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Business Development Strategy for the Management of Used Cooking Oil as a Raw Material for Biodiesel

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ABSTRACT

This study examines the business development strategy of PT XYZ, a Used Cooking Oil (UCO) management company serving as biodiesel feedstock in Jakarta. The research background includes growing biodiesel demand driven by the B35 mandatory program and sustainability program. The significant potential of UCO as a more economical and environmentally friendly alternative feedstock, and the business challenges faced by PT XYZ following the 2022 UCO export restriction policy through the Domestic Market Obligation (DMO) mechanism, which caused an average export volume decline of 84% and temporary closure of three branches outside Jakarta. The study employs a qualitative-quantitative approach using Business Model Canvas (BMC), VRIO, PESTEL, Porter's Five Forces, IFE-EFE matrices, IE matrix, SWOT, and Analytical Hierarchy Process (AHP) using Expert Choice 11 softwere for strategy prioritization. Results indicate that PT XYZ's main strengths are its QC capabilities and laboratory UCO, strong reputation, strategic location in the Jabodetabek area, UCO collection network and access to capital. Minewhile, weaknesses include the absence of ISCC certification and market share analysis, limited development and digital systems for financial. Based on the IE matrix, PT XYZ is positioned in cell II (grow and build). Four recommended strategic priorities are: (1) medium-term contracts with buyers, (2) UCO collection network development, (3) operational cost efficiency, and (4) market expansion. The proposed new BMC integrates business process digitalization, market segment diversification to increase revenue sources, and gradual development toward self-exporting.

Keywords: biodiesel; business model canvas; business strategy; UCO; SWOT; AHP.

INTRODUCTION

Indonesia is a country endowed with abundant natural resources, including petroleum based fossil fuel reserves. Along with rapid economic growth and industrialization, national energy demand continues to increase across various sectors. According to the Indonesian Energy Outlook 2014, domestic energy consumption increased by an average of 5.5% annually between 2003 and 2013, with approximately 96% of the energy supply still derived from fossil fuels, consisting of 48% petroleum, 18% natural gas, and 30% coal (Sugiyono, 2015). This heavy dependence on fossil energy creates various risks, ranging from long-term energy security concerns and global oil price volatility to significant environmental impacts through greenhouse gas emissions.

Recognizing this urgency, the Indonesian government has increasingly focused on improving the production, availability, and utilization of New and Renewable Energy (NRE). This commitment has been reflected in several strategic regulations, including Presidential Regulation No. 5 of 2006 concerning the National Energy Policy, which established renewable energy targets within Indonesia's long-term energy management framework. A tangible manifestation of this commitment is the implementation of the mandatory biodiesel program, which began with B15 and was gradually increased to B20, B30, and ultimately B35 in 2023. The B35 mandate requires all diesel fuel used in Indonesia to contain at least 35% biodiesel content. This percentage will continue to be evaluated and potentially increased as part of the government's strategy to accelerate the energy transition.

The implementation of this mandatory policy has directly resulted in a substantial increase in biodiesel demand. Data from APROBI (2022) show that domestic biodiesel consumption increased significantly from 119 thousand kiloliters in 2009 to 10.42 million kiloliters in 2022. The proportion of domestic biodiesel consumption relative to total production has also continued to rise, reaching as high as 98% in 2020. On the export side,

Indonesia's biodiesel export volume grew from 70 thousand kiloliters in 2009 to 419 thousand kiloliters in 2022. However, this rapid growth in demand has not been fully met. According to data from the Indonesian Palm Oil Association (IPOA), only 100 tons of biodiesel export demand out of a total demand of 1,800 tons were fulfilled in 2017, and this supply-demand imbalance continued through 2023.

One of the primary factors contributing to the inability to meet biodiesel demand is the heavy dependence on Crude Palm Oil (CPO) as the main feedstock, whose availability remains limited and is contested by various other industries. Data from LPEM UI (2022) indicate that the proportion of CPO used by the food industry has consistently exceeded its use for biodiesel production since 2019. This situation creates structural pressure on biodiesel feedstock supply and highlights the need for more sustainable feedstock diversification. On the other hand, Indonesia is also one of the largest consumers of cooking oil in the world, with total consumption reaching 15.4 million tons in 2021 (IndexMundi, 2021). This extensive consumption, originating from households, restaurants, hotels, catering businesses, and large-scale food industries, generates substantial quantities of waste cooking oil, commonly known as Used Cooking Oil (UCO).

This extensive consumption, originating from household activities, restaurants, hotels, catering businesses, and large-scale food industries, generates substantial quantities of waste cooking oil, commonly referred to as Used Cooking Oil (UCO). According to research conducted by Traction Energy Asia focusing on households and micro-enterprises, the Greater Jakarta (Jabodetabek) region alone represents the largest contributor, with an estimated UCO potential of 154,000 kiloliters or approximately 151,536 tons annually (Databoks, 2022). Vanessa (2017) further supports this finding, estimating that the UCO generated by communities in the Jabodetabek area reaches approximately 1,889 tons per week. However, a large proportion of this potential UCO remains unutilized and is often directly disposed of into drainage systems.

The issue of UCO management is not only an economic concern but also has serious implications for public health and environmental sustainability. From a health perspective, repeatedly reused cooking oil may increase the risk of cancer, coronary heart disease, stroke, and hypertension. Furthermore, improper disposal of waste cooking oil into waterways or open land may result in clogged drainage systems, water pollution, and soil degradation (Firina, 2010). A study conducted by the Jakarta Environmental Agency (DLH DKI) and LEMTEK UI (2025) reported that domestic waste containing Fat, Oil, and Grease (FOG) is one of the primary sources of river pollution in Jakarta. Approximately 95% of greywater waste is discharged untreated into major rivers such as the Ciliwung, Cipinang, and Sunter Rivers.

