JIM: Jurnal Ilmu Multidisiplin
E-ISSN: 2829-4580
P-ISSN: 2829-4599
GREENATION PUBLISHER
+62 812 1046 7572 http://greenpub.org greenation.info@gmail.com
DOI: https://doi.org/10.38035/jim.v4i2

Market Expansion Strategy for Copper Slag Exports of PT Freeport Indonesia

Fajar Tirtafadhitya[1], Febry Chairuddin Damien[2], Eileen Rosabel Renaningtyas[3], Juliater Simarmata[4].
[1]Institute of Transportation and Logistics Trisakti, Jakarta, Indonesia, fajar.tirtafadhitya@gmail.com
[2]Institute of Transportation and Logistics Trisakti, Jakarta, Indonesia, febrychad@gmail.com
[3]Institute of Transportation and Logistics Trisakti, Jakarta, Indonesia, eileenrosabel@gmail.com
[4]Institute of Transportation and Logistics Trisakti, Jakarta, Indonesia, juliaters@gmail.com

*Correspondence: juliaters@gmail.com[4]

Abstract: This study explores the market expansion strategy for copper slag exports at PT Freeport Indonesia using a qualitative approach. A case study design is employed to examine internal and external factors influencing the expansion, supported by SWOT analysis. Data collection is conducted through in-depth interviews with key stakeholders, including export managers, marketing teams, and industry experts, along with document analysis of company reports and export data. The findings reveal that PT Freeport Indonesia has strong internal capabilities, such as large production capacity and operational experience, which provide a solid foundation for market expansion. However, weaknesses such as high logistics costs and limited knowledge of new markets need to be addressed. Externally, there are significant opportunities driven by global demand and the trend towards sustainability, favoring the use of environmentally friendly materials like copper slag. However, challenges such as market fluctuations and intense competition must be carefully managed. The study recommends strategies for market expansion, including investing in foreign market research, reducing logistics costs through partnerships, and emphasizing the environmental benefits of copper slag. By leveraging its strengths and external opportunities while addressing weaknesses and managing threats, PT Freeport can enhance its competitiveness in the global market. This research highlights the company's potential for success in expanding its copper slag export market through strategic actions.

Keywords: Market Expansion, Copper Slag, PT Freeport Indonesia, SWOT Analysis

INTRODUCTION

In the global context, international trade plays a significant role in the economic growth of many countries, including those in Asia and Indonesia. Exports serve as one of the primary pillars supporting global economic development by expanding market access, enhancing competitiveness, and fostering innovation. Alongside the improvement of global infrastructure, the demand for industrial raw materials continues to rise, including recycled materials such as

copper slag, which holds potential for various industrial applications, particularly in the construction sector.

In Asia, a region characterized by rapid infrastructure development, especially in countries like China, India, and several Southeast Asian nations, the demand for construction materials continues to grow. These countries represent critical markets for industrial products that support their infrastructure growth. Amidst the global trend towards greener economies, recycled materials such as copper slag are gaining popularity due to their environmentally friendly nature and their contribution to sustainability in infrastructure development.

Indonesia, as a country with substantial economic potential and a strategic position in the Asian region, has demonstrated significant progress, particularly in the export sector, which contributes to the growth of its gross domestic product (GDP) and the creation of new employment opportunities. The Indonesian government actively promotes export expansion by implementing various policies to enhance the competitiveness of local products in the global market. These efforts include improving product quality, simplifying export procedures, and promoting flagship products in international markets. Exports make a positive contribution to long-term economic growth (Rahmadi & Ichihashi, 2011).

In the case of PT Freeport Indonesia, which recently completed the construction of the world's largest copper smelter located in Gresik, East Java, covering an area of 108 hectares, the company processes mining concentrates from Papua into copper cathodes. During its production process, PT Freeport Indonesia also generates copper slag, categorized as hazardous and toxic waste (B3 waste). According to Article 59, paragraph 1 of the Ministry of Environment and Forestry (KLHK) regulation, all producers of B3 waste are required to manage the waste they generate (Permen LHK, 2015). B3 waste management for copper slag can involve its utilization by the cement industry as an additive in kiln processes and by shipyards for sandblasting. Several cement companies and shipyards in Indonesia already utilize this copper slag through smelter production by PT Smelting, now acquired by PT Freeport Indonesia. With the establishment of the new Manyar Smelter, copper slag production has significantly increased, resulting in domestic market saturation and limited absorption capacity. Consequently, the only remaining option is to market copper slag in the export market.

