Strategic Pathways for Competitive Advantage in Recycled Aluminium: An Integrated AHP-SWOT Analysis

Waraney Daniel Carl Mumbunan[1*], Nimmi Zulbainarni[2], Suhendi[3]
[1,2,3]*School of Business, Institut Pertanian Bogor; Bogor, Indonesia*

*Corresponding Author E-Mail: carlwaraneymumbunan@apps.ipb.ac.id

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ABSTRACT

The recycled aluminium industry faces competitive challenges that require effective strategies to enhance industry competitiveness. This study aims to analyze internal and external factors within a company and prioritize strategies to improve performance and sustainability. The objectives are to evaluate the company's strengths, weaknesses, opportunities, and threats, and to identify key strategies that support competitive advantage. Data was collected from October 2024 to December 2024 using both qualitative and quantitative methods from 7 respondents. The analysis involved several steps, including IFE analysis (Strengths & Weaknesses) and EFE analysis (Opportunities & Threats) to determine factor priorities, formulation of the TOWS-SWOT matrix, and evaluation of strategy priorities using AHP-SWOT analysis. Based on the TOWS-SWOT matrix, 12 strategies were developed, with ST3, ST2, and WO3 identified as the top priorities. This study provides comprehensive insights into companies in determining competitive and sustainable strategy alternatives in the recycled aluminium industry, which can ultimately enhance industry competitiveness and support long-term sustainability.

Keywords*: AHP-SWOT Analysis, External Factors Evaluation, Internal Factors Evaluation, Recycled Aluminium.*

INTRODUCTION

Indonesia has the sixth-largest bauxite reserves and the fifth-largest production in the world. According to the US Geological Survey (2023), there is significant potential for the development of the national aluminum industry. Bauxite is the primary raw material for aluminum production, making its management and utilization a strategic factor to support a more competitive downstream industry. Since 2023, the Indonesian government has banned the export of raw materials, including bauxite, to encourage downstream industrialization, particularly in the mineral sector, and to increase the added value of domestic products, including aluminum itself. This policy aims to promote a more integrated industry from upstream to downstream, allowing broader economic benefits.

According to The Aluminium Association (2024), Aluminum consists of two main types: primary aluminum and secondary aluminum. Primary aluminum is produced from pure bauxite ore through an energy-intensive smelting process, while secondary aluminum is produced from recycled aluminum scrap. Secondary aluminum is considered more environmentally friendly because its production process is much more energy-efficient and less damaging to the environment compared to primary aluminum. The energy required for secondary aluminum production is only about 5% of that needed for primary aluminum. This demonstrates that developing secondary aluminum not only has economic value but also contributes to environmental sustainability.

Despite abundant bauxite reserves, Indonesia's domestic production capacity is estimated at only 25% of the total national aluminum consumption of 1 million tons. As

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a result, to meet domestic industrial and market demands, Indonesia still needs to import approximately 724,746 tons of aluminum. This gap highlights the need to strengthen the domestic aluminum processing industry through increased production capacity and the development of higher-value-added downstream products. To address this demand, PT Indonesia Aluminum Alloy (IAA) was established in 2020 as a midstream aluminum producer, aiming to stimulate the growth of the downstream industry. The company serves as a bridge to supply aluminum raw materials domestically while creating opportunities for value-added product development (BPS, 2023). However, PT IAA faces significant challenges. The company experienced operating losses at the start of commercial operations, partly due to product specifications not fully matching market needs. In addition, IAA has limited working capital and technology, which restricts production capacity and product innovation. Dependence on imported aluminum scrap is another challenge, as domestic supply remains insufficient. Another critical challenge is the company's position as a price taker in the commodity market. Aluminum prices are benchmarked on the London Metal Exchange (LME), limiting the company's flexibility to set its own selling prices according to market conditions.

Although prior studies have widely examined Indonesia's mineral downstreaming policy and aluminum recycling, most focus on macroeconomic impacts or environmental performance (Zou et al., 2025). Empirical research addressing firm-level strategic challenges faced by secondary aluminum producers operating in the midstream segment under regulatory and price constraints remains limited. Furthermore, studies integrating internal–external strategic analysis with multi-criteria decision-making approaches, such as the SWOT–AHP method, to prioritize downstream strategies in the Indonesian aluminum industry are still scarce (Dergisi, 2017).

In addition to internal challenges, government regulations also affect operations. Minister of Trade Regulations Number 92 of 2019 and Number 58 of 2020 on non-B3 waste import quotas limit the amount of aluminum scrap that can be imported, further restricting the supply of secondary aluminum. This puts additional pressure on production and affects the company's ability to meet market demand at competitive prices. Given these challenges, a comprehensive business strategy is essential for PT IAA. One strategic approach is transforming from midstream to downstream, allowing the company to produce value-added aluminum products. This step is expected to increase profit margins and strengthen the company's position within the national aluminum value chain. This study aims to evaluate PT IAA's existing conditions, analyze internal and external factors affecting business performance, and determine priority strategies using a SWOT approach combined with AHP derived from SWOT. With the right strategies, PT IAA is expected to enhance competitiveness, productivity, and long-term sustainability while supporting the development of an integrated national aluminum industry.