This situation is exacerbated by the absence of a structured UCO collection and disposal system in Indonesia, unlike many developed countries that have implemented strict regulations regarding waste cooking oil management. Although Jakarta has enacted Governor Regulation No. 167 of 2016 concerning Waste Cooking Oil Management, which requires businesses to properly manage UCO waste, implementation remains inconsistent and requires more intensive monitoring. This condition, however, presents a business opportunity for organizations capable of providing professional, structured, and economically valuable UCO management services.

In this context, UCO emerges as a strategic solution that addresses two major challenges simultaneously: reducing the scarcity and competition associated with CPO as biodiesel feedstock and resolving the issue of waste cooking oil management. Technically, UCO contains fatty acids that can be converted into biodiesel through a transesterification process, producing fuel that meets industry standards provided that Free Fatty Acid (FFA) levels are maintained within acceptable limits. From an economic perspective, the use of UCO as biodiesel feedstock has proven to be more cost-efficient. Widodo et al. (2011) reported that feedstock accounts for approximately 60–70% of total biodiesel production costs.

Consequently, utilizing UCO, which has relatively low economic value and is abundantly available, represents an effective strategy for reducing production expenses. Setiadi et al. (2023) quantified this advantage, demonstrating that the production cost of UCO-based biodiesel is approximately IDR 6,000 per liter, significantly lower than CPO-based biodiesel, which costs around IDR 8,000 per liter. This finding is consistent with conclusions from the 2007 Conference on Biodiesel Industry By-product Utilization, which emphasized the importance of identifying lower-cost alternative feedstocks such as UCO to prevent industry failure resulting from increases in olein and methanol prices (Prakoso et al., 2007). From an environmental sustainability perspective, life-cycle assessment (LCA) studies demonstrate that UCO-based biodiesel generates lower greenhouse gas emissions than biodiesel derived from virgin vegetable oils (Srikumar, 2024; Osipova et al., 2023). As a result, UCO is considered a superior feedstock within the framework of circular economy principles and sustainable development. The IEA Bioenergy Report (2022) also highlights that waste-based bioenergy sources such as UCO can play a critical role in the global energy transition when supported by appropriate governance and management systems. These conditions position the UCO management business not merely as an economic activity but also as a meaningful contribution to national energy security and environmentally responsible waste management.

One of the pioneers that has responded to the business opportunity presented by UCO management as biodiesel feedstock is PT XYZ, a Jakarta-based company established in 2016. PT XYZ operates as a UCO aggregator and processor, connecting suppliers including restaurants, hotels, food-processing factories, and households with buyers such as exporters and domestic biodiesel producers. The company's business processes include UCO collection management, weighing, transportation, filtration, laboratory quality testing, and delivery to export partners. At its operational peak, PT XYZ was capable of directly exporting more than 60 tons of UCO per week to Europe through four operational branches located in Jakarta, Lampung, Surabaya, and Balikpapan.

However, since 2022, PT XYZ has faced significant business turbulence. Government policies restricting UCO exports through the Domestic Market Obligation (DMO) mechanism and export tariff regulations implemented in 2022 directly affected the company's operations. Based on preliminary interviews with PT XYZ management, the company's export capacity declined dramatically from more than 60 tons per week to only 8-16 tons per week. Furthermore, three branches outside Jakarta, Surabaya (East Java), Balikpapan (East Kalimantan), and Lampung were forced to suspend operations temporarily. The cumulative impact was substantial, resulting in an average 84% decline in UCO acquisition volume for export purposes between 2022 and 2024, which significantly affected the company's financial condition, liquidity, and operational sustainability.

PT XYZ has many challenges. Externally, uncertainty surrounding government export policies and fluctuations in international market prices represent risks that are difficult to control. In terms of competition, the number of both formal competitors and informal collectors continues to increase, intensifying competition for UCO supply. Purchase prices offered to UCO suppliers, particularly in Jakarta, have increased due to competitive pressure, while export market selling prices remain volatile. Internally, PT XYZ has not yet obtained International Sustainability and Carbon Certification (ISCC), limiting access to European markets, premium pricing opportunities, and compliance with global renewable energy requirements. In addition, the company faces limitations in digital operational management systems, which hinder efficiency and scalability.

Despite gradual improvements in the UCO export industry during 2023–2024 and increasing UCO potential in the Greater Jakarta area, PT XYZ continues to operate with only a single fleet at its East Jakarta headquarters, without reopening branches or expanding collection areas. This is particularly significant given that direct exports to Europe offer

substantially higher profit margins than exports through Tanjung Priok Port, which currently represents the company's primary business model. This stagnation highlights the need for a comprehensive reformulation of business strategy that is adaptive to external dynamics and oriented toward sustainable long-term growth. Therefore, this study was conducted to analyze the Business Development Strategy for Used Cooking Oil (UCO) Management as Biodiesel Feedstock at PT XYZ, a topic that has not previously been investigated. Through this research, it is expected that an effective and efficient business strategy for UCO processing can be developed to support sustainable competitiveness and contribute to the expansion of biodiesel development programs, particularly within the Greater Jakarta area.