Expanding into export markets provides PT Freeport with significant opportunities to contribute more broadly to the global supply chain while promoting copper slag as an environmentally friendly material that supports the circular economy and sustainability. Several strategic reasons justify this expansion, including;

1. Enhancing corporate image as a global sustainability supporter, strengthening the company’s brand among global consumers and investors.
2. Increasing demand for materials such as copper slag in the global market, driven by significant infrastructure growth.
3. Boosting innovation in copper slag derivative products and solidifying the company’s position in international markets.
4. Addressing commodity price fluctuations and global competition more effectively, enhancing competitiveness in an evolving industry.
5. Reducing storage and handling costs of B3 waste domestically, as more waste is utilized and commercialized abroad.
6. Minimizing dependence on local markets while gaining access to countries with rapid infrastructure growth.

The expansion into export markets not only benefits PT Freeport but also contributes significantly to Indonesia, such as;

1. Lowering storage and handling costs of B3 waste domestically by increasing its utilization and commercialization internationally.

2. Increasing foreign exchange earnings through the sale of products in international markets, supporting Indonesia's trade balance and economic stability.
3. Creating new jobs in sectors such as mining, manufacturing, and logistics. These jobs positively impact not only the areas surrounding the Gresik plant but also related sectors throughout Indonesia.
4. Enhancing the global competitiveness of Indonesian products, improving the country's reputation, and demonstrating its ability to produce goods that meet international standards.

Enhancing the Global Competitiveness of Indonesian Products. This effort helps to elevate Indonesia's image while demonstrating the nation's capability to produce goods that meet international standards.

To maximize this opportunity, PT Freeport needs to implement a comprehensive export marketing strategy. The first export strategy focuses on market segmentation (targeting countries with rapidly growing construction and manufacturing industries), product differentiation (developing derivative products from Copper Slag that offer higher added value), compliance with international regulations (aligning export procedures with requirements, ensuring products meet environmental standards, and obtaining international certifications applicable in export destination countries), and competitive pricing (achieved through efficiency in logistics and production, as well as price adjustments based on global market dynamics).

It also includes partnerships and alliances (establishing collaborations with local distributors and global construction companies to ensure swift access to new markets and secure long-term contracts), promotion (utilizing social media, international trade fairs, and publications in industry media), supply chain optimization (collaborating with logistics companies with efficient management), local adaptation research (understanding specific local needs in target countries, such as business climate, culture, and local regulations), export risk management (using financial strategies to hedge against price fluctuations and currency exchange rate changes that could impact profits), and expanding exports to various countries.

METHOD

Research Approach

This study employs a qualitative approach to explore the market expansion strategy for copper slag exports at PT Freeport Indonesia. This approach is chosen as it enables the researcher to deeply investigate the internal and external factors influencing the expansion process and formulate strategies based on SWOT analysis.

Research Design

The research design used is a case study. This case study focuses on PT Freeport Indonesia with the aim of understanding the dynamics of the export market expansion strategy through the analysis of data collected from in-depth interviews, documentation, and observations.

Data Collection Techniques

The data collection techniques in this study include:

1. In-depth Interviews
   Interviews were conducted with key stakeholders, including export managers, marketing teams, and industry experts. These interviews aim to gather insights into the strengths, weaknesses, opportunities, and threats related to market expansion.
2. Document Analysis

Documentation includes annual company reports, export data, and relevant business strategy documents.

Expert Selection

This section describes the approach used to obtain relevant data and information for the study. In this research, in-depth interviews with experts were chosen as the primary technique for collecting qualitative data. The interviews were conducted in a structured manner with informants who possess knowledge, experience, and expertise in fields relevant to the research topic.

The in-depth interview method aims to comprehensively explore information, providing a thorough understanding of the issues that are the focus of the study. Data obtained from these interviews will be systematically analyzed to make a significant contribution to solving the research problem.

The steps involved in conducting the interviews include identifying informants, preparing interview guidelines, conducting the interviews, and processing the data. Using this method, the research findings are expected to provide accurate and relevant insights aligned with the research objectives.