LITERATURE REVIEW

Strategic Management

Strategy has been defined in various ways depending on organizational context. Steiner (1979) defines strategy as the directed and fundamental decisions, including vision and mission, combined with important activities to help the organization achieve its goals. Mintzberg (1994) emphasizes strategy as a long-term plan for attaining organizational objectives. Additionally, Porter (1996) highlights strategy as a tool to differentiate companies from competitors by creating uniqueness in products and services, ultimately gaining a competitive advantage. Strategic management is the systematic process of planning, controlling, and evaluating business activities to maintain and enhance competitive advantage (Dhlamini, 2024). This process involves defining organizational goals, analyzing internal factors such as strengths and weaknesses, assessing external factors including opportunities and threats, formulating strategy alternatives, implementing selected strategies, and evaluating outcomes. Wheelen and Hunger (2012) argue that strategies must be continuously monitored and improved to overcome internal weaknesses, respond to external threats, and maintain sustainable competitive advantage.

Internal factor analysis identifies core strengths and weaknesses, which allows management to leverage competencies and address limitations (Hamel & Prahalad, 1995). Engaging all stakeholders ensures that internal data is reliable for strategic decision-making (Pratidina, 2017). The Valuable, Rare, Inimitable, and Organized (VRIO) framework is a critical tool for evaluating a company's resources, as fulfilling these criteria enables sustainable competitive advantage (Barney, 2014). Thus, strategic management integrates vision, internal and external analysis, and continuous evaluation to guide organizations in achieving long-term goals, enhancing competitiveness, and ensuring sustainability in complex and dynamic business environments.

Conceptual Framework for Strategic Analysis Using SWOT and AHP

Achieving competitive advantage requires careful analysis of both internal and external factors affecting the organization (Wildanika et al., 2024). Internal analysis examines strengths and weaknesses through the lens of organizational competencies, helping firms convert weaknesses into differentiating advantages and build on core strengths (Hamel & Prahalad, 1995). Stakeholder involvement is essential for gathering accurate information to identify which factors truly contribute to competitive positioning (Pratidina, 2017). External analysis focuses on opportunities and threats that exist beyond the organization's control (David, 2006). Common frameworks include PESTLE analysis, which evaluates political, economic, social, technological, legal, and environmental factors, and Porter's five forces, which examines industry competition, including rivalries among competitors, threats of new entrants, substitutes, and bargaining power of suppliers and consumers. These tools help firms determine strategic priorities and anticipate environmental challenges.

SWOT analysis integrates internal and external insights to formulate actionable strategies. By leveraging strengths to seize opportunities and addressing weaknesses to mitigate threats, organizations can define key success factors that guide strategic decision-making (Rangkuti, 2005). To prioritize complex decisions, the Analytical Hierarchy Process (AHP) assigns weights to multiple criteria, enabling structured evaluation of alternatives and supporting objective decision-making in strategy formulation (Saaty, 2001; Parhusip, 2019). By combining internal and external assessments with structured prioritization, organizations can develop strategies that enhance competitiveness, improve efficiency, and support sustainable growth in dynamic markets, including specialized sectors such as recycled aluminium.

RESEARCH METHODS

This study employed a quantitative and qualitative approach, aiming to evaluate the current condition of PT Indonesia Aluminum Alloy (IAA) and to formulate the most effective business strategies for the company. This approach allows the researchers to gain a comprehensive understanding of the internal and external factors affecting the company's performance while identifying strategic priorities through structured analysis. To ensure the validity and trustworthiness of the findings, data triangulation was applied by comparing information obtained from interviews and questionnaires. Primary data were collected through interviews and questionnaires. Interviews were conducted with internal company parties, including directors, managers, and staff, to obtain in-depth information regarding operations, challenges, and previously implemented strategies. Questionnaires were administered to external stakeholders, such as Galunesia and PT Indonesia Asahan Aluminium, to gather perspectives on market conditions, opportunities, and threats. The sampling technique used was purposive sampling based on expert sampling, focusing on selecting respondents with relevant expertise and experience suitable for the research objectives (Etikan & Bala, 2017). The study population included all internal parties involved in decision-making and operational activities, as well as external parties with direct relationships with the company. From this population, seven key respondents were selected, considered to possess the most relevant information and expertise to support the research objectives. The research instruments

consisted of semi-structured interview guides and closed-ended questionnaires. The interview guides were designed to explore the company's strengths, weaknesses, opportunities, and threats, while the questionnaires quantitatively measured respondents' perceptions of these factors. The instruments were pre-tested to ensure question clarity and consistency of responses.

Data analysis was conducted in four main stages. The first stage was the External Factor Evaluation (EFE), which assessed opportunities and threats based on economic, political, social, technological, legal, and environmental factors, including weighting and ranking (David, 2002). The second stage was the Internal Factor Evaluation (IFE), which identified the company's strengths and weaknesses. The third stage was SWOT analysis, which formulated strategies by combining internal and external factors into SO, ST, WO, and WT strategies. The fourth stage involved the AHP combined with SWOT to objectively determine strategic priorities through a decision hierarchy and relative weighting between factors (Pesonen et al., 2000). The AHP-SWOT process was conducted across four hierarchical levels: goal setting, identification of key SWOT factors, elaboration of sub-factors, and selection and evaluation of numerically prioritized strategic alternatives. The combination of these methods enables the development of an effective recycled aluminum business strategy for PT IAA, which is expected to enhance competitiveness, productivity, and long-term sustainability.