METHODS

Location, Timing, and Research Approach

This research was conducted at PT XYZ, whose headquarters are located in Cakung, East Jakarta. This area serves as the company's primary operational region and is situated within an industrial zone with strategic access to supplier networks and UCO transportation logistics. Data collection was carried out during the 2024–2025 period. This research employed a mixed-methods approach, integrating qualitative methods to obtain in-depth information through interviews and field observations with quantitative methods for weighting and scoring (scale 1–4) in strategic matrix analyses and the Analytical Hierarchy Process (AHP).

Data Types and Sources

Primary data were obtained through semi-structured in-depth interviews with PT XYZ's leadership and management regarding business conditions, operational models, strategic factors, and the company's development vision. Interviews were conducted with the director, deputy director, business development personnel, operational manager along with the Procurement and Quality Control (QC) person-in-charge, UCO suppliers/service users approved by PT XYZ, and representatives from competing companies. In addition, primary data collection was also conducted through weighting questionnaires distributed to expert respondents for the purpose of weighting factors in the Internal Factor Evaluation (IFE), External Factor Evaluation (EFE), and Analytical Hierarchy Process (AHP) analyses. Secondary data were obtained from biodiesel and UCO industry reports, scientific publications, government regulations, statistical data from Statistics Indonesia (BPS), APROBI, reports from LPEM UI, and various other reliable sources.

Sampling Methods and Respondents

Respondents were selected using a purposive sampling technique based on the criterion that they possessed direct and comprehensive knowledge of the UCO management business and biodiesel industry. This approach ensured that the data and information required for this study could be obtained in a comprehensive and accurate manner. The respondents consisted of company executives (director and deputy director), general manager and operational manager, human resources personnel, laboratory supervisors at PT XYZ, two competitors with expertise in their respective companies, and three suppliers/service users of PT XYZ. The research involved ten respondents, with the sample size determined based on the principle of information saturation, given the nature of the research as an in-depth case study of a single company.

Stages of Analysis

The analysis was conducted sequentially using data obtained from interviews and questionnaires. The first stage involved mapping the existing business model using the Business Model Canvas (BMC) through in-depth interviews and field observations of PT XYZ's operational processes. This stage produced a comprehensive description of the company's nine BMC elements and the relationships among them. The second stage focused on identifying internal factors through VRIO analysis of the company's resources and

capabilities. These resources were categorized into primary activities namely Inbound Logistics, Operations, Outbound Logistics, Marketing and Sales, and Service, and supporting activities, including Procurement, Human Resource Management, Technology Development, and Infrastructure. The results of the VRIO analysis were summarized and weighted in the Internal Factor Evaluation (IFE) Matrix. The third stage involved identifying external factors through PESTEL Analysis and Porter's Five Forces Analysis. These factors were subsequently weighted in the External Factor Evaluation (EFE) Matrix according to their level of importance and the company's response ratings.

The fourth stage consisted of determining the company's strategic position by mapping the total IFE and EFE scores onto the Internal–External (IE) Matrix, resulting in recommendations for general strategic directions. The fifth stage involved formulating specific strategic alternatives through the SWOT Matrix by matching the most significant internal and external factors. This process generated four categories of strategies: SO (Strengths–Opportunities), WO (Weaknesses–Opportunities), ST (Strengths–Threats), and WT (Weaknesses–Threats). The sixth stage focused on determining the priority among strategic alternatives using the Analytical Hierarchy Process (AHP). Comparison assessments were conducted by expert respondents and processed to generate priority rankings. The analysis also included the calculation of weighting values and the Consistency Ratio (CR) to verify the consistency of expert judgments. The seventh and final stage involved developing a new or improved Business Model Canvas (BMC) as an operationalization of the priority strategies that had been identified. This stage also included the formulation of concrete and implementable managerial implications to support the company's future business development.

RESULTS AND DISCUSSION

Business Model Canvas (BMC) Existing *PT XYZ*

The mapping of PT XYZ's current Business Model Canvas (BMC) can be identified through nine interconnected business model elements. From the Customer Segments perspective, PT XYZ serves two primary groups: UCO suppliers (HORECA businesses, food industries, and households in the Greater Jakarta area) as sources of raw materials, and UCO buyers (local exporters serving the European market and domestic biodiesel industries) as sources of revenue. The Value Propositions offered to suppliers include convenient on-site collection services, immediate cash payments, and contributions to responsible waste management. For buyers, the main value proposition lies in the assurance of UCO quality verified through laboratory testing and the continuity of supply.

The company's Channels are still dominated by face-to-face communication and direct telephone contact between field personnel and suppliers. Customer Relationships are established primarily through personal trust and responsiveness, without a structured customer relationship management system. Revenue Streams are generated from the margin between the purchase price of UCO from suppliers and the selling price to buyers, making the business highly dependent on fluctuations in international market prices. Key Resources include transportation vehicles, QC laboratory equipment, working capital, and experienced field personnel. Key Activities consist of collecting, handling, quality control, treatment, and delivery processes. Key Partnerships are maintained with UCO suppliers and UCO buyers through local export channels. The Cost Structure is primarily dominated by UCO procurement costs, vehicle operating expenses, and field labor costs.

The evaluation of the existing BMC reveals several structural limitations that need to be addressed. First, the company's dependence on a single buyer group (local exporters operating through Tanjung Priok Port) creates a high concentration risk in revenue generation. When these buyers face obstacles such as changes in export regulations or financial difficulties, PT XYZ lacks readily available alternative sales channels. Second, the absence of a structured

supplier retention system makes the company vulnerable to losing suppliers to competitors that offer more attractive prices or better services. Third, the lack of an integrated information system limits real-time performance monitoring, causing operational and strategic decision-making to be largely reactive rather than proactive. The identification of these limitations serves as the basis for formulating a more adaptive and sustainable Business Model Canvas.