Data Analysis Techniques

The collected data is analyzed using SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis as the main framework. The analysis is conducted in the following stages:

1. Identification of Internal and External Factors
   a. Internal Factors**:** Identifying the company's strengths and weaknesses based on interview data and documentation.
   b. External Factors: Analyzing opportunities and threats based on market trends, international regulations, and industry conditions.
2. SWOT Analysis The results of internal and external factor identification are mapped into a SWOT matrix. This matrix is used to evaluate the company's strategic position.
3. Strategy Formulation Based on the SWOT analysis, export market expansion strategies are formulated using the following approaches:
   a. SO (Strengths-Opportunities): Leveraging strengths to capitalize on opportunities.
   b. WO (Weaknesses-Opportunities): Addressing weaknesses to pursue opportunities.
   c. ST (Strengths-Threats): Utilizing strengths to counter threats.
   d. WT (Weaknesses-Threats): Minimizing weaknesses and avoiding threats.

Strengths

1. Large Production Capacity
   PT Freeport produces 2.3 million tons of Copper Slag annually, providing sufficient volume for sustainable export.
2. Market Diversification
   Exports allow the company to reduce reliance on the saturated domestic market, creating new opportunities in international markets.
3. Environmental Benefits
   Copper Slag can be used as a construction material, promoting a positive image as an eco-friendly raw material and contributing to the circular economy.
4. Operational Experience
   PT Freeport has extensive experience in the large mining industry, enabling it to handle the complexities of large-scale exports.

Weaknesses

1. Varying Environmental Regulations
   Different countries have different environmental regulations, which could complicate PT Freeport's efforts to align products with international standards.
2. Logistics Costs
   Shipping Copper Slag in large quantities can be cost-prohibitive, especially for long distances to export destinations.
3. New Markets
   PT Freeport needs to start from scratch to understand foreign markets, including preferences, regulations, and building business relationships with new importers.

Opportunities

1. International Demand
   Countries with rapidly growing construction industries may have a high demand for materials like Copper Slag, especially in regions with significant infrastructure growth.
2. Sustainability
   With the increasing global focus on sustainability and the use of recycled materials, Copper Slag can be promoted as an environmentally friendly solution.
3. Product Innovation
   PT Freeport can develop derivative products from Copper Slag for various industrial segments, creating more opportunities in international markets.

Threats

1. International Market Fluctuations
   Unstable global commodity prices could affect the competitiveness of Copper Slag in the export market.
2. Import Regulation Barriers
   Some countries may have strict regulations regarding industrial waste, complicating the export process.
3. Global Competition
   PT Freeport faces competition from other companies that may offer alternative materials at lower prices or have better market access.

RESULTS AND DISCUSSION

Policies or Regulations for the Utilization of Copper Slag

In Indonesia, the management of industrial waste, including copper slag, is regulated by Law No. 32 of 2009, Article 59, which stipulates that all parties generating hazardous and toxic waste (B3) must manage it (UU, 2009). According to Government Regulation No. 22 of 2021, construction materials must undergo technical assessments to ensure minimal environmental impact and quality (PP, 2021). Before copper slag can be used in construction materials, companies must obtain utilization permits and meet the technical requirements set forth in Minister of Environment and Forestry Regulation No. 10 of 2020 (Permen LHK, 2020) and Minister of Industry Regulation No. 16 of 2020, which ensures that the raw materials used, including aggregates, are safe and comply with technical Indonesian National Standards (SNI) (Kemenperin RI, 2020). These standards include tests such as specific gravity, abrasion resistance, organic material content, freeze-thaw resistance, moisture content, grain size, alkali-silica reaction resistance, concrete compressive strength, chemical resistance, and clay content as outlined in SNI 2847:2019 (Badan Standardisasi Nasional, 2019).

The use of copper slag in construction must also comply with international standards, as improper handling of copper slag can contaminate soil, air, or water, and it must be ensured that the material meets safe limits for heavy metal content iso (ISO 14001:2015, 2015). Each

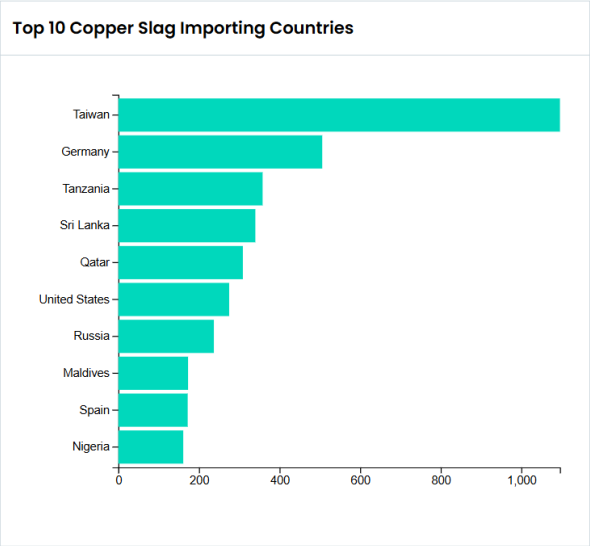
material's performance should be tested to ensure durability and environmental stability over the long term, considering the recycling of copper slag as a sustainable step (ISO 15686:2011, 2011). This step will be evaluated based on the environmental impact of copper slag and compared to traditional materials, as seen in the use content of copper slag in each functional unit of each material (ISO 14040:2006, 2006). Green building certifications such as LEED, BREEAM, the EU Waste Framework Directive, and ASTM C618 govern its use in concrete.