RESULTS

Identification and Prioritization of Internal and External Strategic Factors

Regarding the factors listed in the results of the Internal Factor Evaluation (IFE), there are 13 total internal factors consisting of 7 strength factors and 6 weakness factors. Then, the priority ranking of these factors is calculated and filtered so that 5 priority strength and weakness factors are selected based on the calculation of each factor. The factors listed in the results of the External Factor Evaluation analysis (EFE) are 22 total external factors, consisting of 15 opportunity factors and 7 threat factors. Then, these factors will be calculated and ranked by weight, and the top 5 factors will be selected as priorities for the next stage, both from the opportunity and threat factors.

Table 1. Internal Factors Evaluation of Strengths

Internal Factors of Strengths	Weight
Quality of Aluminium Molten as the Raw Material	0.156
Corporate Branding as the Subsidiary of Inalum	0.127
Strategic Factory Location	0.116
Relationship with the Government, Considering PT IAA is a State-Owned Company	0.092
Production Capacity per Year	0.087

Table 1 presents the five main strengths of PT IAA along with their respective weights, reflecting the influence of each factor on the company's competitiveness. The top factor is the quality of aluminium molten as raw material, which is considered a strength because it ensures high-quality and consistent raw materials, supporting competitive aluminum production. The second factor, corporate branding as the subsidiary of Inalum, strengthens the company by enhancing its reputation and customer trust. Strategic factory location is a key strength because the factory's proximity to the parent company and the port improves distribution efficiency, reduces logistics costs, and facilitates product delivery. The fourth factor, relationship with government, considering PT IAA is a state-owned company, provides operational support and management advantages. Production capacity per year enables the company to meet market demand and support long-term growth. Together, these five factors represent the company's core strengths, which can be leveraged to improve performance and maintain competitiveness in the aluminum industry.

Table 2. Internal Factors Evaluation of Weaknesses

Internal Factors of Weaknesses	**Weight**
Human Resource Skills (Especially for Aluminium Recycling)	0.075
Market Network of Billet Products	0.064
Useful Life Technology Exceeds 25 Years	0.046
Company Ability to Conduct Product Research and Development	0.04
Dependence on Only 1 Aluminium Commodity	0.035

Table 2 presents the five main weaknesses of PT IAA along with their weights, indicating how each factor limits the company's competitiveness. The top weakness is human resource skills, with a weight of 0.075, highlighting the need to improve workforce skills, particularly in aluminum recycling. The second factor, the market network of billet products, reflects limitations in market reach, including mismatches between product specifications and market demand. The third weakness, useful life technology exceeds 25 years, indicates aging technology, reducing production efficiency and degrading both machinery and workforce skills (Parhusip, 2019). The fourth factor, the company's ability to conduct product research and development, shows limited capacity for innovation and product development, as operational activities remain the primary focus. Dependence on only 1 aluminium commodity reflects the risk of relying on a single product, making the company vulnerable to price fluctuations. These five factors highlight areas for improvement to enhance efficiency, diversify products, and strengthen long-term competitiveness.

Table 3. External Factors Evaluation of Opportunities

External Factors of Opportunities	**Weak**
Large and Continuously Growing Domestic and International Recycled Aluminum Market	0.052
Aluminium Consumption per Capita of the People of Indonesia	0.05
Existing Condition of Indonesia's Political Stability	0.048
Potential Gap Between Supply and Demand of Domestic Aluminium	0.048
Technological Advancement of Recycled Aluminium Production on Increasing Productivity	0.046

Table 3 presents the top five external opportunities for PT IAA, along with their respective weights, highlighting potential factors that the company can leverage to enhance competitiveness. The highest-weighted opportunity is the large and continuously growing domestic and international recycled aluminum market, which indicates strong market potential for expansion (Etikan & Bala, 2017). The second opportunity, aluminum consumption per capita in Indonesia, suggests increasing domestic demand that can be captured by the company. The third factor, the existing condition of Indonesia's political stability, provides a favorable environment for investment and long-term planning. The fourth factor, the potential gap between supply and demand of domestic aluminum, indicates opportunities to fill market shortages and increase market share. The technological advancement of recycled aluminum production to increase productivity represents an opportunity for IAA to adopt new technologies to improve efficiency and competitiveness. These opportunities highlight areas where the company can strategically focus to grow its business and strengthen its position in the recycled aluminum industry.

Table 4 presents the top five external threats facing PT IAA, along with their weights, highlighting factors that may limit the company's competitiveness. The highest-weighted threat is the price volatility of aluminium in the LME, which exposes the company to fluctuations in international aluminum prices. The second factor, availability of working capital, such as capital deposits, indicates potential financial constraints that may affect operations and expansion (Zou et al., 2025). The third threat, competition between domestic and international competitors, emphasizes the challenge of maintaining market share amid strong competitive pressure. The fourth factor, availability of clean and homogeneous domestic aluminium scrap, points to potential supply limitations that could affect production consistency. Thus, regulations of non-B3 waste import quotas based on the Ministry of Trade Regulation Number 92 of 2019 and Number 58 of 2020 represent

legal constraints that restrict the import of raw materials for production. These threats highlight external challenges that IAA needs to monitor and manage to sustain competitiveness and ensure stable operations.