Internal Factor Analysis: VRIO and IFE Matrix

The VRIO analysis identified 38 resources and capabilities of PT XYZ. Among these resources and capabilities, six were classified as weaknesses requiring improvement, while the remaining resources were categorized as strengths or competitive advantages. Based on the analysis, the classification of PT XYZ's resources and capabilities is summarized in Table 1.

Table 1 Summary of VRIO Analysis of *PT XYZ* 's Main Internal Factors

Resources / Capabilities	(V)	(R)	(I)	(O)	Competitive Implication	Score
Company market share analysis (not yet available)	No	No	No	No	Critical weakness	0,024
ISCC Certification (not yet obtained)	No	No	No	No	Critical weakness	0,030
Technology development facilities	No	No	No	No	Critical weakness	0,030
Budgeting system (manual)	Yes	No	No	No	Critical weakness	0,037
QC Capability	Yes	Yes	Yes	Yes	Sustainable competitive advantage	0,122
QC Laboratory	Yes	Yes	Yes	Yes	Sustainable competitive advantage	0,122
Corporate reputation	Yes	Yes	Yes	Yes	Sustainable competitive advantage	0,122
Strategic business location	Yes	No	No	Yes	Temporary competitive advantage	0,098
Supplier network	Yes	Yes	No	No	Temporary competitive advantage	0,091

Source: Results of research analysis (2025)

Among the 32 strengths identified, several emerged as key competitive advantages. The QC laboratory for Free Fatty Acid (FFA) testing represents a sustainable competitive advantage that fulfills all four VRIO criteria. This capability is highly valuable because it ensures product quality in accordance with export standards, rare because not all competitors possess similar facilities, difficult to imitate because it requires substantial investment in equipment and skilled personnel, and well organized through established UCO quality control procedures for supplier-sourced materials. Another major strength is PT XYZ's reputation among buyers and suppliers, which has been built through several years of direct export experience to the European market and through trusted relationships with suppliers based on previous business transactions. This reputation constitutes a valuable resource that is difficult for competitors to replicate in the short term. Furthermore, the company's strategic location in the industrial area of East Jakarta serves as an important competitive advantage due to its proximity to HORECA supplier networks and convenient access to Tanjung Priok Port, enabling operational activities to be conducted more effectively and efficiently. In addition, the supplier network that has been developed over eight years of operation represents a valuable resource that would require a considerable amount of time for new competitors to replicate. Access to capital provided by partners or UCO buyers, including working capital support for UCO procurement and training

facilities for PT XYZ, also strengthens the company's competitiveness in terms of pricing within the market.

On the weakness side, several critical issues were identified. First, the company has not yet conducted a comprehensive market share analysis, which is essential for mapping existing suppliers and assessing their potential. As a result, UCO procurement remains limited and highly dependent on a single sales channel through local exporters operating in Tanjung Priok, thereby restricting profit margins. Second, PT XYZ has not yet obtained International Sustainability and Carbon Certification (ISCC), which is often a supporting requirement for direct exports to the European market and provides access to significant premium pricing opportunities. Third, limitations in digital technology development constrain business scalability and operational efficiency, and this area has not yet received sufficient attention as a means of maintaining competitiveness and fostering innovation. Fourth, operational monitoring and management systems remain largely manual, covering collection records, inventory tracking, and payment administration. The results of the Internal Factor Evaluation (IFE) Matrix indicate a total weighted score of 2.451, which is above the average benchmark and suggests a relatively strong internal position. Nevertheless, several weaknesses still require immediate attention to enhance the company's overall competitiveness.

External Factor Analysis: PESTEL, Porter's Five Forces, and the EFE Matrix

Strategic Position: IE Matrix

The PESTEL analysis identified both opportunities and threats across six dimensions of the macro-environment: political, economic, social, technological, environmental, and legal factors. Of the 28 PESTEL factors analyzed, 12 were classified as threats and 16 as opportunities that could be further developed. From a political perspective, the B35 mandatory biodiesel program and renewable fuel development regulations under the Minister of Energy and Mineral Resources Regulation No. 32 of 2008 concerning renewable energy management provide long-term opportunities for alternative feedstock demand from UCO. However, inconsistent export tariff policies and Domestic Market Obligation (DMO) regulations pose significant threats to the industry.

From an economic perspective, Indonesia's stable economic growth rate (5.05% in 2023, according to Statistics Indonesia) and the decline in inflation from 5.51% in 2022 to 2.61% in 2023 have created a more favorable business environment. Socially, increasing public awareness of environmental and health issues has stimulated demand for more responsible UCO waste management practices. From a technological perspective, advances in the Internet of Things (IoT) and widespread social media penetration—where 36.2% of consumers discover new products through social media (Slice.id, 2024)—have created digital marketing opportunities that PT XYZ has yet to fully exploit. Environmentally, the high level of unmanaged UCO pollution in the Greater Jakarta area represents a substantial market opportunity. Legally, Jakarta Governor Regulation No. 167 of 2016, which mandates the proper management of UCO waste, supports the development of PT XYZ's business.

Porter's Five Forces analysis reveals a complex competitive landscape. The bargaining power of UCO suppliers is considered moderate to high because suppliers can compare offers from numerous companies and an increasing number of informal collectors. The bargaining power of buyers (exporters) is relatively high because PT XYZ remains dependent on a limited number of buyer partners. The threat of new entrants is moderate because entry barriers are relatively low; however, significant working capital requirements and quality control competencies serve as natural barriers. The threat of substitute products is low in the medium term, given that no alternative biodiesel feedstock is currently more economical than UCO. Competitive rivalry among existing firms is relatively intense, particularly due to informal collectors that operate without regulatory compliance costs.

