. [37] who emphasised that the absence of environmental knowledge as a significant barrier to the adoption of green supply chain management practices in Indian companies. This issue is further compounded by a lack of awareness regarding the environmental impact of business activities and a tendency to perceive environmental concerns as beyond one's responsibility. Conversely, Handyani et al. [38] identified barrier pertains to a lack of awareness concerning green practices and their associated benefits. Similarly, Gupta et al. [14] prevailing barrier is characterised as a deficiency in knowledge regarding Environmental Management System (EMS) Standards, coupled with a lack of awareness concerning the advantages of sustainability.

Lack of Commitment to Reverse Logistics Implementation

The lack of commitment to implementing reverse logistics is a leading barrier in UCO management, with the highest eigenvalue observed in PIC at 0.312 and CJ at 0.260. Reverse logistics ranked highest in importance among other inhibiting factors, indicating a need for effective and efficient management to enhance consumer feedback. It has been posited by certain researchers that the absence of reverse logistics implementation may impede green supply chain management (GSCM) initiatives. Do and Huang [39] identified it as the critical barriers of GSCM, while Govindan et al. [37] and Uddin et al. [40] named it as the lack of awareness about reverse logistics adoption. Moreover, a system that minimizes environmental impact is essential to foster greater concern for environmental issues and enhance reverse logistics practices.

E. Average Priority Level of Driving and Inhibiting Factors Across All Catering Businesses

This section elaborates on the overall average and ranking of the priority level of both driving and inhibiting factors that influence the intention to manage UCO in catering businesses, as previously detailed in the pairwise comparison matrices.

Average of Driving Factors

Based on the overall pairwise comparison matrix from all catering businesses, the analysis revealed that the most influential driving factor in encouraging the intention to manage UCO is Internal Policy (Management Commitment), with the highest average score of 2.281. This is followed by:

1. Internal Policy (Management Commitment) – 2.281
2. Improved Company Reputation – 1.942
3. Increased Company Profit – 1.91
4. Improved Environmental Awareness – 1.623
5. Improved Social Awareness – 1.58
6. External Policy (Government Regulations) – 1.445
7. Availability of Facilities in the Company – 1.415
8. Public Health Concerns – 1.276
9. Product Innovation – 0.809

These findings suggest that internal motivation from within the business, particularly a strong commitment from management, plays a crucial role in determining whether UCO is managed sustainably. Factors related to company image and financial benefits also serve as significant motivators. External influences like government policy, although important, rank lower, indicating that internal factors are the primary drivers.

Average of Inhibiting Factors

On the contrary, the evaluation of inhibiting factors shows that the most dominant barrier is Lack of Knowledge, with the highest average score of 2.172. The priority ranking of inhibiting factors is as follows:

1. Lack of Knowledge – 2.172
2. Cost – 2.043
3. Public Health Concerns – 1.979
4. Lack of Management Commitment – 1.9
5. Lack of Infrastructure Availability – 1.444
6. Lack of Stakeholder Outreach/Socialization – 1.388
7. External Policy (Government Regulations) – 1.234
8. Lack of Commitment in Reverse Logistics Implementation – 0.821

The data reveals that knowledge-related constraints are the primary obstacles, signalling the importance of education and training initiatives in waste oil management. Additionally, economic barriers such as high operational costs further discourage implementation. Interestingly, factors such as regulatory enforcement and reverse logistics commitment were found to be less influential inhibitors, perhaps due to low awareness or underdeveloped systems in these areas.

The comparative analysis indicates that management's internal commitment and knowledge levels are critical in shaping catering businesses' behaviour towards UCO

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management. Strengthening internal policies and increasing education and awareness are therefore key strategies to enhance sustainable practices in this sector.

The key factors identified in this study, such as awareness of environmental responsibility, ease of access to collection systems, and economic incentives, align with several findings from prior AHP-based studies on waste management in urban settings [19],[22]. However, unlike studies in the manufacturing or industrial sectors that emphasize regulatory compliance or technological infrastructure, the catering industry shows a stronger orientation toward behavioral and logistical factors, highlighting the role of informal practices and daily operational constraints. This underscores the need for tailored strategies in different industries.

F. Practical Implications and Recommendations

While this study identifies the primary drivers and inhibitors in UCO management, it is imperative to translate these insights into actionable interventions. For instance, awareness programs could be developed in collaboration with local health and environmental departments, focusing on the harmful effects of improper oil disposal and the benefits of UCO recycling.

Additionally, reverse logistics models, such as scheduled pick-up services or mobile collection points managed by certified aggregators, could be piloted to reduce the logistical barriers faced by small- and medium-sized catering businesses. Providing incentives, such as reduced waste management fees or certifications for sustainable practices, may further encourage participation. These interventions should be context-specific and iteratively refined based on stakeholder feedback and pilot results.

V. CONCLUSION

This study reveals that the most influential driving factor in the intention to manage UCO among catering businesses is internal policy, particularly management commitment. Conversely, the primary inhibiting factor is the lack of knowledge among catering operators. These findings emphasize the importance of strengthening internal management strategies and providing education and awareness regarding used oil management. By addressing both supporting and inhibiting factors, catering businesses can better contribute to environmental sustainability. Moreover, external support from stakeholders, especially the government, is crucial to enhance infrastructure, incentives, and regulations that facilitate the effective implementation of waste oil management practices.

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