Table 4. External Factors Evaluation of Threats

External Factors of Opportunities	**Weak**
Price volatility of aluminium in the LME	0.052
Availability of working capital, such as capital deposits.	0.05
Competition between domestic and international competitors	0.048
Availability of clean and homogeneous domestic aluminium scrap	0.048
Regulations of non-B3 waste import quota as the raw materials based on the Ministry of Trade Regulation Number 92 of 2019 and the Ministry of Trade Regulation No. 58/2020.	0.046

TOWS–SWOT Matrix and Strategic Alternative Formulation

Based on Table 5, the TOWS-SWOT Matrix above presents alternative strategies for PT IAA based on a combination of internal factors (strengths and weaknesses) and external factors (opportunities and threats). Strengths, opportunities, and strategies leverage the company's strengths to capitalize on market opportunities, such as producing downstream aluminum products, forming strategic partnerships, and conducting sustainability campaigns. Weaknesses, opportunities, and strategies address internal weaknesses by utilizing opportunities, including investing in production equipment, providing employee training, and optimizing 5-inch aluminum billet production to meet market demand. Strengths threats strategies use the company's strengths to counter external threats, such as financial restructuring, business diversification, and temporarily using high-purity molten aluminum to overcome raw material shortages. Weakness threats strategies focus on mitigating weaknesses while managing external threats through collaboration with universities, outsourcing, and joint ventures with experienced companies in secondary aluminum and downstream production. Thus, the matrix provides a strategic roadmap to enhance IAA's competitiveness, operational efficiency, and sustainable growth.

Table 5. TOWS-SWOT Matrix

Internal/External Factors	**SWOT-TOWS Matrix**
Strengths	S1: Quality of aluminium molten as the raw material.
	S2: Corporate branding as the subsidiary of Inalum.
	S3: Strategic factory location.
	S4: Relationship with the government, considering PT IAA is a state-owned company.
	S5: Production capacity per year.
Weakness	W1: Human resource skills (especially for aluminium recycling).
	W2: Market network of billet products.
	W3: Useful life technology exceeds 25 years.
	W4: The company's ability to conduct product research and development.
	W5: Dependence on only 1 aluminium commodity.
Opportunities	O1: Large and continuously growing domestic and international recycled aluminum market.
	O2: Aluminium consumption per capita of the people of Indonesia.
	O3: Existing condition of Indonesia's political stability.
	O4: Potential gap between supply and demand of domestic aluminium.
	O5: Technological advancement of recycled aluminium production to increase productivity.
Threats	T1: Price volatility of aluminium in LME.
	T2: Availability of working capital, such as capital deposits.
	T3: Competition between domestic and international competitors.
	T4: Availability of clean and homogeneous domestic aluminium scrap.

Internal/External Factors	SWOT-TOWS Matrix
	T5: Regulations of non-B3 waste import quota as the raw materials based on the Ministry of Trade Regulation Number 92 of 2019 and the Ministry of Trade Regulation Number 58 of 2020.
SO Matrix	SO1: Shifting some of the production output to produce downstream aluminum products and increasing production capacity to create economies of scale. (S1, S2, S3, S4, S5, O1, O2, O4)
	SO2: Collaborating and building partnerships with FMCG companies and other strategic partners to provide solutions for cans and Aluminum Foil packaging. (S1, S3, S4, S5, O1, O4, O5)
	SO3: Conducting sustainability campaigns to promote the company PT IAA and its products. (S1, S2, O1, O2, O4)
WO Matrix	WO1: Investing in production equipment to upgrade technology and also to invest in equipment to produce downstream aluminum products. (W1, W2, O1, O2, O4, O5)
	WO2: Provide employee training related to the implementation of downstream aluminum product production and research & development. (W1, W4, W5, O5)
	WO3: Prioritize and optimize 5-inch aluminum billet production in accordance with market demand. (W2, W5, O1, O4)
ST Matrix	ST1: Conducting financial restructuring to overcome problems related to capital availability. (S2, S3, S4, T2, T4)
	ST2: Conducting Business Diversification and gradual downstreaming to increase the aluminum commodities. (S1, S3, S4, S5, T1, T3, T5)
	ST3: Utilizing high-impurity molten aluminum as a short-term strategy to overcome the problem of scrap raw materials. (S1, T2)
WT Matrix	WT1: Collaborating with universities both in Indonesia and abroad. (W1, W2, W4, W5, T4, T5)
	WT2: Collaborating with third parties (outsourcing) to assist companies in the production sector. (W1, T1, T4)
	WT3: Conducting Joint Ventures with companies experienced in the production of secondary aluminum and its downstream products. (W3, T1, T2, T3)

Based on Table 6, the results of the Analytical Hierarchy Process SWOT (A'WOT) analysis prove that, related to the weighting results in the assessment of strengths, weaknesses, opportunities, and threats, the opportunity factor occupies the highest weight value with a value of 0.347. After that, continued with the assessment of each subfactor. In the strength factor, the highest weight results were obtained in subfactor S1, namely, the quality of molten aluminum raw materials. In the weakness factor, the highest score was obtained in subfactor W1, namely, human resource expertise in producing aluminum, especially in aluminum recycling. In the opportunity factor, the highest score was obtained by O2, namely, the aluminum consumption per capita of Indonesian society. After that, the highest subfactor in the threat factor, namely T3, is competition with competitors both foreign and domestic.