Table 2. Summary of PT XYZ's Main External Factor Analysis

Threats	Score
Export tariff policy	0.106
Domestic Market Obligation (DMO) implementation policy	0.106
Service users/suppliers have bargaining power in supplying UCO	0.088
Service users/suppliers can easily compare UCO prices with offers from competitors in the same industry	0.106
Opportunities	**Score**
Growing public awareness of environmental issues	0.106
High levels of environmental pollution	0.106
The disposal and collection of UCO remain unstructured and lack a systematic management system	0.106
Suppliers/service users are sensitive to the purchase price offered for UCO	0.106
Differences in selling price offers provided by buyers	0.106
Service users/suppliers can easily access information on price changes from other parties	0.106

Source: Results of research analysis (2025)

The results of the EFE Matrix indicate a total weighted opportunity score of 1.923. This figure is substantially higher than the total weighted threat score of 1.088, resulting in an overall EFE score of 3.011. The EFE score suggests that PT XYZ operates within an external environment that is rich in opportunities and that the company generally responds to these opportunities effectively. Nevertheless, greater efforts are still required to mitigate risks associated with government policies, which remain the company's primary vulnerability. The considerable difference between the opportunity and threat scores (1.923 versus 1.088) reflects that the growth potential of the UCO management business significantly outweighs the existing constraints. It also indicates that well-targeted strategic initiatives could substantially accelerate the company's growth. Furthermore, this condition implies that investments aimed at capitalizing on opportunities such as digitalization, ISCC certification, and the expansion of UCO collection networks are likely to generate returns far exceeding their associated costs, making them highly justifiable strategic investment priorities.

Strategic Position: IE Matrix

The results of the IFE and EFE analyses provide the basis for constructing the Internal–External (IE) Matrix. The IFE score of 2.451 indicates a relatively strong internal position, while the high EFE score of 3.011 reflects a highly favorable external environment. Based on analysis, PT XYZ's strategic position can be illustrated in the IE Matrix shown in Figure 1.

Figure 1. Internal–External (IE) Matrix

Based on the integration of the IFE and EFE scores, PT XYZ is positioned in Cell II of the Internal–External (IE) Matrix, which corresponds to the **"Grow and Build"** category. This position recommends the implementation of intensive growth strategies, including market penetration, market and product development, as well as integrative growth strategies such as backward vertical integration through the development and expansion of UCO supplier networks, or forward vertical integration through independent biodiesel processing as a long-term strategic vision. The Cell II position confirms that although PT XYZ has experienced operational challenges since 2022, its business fundamentals and external environment remain highly conducive to a well-planned aggressive growth strategy. So internal strengths and external opportunities should be leveraged as effectively and efficiently as possible.

These findings are consistent with the results of the PESTEL and Porter's Five Forces analyses, both of which indicate the existence of numerous opportunities that PT XYZ can exploit. The highest-scoring opportunities identified in the EFE Matrix include: (1) increasing public awareness of environmental issues (score: 0.106); (2) the high level of environmental pollution caused by UCO waste (score: 0.106); (3) the absence of a structured UCO disposal and collection system (score: 0.106); (4) the sensitivity of UCO suppliers to competitive pricing offers (score: 0.106); (5) variations in selling price offers from buyers (score: 0.106); and (6) suppliers can easily access market price information (score: 0.106). Meanwhile, the most significant threats with the highest EFE scores include: (1) export tariff policies (score: 0.106); (2) Domestic Market Obligation (DMO) policies (score: 0.106); (3) the ability of suppliers and service users to easily compare UCO prices offered by competing firms (score: 0.106); and (4) the bargaining power of suppliers in comparing prices offered by competitors (score: 0.088). These opportunities and threats provide a strong foundation for strategy formulation through the SWOT Matrix and for determining strategic priorities through the AHP.

SWOT Matrix and Alternative Strategies

Based on the integration of the internal and external analyses, the SWOT Matrix generated four groups of strategic alternatives for PT XYZ. Each strategic group was designed to address a specific combination of internal conditions and external dynamics faced by the company. Table 4 presents a summary of PT XYZ's SWOT Matrix along with the resulting strategic alternatives.

Table 3 SWOT Matrix and Alternative Strategy of *PT XYZ*

SWOT ANALYSIS	**OPPORTUNITIES (O)** O1. Environmental awareness O2. High levels of environmental pollution O3. The absence of a structured UCO disposal system O4. Supplier sensitivity to pricing O5. Differences in buyer price offers O6. Ease of access to market price	**THREATS (T)** T1. Export tariff policies and DMO regulations T2. High supplier bargaining power T3. UCO price fluctuationsT4. Ease of comparing prices among competitors
STRENGTHS (S) S1. Quality Control (QC) capability S2. Corporate reputation S3. QC laboratory facilities S4. Strategic business location S5. Established supplier network S6. Access to capital	**SO Strategies SO1.** Expand the UCO collection network through business quality and corporate reputation *(S1, S4–O2, O3)* – **Market Development SO2.** Expand markets and increase UCO volume *(S2, S6–O1, O4)* – **Market Development SO3.** Digitalize collection services and customer communication *(S4, S5–O6)* – **Product Development**	**ST Strategies ST1.** Strengthen medium-term contracts with buyers and suppliers to mitigate supplier bargaining power and UCO price fluctuations *(S3, S5–T1, T3)* – **Backward and Forward Integration**
WEAKNESSES (W) W1. Absence of market share analysis W2. Lack of ISCC certification W3. Limited technology development	**WO Strategies WO1.** Enhance digital technology and develop financial monitoring system *(W2, W4–O6)* – **Product Development WO2.** Obtain ISCC certification *(W3–O1, O7)* – **Product Development WO3.** Optimize digital	**WT Strategies WT1.** Improve operational efficiency and cost control to reduce the impact of external fluctuations *(W4–T4, T5)* – **Horizontal Integration**

facilities W4. Manual financial and budgeting systems	marketing to expand UCO market share *(W1–O6, O5)* – **Market Penetration**

Source: Results of research analysis (2025)

The SO strategies leverage PT XYZ's QC laboratory facilities and export reputation to expand its premium UCO supplier network throughout the Greater Jakarta area while establishing strategic partnerships with exporters and new buyers who value verified product quality. The WO strategies emphasize accelerating ISCC certification to regain direct access to the European export market at premium prices, as well as digitalizing operational systems, including collection applications, real-time inventory tracking, and integrated payment systems, to improve operational efficiency and business scalability. The ST strategies focus on developing medium-term contracts (6–24 months) with buyers to mitigate the risks associated with export policy changes and price fluctuations, while also diversifying sales channels to domestic biodiesel markets and AFAL (Animal Fat and Like) industries as a buffer against export policy risks. The WT strategies aim to optimize operational cost efficiency through the improvement of collection routes using digital mapping systems and the implementation of a nucleus–plasma partnership model, which enables significant capacity expansion without substantial infrastructure investment despite working capital constraints.

Strategy Priorities through AHP

Based on the analyses conducted, improvements to PT XYZ's strategy and business model are necessary to optimize business development. In addition to the SWOT analysis, the Analytical Hierarchy Process (AHP) was employed to determine the most appropriate strategic alternatives and priorities for developing an improved business model. The AHP method was used to support strategy formulation, beginning with the establishment of objectives, factors, sub-factors, and strategic alternatives. The AHP hierarchy developed for PT XYZ to achieve its business development goals in UCO management is presented in Figure 2.

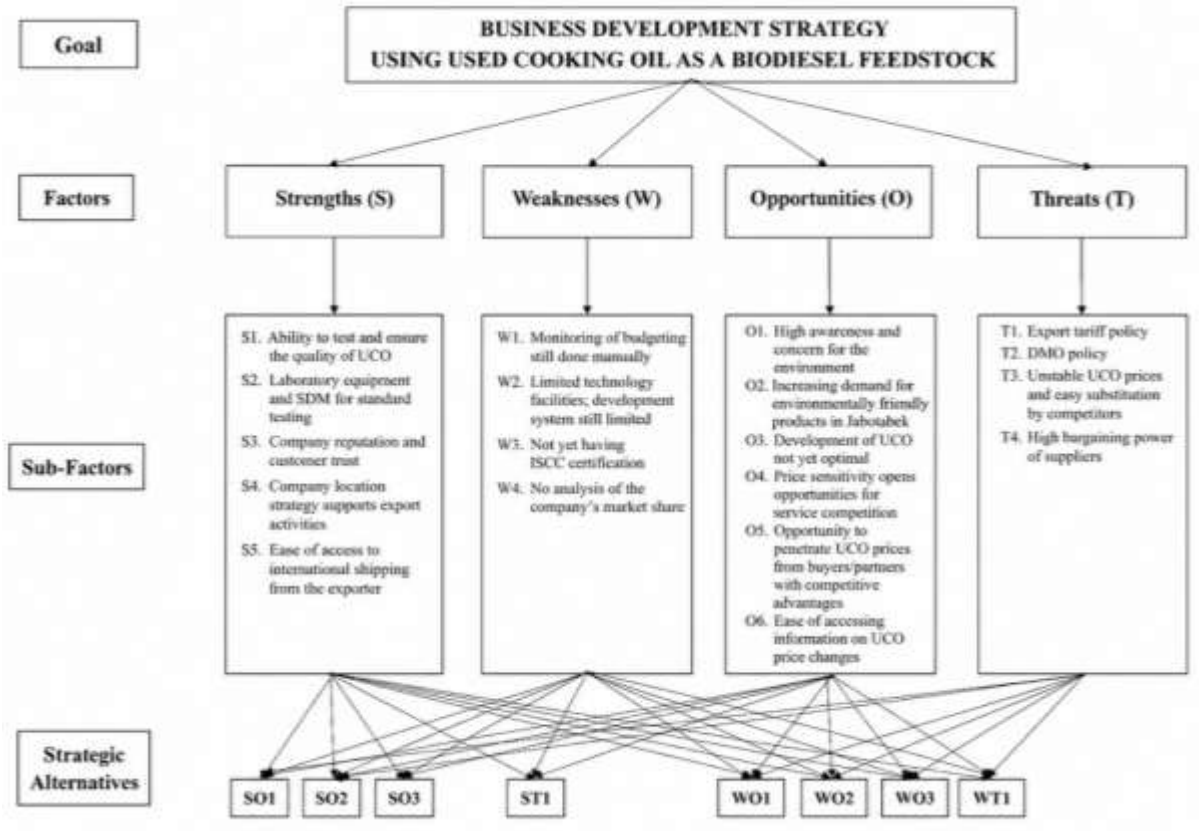

Figure 2. PT XYZ AHP– SWOT Hierarchy

The determination of strategic priorities using AHP involved two stages of evaluation by expert respondents. The first stage consisted of weighting the evaluation criteria, including the urgency of implementation, potential impact on revenue generation, feasibility of implementation, risk mitigation capability, and alignment with the company's long-term vision. The second stage involved pairwise comparisons among the four strategic alternatives based on each criterion. The Consistency Ratio (CR) values for all evaluations were below 0.10, confirming the consistency and reliability of the expert judgments. Table 4 presents the four main strategic priorities and their respective priority levels.