Table 6. Results of Local Weight Calculation

Criteria	Weight	Subcriteria	Weight	Inconsistency
Strengths	0.33	S1: Quality of aluminium molten as the raw material.	0.488	0.03 (3%)
		S2: Corporate branding as the subsidiary of Inalum.	0.167	
		S3: Strategic factory location.	0.135	
		S4: Relationship with government: considering PT IAA is a state-owned company.	0.097	
		S5: Production capacity per year.	0.114	
Weaknesses	0.154	W1: Human resource skills (especially for aluminium recycling).	0.388	0.1 (10%)
		W2: Market network of billet products.	0.168	
		W3: Useful life technology exceeds 25 years.	0.153	
		W4: Company ability to conduct product research and development.	0.156	

Criteria	Weight	Subcriteria	Weight	Inconsistency
		W5: Dependence on only 1 aluminium commodity.	0.135	
Opportunities	0.347	O1: Large and continuously growing domestic and international recycled aluminum market.	0.041	0.05 (5%)
		O2: Aluminium consumption per capita of the people of Indonesia.	0.298	
		O3: Existing condition of Indonesia's political stability.	0.264	
		O4: Potential gap between supply and demand of domestic aluminium.	0.232	
		O5: Technological advancement of recycled aluminium production to increase productivity.	0.166	
Threats	0.168	T1: Price volatility of aluminium in LME.	0.226	0.00539 (0.539%)
		T2: Availability of working capital, such as capital deposits.	0.143	
		T3: Competition between domestic and international competitors.	0.322	
		T4: Availability of clean and homogeneous domestic aluminium scrap.	0.083	
		T5: Regulations of non-B3 waste import quota as the raw materials based on the Ministry of Trade Regulation Number 92 of 2019 and the Ministry of Trade Regulation Number 58 of 2020.	0.226	

Based on Table 7, the priorities related to the alternative strategies, the 1st rank is occupied by the ST3 strategy in the form of utilizing high impurity molten aluminum as a short-term strategy to overcome the problem of scrap raw materials with a weight of 0.194. The 2nd position is occupied by ST2 in the form of conducting business diversification and gradual downstreaming to increase the aluminum commodities sold and increase added value, and also to reduce dependence on LME price fluctuations with a weight of 0.172. Followed by the 3rd rank alternative strategy in the form of prioritizing and optimizing 5-inch aluminum billet production in accordance with market demand, which is the WO3 strategy with a weight of 0.128.

Table 7. Priority Ranking of Each Strategy Alternative

Strategy	Strategy Alternatives	Weight	Priority
ST3	Utilizing high-impurity molten aluminum as a short-term strategy to overcome the problem of scrap raw materials.	0.194	1
ST2	Conducting business diversification and gradual downstreaming to increase the aluminum commodities sold, increase added value, and also to reduce dependence on LME price fluctuations.	0.172	2
WO3	Prioritize and optimize 5-inch aluminum billet production in accordance with market demand.	0.128	3
WT3	Conducting joint ventures with companies experienced in the production of secondary aluminum and its downstream products with local companies or international companies.	0.093	4
SO1	Shifting some of the production output to produce downstream aluminum products and increasing production capacity to create economies of scale.	0.088	5
ST1	Conducting financial restructurization and seeking alternative funding to overcome problems related to capital availability.	0.076	6
WO1	Investing in production equipment in order to upgrade technology, and also to invest in equipment to produce downstream aluminum products, in order to capture the momentum of the large and continuously growing market.	0.074	7
WT2	Collaborating with third parties (outsourcing) to assist companies in the production sector, especially in the field of downstream products and product diversification.	0.045	8
SO3	Conducting campaigns to promote the company PT IAA and its products, which raise awareness of sustainability for	0.04	9

Strategy	Strategy Alternatives	Weight	Priority
	the environment, knowing that the products sold are recycled aluminum products.		
WT1	Collaborating with universities both in Indonesia and abroad in order to overcome the company's limitations in conducting research and development, especially in conducting research for the development of aluminum impurity sorting technology, in order to overcome problems related to import quotas, and also conduct market research to improve the company's market network.	0.033	10
SO2	Collaborating and building partnerships with FMCG companies and other strategic partners in order to provide solutions for cans and aluminum foil packaging.	0.029	11
WO2	Provide training to employees related to the implementation of downstream aluminum product production as well as training related to strengthening product research and development.	0.029	11

DISCUSSION

PT IAA has several strengths that support its competitiveness. The high quality of molten aluminum used as the main raw material is supplied by its parent company, Inalum, accounting for about 30% of total inputs. Being branded as a subsidiary of Inalum gives the company a strong identity and supports competitive sustainability (Buil et al., 2016). The strategic location of the factory offers logistical advantages and cost efficiency because it is close to Inalum's smelter and Kuala Tanjung Port (Nege & Abegaz, 2024). The company's relationship with the government as a state-owned enterprise helps reduce management conflicts and enhances overall productivity (Sihombing & Akbar, 2022). Thus, since starting production in 2023, the annual production capacity has contributed to increasing the nation's aluminum output (Malek et al., 2015; Csiki et al., 2023).

However, IAA faces internal weaknesses that require improvement. Human resource skills, especially in aluminum recycling, are limited, affecting production efficiency (Bassi & Guidolin, 2021). The market network for billet products is mismatched with demand, as 6-inch aluminum is produced while the market prefers 5-inch, requiring adaptation and marketing adjustments (Al Badi, 2015; Donndelinger & Ferguson, 2020). Outdated technology with a useful life of over 25 years reduces efficiency and workforce capability (Demirova, 2018). The company's research and development capacity remains limited, and innovation must be strengthened to support performance and circular economy activities (Dorrego-Viera et al., 2025). Dependence on a single aluminum commodity, billet, exposes the company to LME price fluctuations, making product diversification essential to improve margins and financial capacity (Clinton & Salami, 2021).