Table 4. Alternative Priorities for UCO *PT XYZ* Management Business Strategy

Rank	Alternative Strategies	Priorities	Categories
1	Medium-term contracts with UCO buyers (local and export markets)	Highest	ST – Risk Mitigation
2	Development of UCO collection networks (partner expansion, nucleus–plasma partnerships, and new operational areas)	High	SO – Growth
3	Operational cost efficiency (route optimization, digitalization, and management systems)	Moderately High	WT – Efficiency
4	Market expansion (new branches, segment diversification, and ISCC certification acceleration)	Moderate	WO – Development

Source: Results of research analysis (2025)

The highest-priority strategy, namely medium-term contracts with buyers, represents the most urgent strategic response to the major risks that have significantly affected PT XYZ. Medium-term contracts (6–24 months) would provide greater certainty regarding sales volume and pricing, enabling more effective working capital and operational planning. Diversification of buyer partnerships, including direct exporters to Europe and domestic biodiesel producers, also forms an important component of this strategy to reduce risk concentration in a single sales channel. Operational implications include improving negotiation processes, developing standardized contract templates, and strengthening the company's product quality track record.

The second strategy, the development of UCO collection networks, focuses on expanding the supplier base through two parallel approaches: organic expansion into underserved HORECA and food industry segments within the Greater Jakarta area, and the development of a nucleus–plasma partnership model in which PT XYZ trains and supports UCO collection partners in designated regions who subsequently supply UCO to the company. This partnership model enables significant capacity expansion without requiring substantial infrastructure investment.

The third strategy, operational cost efficiency, includes the digitalization of collection management systems, real-time inventory tracking, and integrated payment systems. It is further supported by transportation route optimization using digital mapping tools to minimize fuel consumption and reduce operational time per kilogram of collected UCO.

The fourth strategy, market expansion, involves reopening branches outside Jakarta once buyer contracts and financial readiness have been secured. This strategy is accompanied by the acceleration of the ISCC certification process and long-term development toward an independent biodiesel processing business unit.

Proposed New BMC Model

Based on the integration of all strategic analysis results, the proposed new Business Model Canvas (BMC) for PT XYZ introduces comprehensive improvements across all nine elements of the canvas. Table 5 presents a comparison between the existing BMC and the proposed new BMC.

Table 5. Comparison of Existing BMC and New BMC of *PT XYZ*

BMC Element	Existing BMC	Proposed BMC (Recommendation)
Customer Segments	HORECA businesses, food industries, households in the Greater Jakarta area (suppliers), and local exporters (buyers)	Expanded to include AFAL industries (Animal Fat and Like), renewable energy companies, nucleus–plasma partners, government institutions, and circular economy investors
Value Propositions	Convenient collection services, cash payments, and laboratory-verified quality assurance	Enhanced with a scheduled digital platform, profit-sharing schemes, and ISCC certification
Channels	Offline communication (face-to-face meetings, telephone calls, and WhatsApp)	Multi-channel approach including digital platforms, social media, online advertising, and influencer marketing
Customer Relationships	Personal trust, manual responses, and occasional gifts	Supplier appreciation and incentive programs, 24-hour online customer service, regular evaluations, and starter kit provision
Revenue Streams	Margin between UCO purchase and selling prices (single revenue source)	Expanded to include direct export revenue, circular economy partnership programs, and income from application feature development and monetization
Key Resources	Vehicle fleet, QC laboratory, working capital, and field personnel	Enhanced with a digital operational platform, ISCC certification, nucleus–plasma partner network, and improved access to financing
Key Activities	Collecting, handling, quality control (QC), treatment, and delivery	Expanded to include product development, information system development, educational and awareness campaigns, and business digitalization
Key Partnerships	UCO suppliers (upstream) and exporters/buyers (downstream)	Expanded to include financial institutions, technology platform providers, biodiesel associations, certification bodies, and nucleus–plasma partners
Cost Structure	UCO procurement costs, vehicle operating expenses, and labor costs	Expanded to include digital system investments, ISCC certification costs, and nucleus–plasma partnership development expenses

Source: Results of research analysis (2025)

The proposed BMC was designed to achieve two primary objectives simultaneously: minimizing external risks, particularly those associated with fluctuations in export policies and market prices, while creating greater and more sustainable revenue growth opportunities. The most significant transformation occurs in the Revenue Streams element, shifting from a single-source revenue model based solely on trading margins to a diversified revenue model that includes ISCC-certified direct exports, circular economy partnerships, and, progressively, the establishment of an independent biodiesel processing business unit.

The transformation of the Channels element from a purely offline model to a multi-channel digital approach is expected to significantly increase the company's capacity to acquire new suppliers without a proportional increase in labor costs. Furthermore, the proposed BMC integrates environmental and social sustainability dimensions as the foundation of long-term competitive differentiation, which is becoming increasingly relevant in the context of growing global awareness of the urgency of energy transition and the circular economy.

Managerial Implications

Based on the research findings, five critical managerial implications should be implemented by PT XYZ in a structured and measurable manner. These implications are prioritized according to their urgency and potential impact on the company's business performance. First, accelerating the acquisition of International Sustainability and Carbon Certification (ISCC) should be established as a short-term priority program, with a target

completion period of six to twelve months. This certification is not merely an administrative requirement but a strategic asset that provides direct access to the European export market without relying on local exporters as intermediaries. The margin differential between direct exports to Europe and exports conducted through local exporters operating via Tanjung Priok Port is estimated to range from 10% to 20% per ton of UCO. With a potential export volume of 40–60 tons per week following business recovery, this difference represents a substantial increase in revenue. Concrete actions include appointing an internal certification coordinator, consulting with accredited ISCC certification bodies, conducting audits of the internal supply chain management system, and allocating a dedicated budget for the certification process.

Second, operational digitalization should be regarded as a strategic investment that can no longer be postponed. The company's current reliance on manual systems has become a major obstacle to operational efficiency and business scalability. The development of an integrated management information system based on mobile or web applications should include four core modules: (a) a collection management module that enables automated scheduling and real-time confirmation; (b) an inventory tracking module that digitally records UCO inflows and outflows; (c) a supplier management module that stores contract data, transaction histories, and supplier analytics; and (d) a financial administration module that integrates bookkeeping with cash flow management and payment systems, including bank transfers, e-wallets, and other digital payment methods. This investment in digitalization is expected to generate long-term returns through reduced administrative labor costs and accelerated data operational processes.

Third, improving non-raw-material cost efficiency and strengthening the working capital structure should become strategic financial priorities. The UCO collection business is highly working-capital intensive because suppliers are paid immediately after collection, sometimes through advance payment mechanisms while payments from buyers are typically received after a longer period. To address this liquidity challenge, PT XYZ should explore access to working capital financing facilities from commercial banks, including revolving working capital loans, the government-sponsored People's Business Credit (KUR) program, supply chain financing provided by export partners, and partnerships with financial institutions specializing in renewable energy and circular economy sectors.

Fourth, supplier loyalty and retention programs should be formalized and structured more systematically. The loss of suppliers to competitors represents one of the greatest operational risks in the UCO collection business. Recommended initiatives include: a transparent and competitive UCO purchasing price system with regular adjustments based on market prices; advance payment mechanisms for suppliers with consistent volumes or long-term contracts; appreciation programs, such as volume-based bonuses, merchandise, or loyalty incentives for suppliers who have partnered with the company for more than one year; and a rapid complaint-handling and collection-response system supported by measurable service-level agreements (SLAs).

Fifth, the development of PT XYZ's brand identity as a green business based on circular economy principles should be undertaken systematically. Environmental sustainability, circular economy practices, and renewable energy have become increasingly important concerns among a wide range of stakeholders, including consumers, businesses, and investors. PT XYZ possesses a compelling business narrative: transforming hazardous waste into clean fuel while simultaneously reducing environmental pollution. This narrative should be communicated consistently through social media platforms, the corporate website, participation in renewable energy industry exhibitions, and engagement in national environmental and biodiesel policy forums.

CONCLUSION

This study generated four interrelated key findings that collectively provide a comprehensive foundation for the future development of PT XYZ's business. First, the analysis of PT XYZ's current business operations indicates that the company continues to operate a relatively simple business model for managing Used Cooking Oil (UCO) as biodiesel feedstock. The business is currently in an operational phase as an active collector and supplier of UCO to buyers, primarily domestic exporters, under a business-to-business (B2B) model. Its primary activities focus on collection, handling through basic quality control procedures, treatment, and direct delivery to partners. However, the utilization of existing media channels, partnership networks, and operational scale remains limited. Similarly, the company's revenue stream remains highly dependent on a single source, namely UCO sales. Therefore, PT XYZ still requires further development and improvement to achieve sustainable growth, maximize profit margins, and ultimately achieve downstream integration in the long term.

Second, regarding PT XYZ's business operations, several internal factors influence strategic decision-making. The primary weaknesses include the absence of ISCC certification, limited product and system development technology, and operational monitoring processes that are still conducted manually. The company's key strengths include the availability of a dedicated UCO quality control laboratory, a strong and maintainable business reputation, and a strategically located business facility. From an external perspective, the most significant threats include export tariff policies and Domestic Market Obligation (DMO) regulations, the ability of suppliers and service users to easily compare UCO prices offered by competitors, and the bargaining power of suppliers in negotiating prices. Meanwhile, the most promising opportunities include increasing environmental awareness, growing environmental pollution concerns, the lack of a systematic UCO management system in Indonesia, price sensitivity in the UCO market, pricing offers from buyers and partners that can enhance PT XYZ's competitive position, and the suppliers can access market price information.

Third, based on the internal and external factors analyzed, PT XYZ is positioned in Cell II ("Grow and Build") of the Internal–External (IE) Matrix. This position provides the basis for establishing strategic priorities to address identified weaknesses and threats. Strategic alternatives with significant potential for further evaluation and implementation in developing PT XYZ's UCO management business include medium-term contracts, expansion of UCO collection networks, operational cost efficiency initiatives, and market expansion strategies. Among these alternatives, medium-term contractual agreements with both suppliers and UCO buyers received the highest priority and should therefore be implemented first.

Fourth, given the company's current business conditions and the findings from the internal and external analyses, several strategic solutions were formulated, resulting in the development of an improved business model. The proposed business model for managing UCO as biodiesel feedstock at PT XYZ is designed not only to continue selling UCO through domestic partners but also to enable the company to resume direct export activities and eventually establish an independent biodiesel processing business through various collaborative arrangements across the entire value chain, from upstream collection to downstream processing. In addition, business operations that have traditionally relied on offline promotional activities will be enhanced through the optimization of online marketing and the implementation of technology-based business processes covering collection services, QC, inventory management, and integrated payment systems supported by digital applications.

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