Externally, IAA faces several major opportunities. According to Fortune Business Insights (2023), the domestic and international recycled aluminum market is large and continues to grow, with energy consumption at only 5% compared to primary aluminum, thereby enhancing efficiency. PT Cita Mineral Investindo (2020) notes that aluminum consumption per capita in Indonesia is 6.79 kg, indicating significant domestic market potential, supported by the development of SGAR to reduce import dependence. Political stability in Indonesia reduces investment risks (Basavarajappa, 2022). The gap between supply and demand in domestic aluminum production, with only 25% of 1 million tons produced locally, provides opportunities to improve competitiveness, create employment, and support foreign exchange earnings (Anggrahini et al., 2020; Abdinagoro & Hamsal, 2022). Technological advancements, such as High Shear Melt Conditioning (HSMC), also enhance production efficiency and effectiveness (Lazaro-Nebreda et al., 2022).

Priority threats include volatility in LME aluminum prices, which can affect profit margins and increase financial risk. In addition, limited working capital requires careful financial management to support operations and strategic investments (Dahlia et al., 2019; Manalu et al., 2022). The company also faces intense domestic and international competition, challenges related to a limited supply of clean aluminum scrap, and strict

non-B3 waste import quota regulations that constrain material sourcing (Dewi, 2016; Ministry of Trade, 2019; Ministry of Trade, 2020; Bagaskara & Moko, 2022). Based on the SWOT analysis, twelve alternative strategies were formulated to address these threats along with internal strengths and weaknesses. Strength threat strategies focus on actions that leverage internal strengths to mitigate external threats, such as financial restructuring, business diversification with gradual downstream expansion, and the temporary use of high-impurity molten aluminum to sustain production effectiveness (Mavlutova et al., 2020; Razak, 2022). Weakness threat strategies involve forming collaborations with universities, outsourcing certain functions, and entering joint ventures with experienced companies to strengthen technical capabilities and manage risks better (Zmadi & Al-Jawazneh, 2016; Tereshchenko et al., 2024; Puspadewi et al., 2024; Basra et al., 2025).

Other approaches include strength opportunity strategies, such as expanding downstream production, building strategic partnerships, and launching sustainability campaigns to enhance market presence and resilience (Jackson, 2023; Kurniawan et al., 2023; Saleem et al., 2024). Weakness opportunity strategies prioritize investments in modern equipment, employee training programs, and the optimization of 5-inch billet production to improve operational efficiency and capitalize on growth opportunities (Olutimehin et al., 2024; Mustafa-Sadiku, 2025).

CONCLUSION

Based on the research, several key findings were identified. From the external factors, the largest opportunity for PT Indonesia Aluminium Alloy (IAA) is the continuously growing domestic and international recycled aluminum market, reflecting strong market potential and efficiency advantages. The primary threat is aluminum price volatility at the LME, which affects profit margins and financial stability. From the internal factors, the company's main strength is the high quality of molten aluminum raw materials supplied by PT Inalum, while the most significant weakness is the limited human resource expertise in aluminum production, especially in recycled aluminum.

The implications of these findings indicate that IAA should prioritize strategies that leverage its strengths to capture market opportunities while addressing internal weaknesses to mitigate external threats. Specifically, implementing downstream production, diversifying products, optimizing billet production, and investing in employee training and technology will enhance competitiveness, operational efficiency, and sustainable growth. Additionally, managing financial risks related to price volatility and securing reliable raw material supply are crucial for long-term stability.

This study is limited by its focus on a single case study and a relatively small number of expert respondents, which may restrict the generalizability of the findings. In addition, the SWOT–AHP analysis relies on subjective expert judgments and reflects market and regulatory conditions at the time of analysis, which may change over time. Based on these results, several recommendations can be made. IAA should continue expanding its downstream production and strategic partnerships, strengthen human resource capabilities through targeted training programs, and explore technological advancements to improve production efficiency. Furthermore, continuous monitoring of market trends and price fluctuations is essential. For future research, it is recommended to examine the long-term impact of downstream product diversification on profitability, investigate alternative funding mechanisms to reduce financial risk, and explore the role of innovation in circular economy practices within the Indonesian aluminum industry.

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REFERENCES

[1] Abdinagoro, S., & Hamsal, M. (2022). Strategic marketing approach of Indonesia aluminium mineral industry: Upstream and downstream analysis. *The Winners, 23*(2), 181–188.

[2] Al Badi, K. (2015). The dimensions of marketing mix. *Management and Organizational Studies, 2*(1), 136–142.

[3] Anggrahini, A. H., Wibowo, A. P., & Rosyid, F. A. (2020). Peramalan kebutuhan bijih bauksit untuk memenuhi kebutuhan aluminium nasional menggunakan model ardl dan var. *Prosiding Temu Profesi Tahunan PERHAPI*, 401-412.

[4] Bagaskara, M., & Moko, W. (2022). Perumusan strategi pengembangan bisnis daur ulang logam aluminium. *Jurnal Kewirausahaan dan Inovasi, 1*(2), 239–250.

[5] Barney, J. (2014). *Gaining and sustaining competitive advantage* (4th ed.). Boston, MA: Pearson.

[6] Basavarajappa, P. T. (2022). The influence of political and economic stability on foreign direct investment decisions. *International Journal of Research and Analytical Reviews, 9*(1), 121-132.

[7] Basra, A., Wedawatta, G., & Tetteh, M. (2025). Critical success factors for rail infrastructure joint ventures. *Discover Cities, 2*(3), 1–35.

[8] Bassi, F., & Guidolin, M. (2021). Resource efficiency and circular economy in European SMEs: Investigating the role of green jobs and skills. *Sustainability, 13*(21), 12136-12144.

[9] BPS. (2023). *Impor aluminium menurut negara asal utama, 2013–2022*. Retrieved October, 15, 2025, from https://www.bps.go.id/statictable/2019/02/14/2017/impor-aluminium-menurut-negara-asal-utama-2013-2022.html

[10] Buil, I., Catalan, S., & Martinez, E. (2016). The importance of corporate brand identity in business management: An application to the UK banking sector. *BRQ Business Research Quarterly, 19*(1), 3–12.

[11] Clinton, E., & Salami, C. (2021). Impact of diversification strategy on organizational performance in manufacturing firms in Nigeria. *International Research Journal of Management, IT & Social Sciences, 8*(6), 589–604.

[12] Csiki, O., Demeter, K., & Losonci, D. (2023). How to improve firm performance? – The role of production capabilities and routines. *International Journal of Operations & Production Management, 43*(13), 1–26.

[13] Dahlia, D., Pardede, M., & Sutardi, S. (2019). Pengaruh hutang, aktiva lancar, aktiva tetap dan penyusutan terhadap modal kerja pada PT Batara Prima Selera. *JEBI Jurnal Ekonomi Bisnis Indonesia, 14*(1), 22–32.

[14] David, F. R. (2002). *Manajemen strategi: Konsep*. Jakarta: Prenhallindo.

[15] David, F. R. (2006). *Manajemen strategis: Konsep*. Jakarta: Salemba Empat.

[16] Demirova, S. (2018). Innovative obsolescence and its impact on production development of industrial products. *Innovations*, *6*(1), 7-9.

[17] Dergisi, U. S. (2017). SWOT analysis: A theoretical review. *The Journal of International Social Research*, *10*(51), 1-10.

[18] Dewi, D. (2016). Strategi peningkatan daya saing industri manufaktur untuk pembangunan PLTN. In *Prosiding Seminar Nasional XI "Rekayasa Teknologi Industri dan Informasi 2016"* (pp. 132–141). Yogyakarta: Sekolah Tinggi Teknologi Nasional Yogyakarta.

[19] Dhlamini, J. (2024). Understanding strategic planning: an assessment of the definitions, planning process and competitive advantage. *Strategy & Leadership*, *52*(5-6), 64-81.

[20] Donndelinger, J., & Ferguson, S. (2020). Design for the marketing mix: The past, present, and future of market-driven engineering design. *Journal of Mechanical Design, 142*(6), 1–21.

[21] Dorrego-Viera, J., Urbinati, A., & Lazzarotti, V. (2025). Transition towards circular economy: Exploiting open innovation for circular product development. *Journal of Innovation & Knowledge, 10*(2), 1668-1678.

[22] Etikan, I., & Bala, K. (2017). Sampling and sampling methods. *Biometrics & Biostatistics International Journal, 5*(6), 149-177.

[23] Fortune Business Insights. (2023). *Aluminium market size, share & industry analysis, by product, by alloy type, by end-use, and regional forecast, 2024–2032*. Retrieved August 17, 2025, from https://www.fortunebusinessinsights.com/industry-reports/aluminium-market-100233

[24] Hamel, G., & Prahalad, C. K. (1995). *Kompetensi masa depan*. Jakarta: Binarupa Aksara.

[25] Jackson, E. (2023). Large-scale production driving innovation and economic growth. *Journal Pharmaceutical Bioprocessing, 11*(4), 121- 131.

[26] Kurniawan, M., Kadang, J., & Waluyo, M. (2023). Membangun strategi kemitraan dalam meningkatkan pendapatan usaha Aura Bedda Lotong. *Journal of Management and Creative Business (JMCBUS), 1*(2), 103–111.

[27] Lazaro-Nebreda, J., Patel, J., Lordan, E., Zhang, Y., Karakulak, E., Al-Helal, K., Scamans, G., & Fan, Z. (2022). Degassing of aluminum alloy melts by high shear melt conditioning technology: An overview. *Metals, 12*(10), 1–21.

[28] Malek, N., Shahzad, K., Takala, J., Boinec, S., Papler, D., & Liu, Y. (2015). Analyzing sustainable competitive advantage: Strategically managing resource allocations to achieve operational competitiveness. *Management and Production Engineering Review, 6*(4), 70–86.

[29] Manalu, E., Machpudin, A., & Firmansyah. (2022). Analisis kebutuhan modal kerja dan kebijakan modal kerja pada usaha mikro makanan dan minuman di daerah 16 Kelurahan Beliung Kota Jambi. *Jurnal Dinamika Manajemen, 10*(3), 133–141.

[30] Mavlutova, I., Babenko, V., Dykan, V., Prokopenko, N., Kalinichenko, S., & Tokmakova, I. (2020). Business restructuring as a method of strengthening company's financial position. *Journal of Optimisation in Industrial Engineering*, *8*(5), 105–115.

[31] Ministry of Trade of the Republic of Indonesia. (2019). *Regulation of the Minister of Trade of the Republic of Indonesia No. 92 of 2019 on the second amendment to Regulation of the Minister of Trade No. 84 of 2019 on the import provisions for non-hazardous and non-toxic waste as industrial raw materials*.

[32] Ministry of Trade of the Republic of Indonesia. (2020). *Regulation of the Minister of Trade of the Republic of Indonesia No. 58 of 2020 on the second amendment to Regulation of the Minister of Trade No. 84 of 2019 on the import provisions for non-hazardous and non-toxic waste as industrial raw materials*.

[33] Mintzberg, H. (1994). *The rise and fall of strategic planning*. Cham: Basic Books.

[34] Mustafa-Sadiku, K. (2025). The effects of training on improving employee performance. *International Journal of Scientific and Research Publications, 15*(2), 1–10.

[35] Nege, T., & Abegaz, M. (2024). Strategic importance of location for export competitiveness: A systematic literature review. *American Journal of Theoretical and Applied Business, 9*(2), 33–46.

[36] Olutimehin, D., Nwankwo, E., Ofodile, O., & Ugochukwu, C. (2024). Strategic operations management in FMCG: A comprehensive review of best practices and innovations. *International Journal of Management & Entrepreneurship Research, 6*(3), 780–794.

[37] Parhusip, J. (2019). Penerapan metode Analytical Hierarchy Process (AHP) pada desain sistem pendukung keputusan pemilihan calon penerima Bantuan Pangan Non Tunai (BPNT) di Kota Palangka Raya. *Jurnal Teknologi Informasi, 13*(2), 18–29.

[38] Pesonen, M., Ahola, J., Kurttila, M., Kajanus, M., & Kangas, J. (2000). *Investment strategies of Finnish forest industry in North America: A case study using SWOT*. Dordrecht: Kluwer Academic Publishers.

[39] Porter, M. (1996). What is strategy? *Harvard Business Review, 74*(6), 61–78.

[40] Pratidina, C. (2017). *Perencanaan strategik pabrik produk beton Bogor PT XYZ Tbk*. Bogor: Institut Pertanian Bogor (Bachelor thesis).

[41] PT Cita Mineral Investindo. (2020). *Paparan publik PT Cita Mineral Investindo Tbk*. Bursa Efek Indonesia. Retrieved June 15, 2025, from https://www.idx.co.id/StaticData/NewsAndAnnouncement/ANNOUNCEMENTSTOCK/From_EREP/202007/5f7a212e68_04590d486b.pdf

[42] Puspadewi, G., Insani, G., Hasnakusumah, R., & Rumbung, K. (2024). Pengaruh outsourcing terhadap keunggulan kompetitif perusahaan. *Media Hukum Indonesia (MHI), 2*(2), 569–575.

[43] Rangkuti, F. (2005). *Analisis SWOT: Teknis membedah kasus bisnis*. Jakarta: Gramedia Pustaka Utama.

[44] Razak, I. (2022). Product diversification: Marketing management strategy for business growth. *Jurnal Ekonomi, 11*(3), 2162–2167.

[45] Saaty, T. (2001). *Decision making for leaders: The analytical hierarchy process for decisions in complex world*. Pittsburgh: RWS Publications.

[46] Saleem, A., Shahid, S., Rana, M., Lakho, A., & Ali, S. (2024). Exploring the impact of sustainable media campaigns on consumer behavior. *Bulletin of Business and Economics, 13*(2), 811–824.

[47] Sihombing, E., & Akbar, F. (2022). Pengaruh kepemilikan pemerintah, strategi bisnis dan good corporate governance terhadap kinerja perusahaan. *JAMBURA Economic Education Journal, 4*(1), 97–105.

[48] Smadi, Z., & Al-Jawazneh, B. (2016). The benefits of the outsourcing strategy as perceived by the industrial companies in Jordan. *Global Journal of Management and Business Research*, *16*(7), 1-13.

[49] Steiner, G. (1979). *Strategic planning*. New York: Free Press.

[50] Tereshchenko, E., Salmela, E., Melkko, E., Phang, S., & Happonen, A. (2024). Emerging best strategies and capabilities for university–industry cooperation: Opportunities for MSMEs and universities to improve collaboration. A literature review 2000–2023. *Journal of Innovation and Entrepreneurship, 13*(28), 1–45.

[51] The Aluminium Association. (2024). *Secondary production 101*. Retrieved January 15, 2025, from https://www.aluminum.org/secondary-production-101

[52] US Geological Survey. (2023). *Bauxite and alumina, USGS. Mineral commodity summaries*. Retrieved October 15, 2025, from https://www.usgs.gov/centers/nmic/bauxite-and-alumina

[53] Wheelen, T., & Hunger, J. (2012). *Strategic management and business policy: International edition* (13th ed.). MA: Pearson.

[54] Wicaksono, T. (2020). *Strategi pengembangan bisnis baja PT XYZ*. Bogor: Institut Pertanian Bogor (Bachelor thesis).

[55] Wildanika, A., Atrhana, N., Saiful, S., & Chamariyah, C. (2024). Competitive advantage management strategy and corporate survival ability. *Jurnal Ilmiah Akuntansi Kesatuan*, *12*(5), 731-738.

[56] Zou, C., Gao, W., & Ai, F. (2025). Strategic mineral policies for Indonesia: Enhancing global competitiveness, economic growth, and environmental sustainability through innovation and renewable energy. *Renewable Energy*, *244*(5), 122-133.