Strategies to Enhance the Competitiveness of Copper Slag Exports

Global supply chain theory illustrates how companies can achieve operational efficiency by integrating suppliers, manufacturers, and distributors across countries (Strakova et al., 2021). In international marketing, optimizing the supply chain becomes crucial to reduce logistics costs and ensure product availability in destination countries. According to Michael Porter's value chain theory, a coordinated and sustainable supply chain not only enhances competitiveness but also helps companies add value at each stage of the supply chain (Strakova et al., 2021).

Sustainability and the circular economy are two concepts that are increasingly important in the strategy of global companies. In a circular economy, products are reprocessed and reused, thereby minimizing waste. Copper slag, produced by PT Freeport, can be utilized as an environmentally friendly construction material, supporting waste reduction, and providing added value to the company. The sustainability theory proposed by Elkington in the Triple Bottom Line (TBL) concept emphasizes the importance of economic growth, environmental preservation, and social welfare (Belotti Pedroso et al., 2021). PT Freeport's expansion into international markets and efforts to position copper slag as a sustainable product highlight the company's attempt to strengthen its positive image as a global sustainability advocate (PT Freeport Indonesia, 2022).

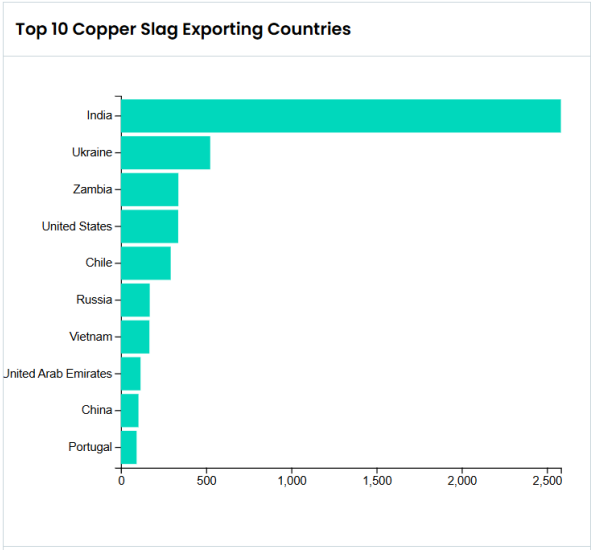
The top 10 importers of copper slag are led by Taiwan with 1,096 imports, followed by Germany in second place with 506 imports, Tanzania in third with 358 imports, Sri Lanka with 340 imports, Qatar with 309 imports, the United States with 275 imports, Russia with 237 imports, the Maldives with 173 imports, Spain with 172 imports, and Nigeria in tenth with 161 imports (Volza, 2024).



Source: Volza Import Data

Figure 1. Top 10 Copper Slag Importing Countries

Meanwhile, the largest copper slag exporting countries are led by India with 2,582 exports, followed by Ukraine in second place with 524 exports, Zambia in third place with 337 exports, the United States with 336 exports, Chile with 292 exports, Russia with 169 exports, Vietnam with 167 exports, the United Arab Emirates with 115 exports, China with 103 exports, and Portugal in tenth place with 92 exports (Volza, 2024).



Source: Volza Import Data

Figure 2. Top 10 Copper Slag Exporting Countries

In addition to the top 10 exporting countries, there are several countries that also contribute to the top 10 copper slag importing countries, including Argentina, Congo, Japan, Oman, the Bahamas, Canada, Poland, Brazil, and Germany (Volza, 2024). The pricing set by these countries varies significantly, ranging from USD 25-40/MT (India, Vietnam, and China), USD 30-45/MT (United Arab Emirates, Ukraine, Argentina, Oman, and Poland), USD 30-50/MT (Russia), USD 35-50/MT (Zambia, Congo, the Bahamas, Brazil, and Portugal), USD 35-55/MT (Chile), and USD 40-60/MT (United States, Japan, Canada, and Germany) (Market Reports World, 2024).

Tariff and non-tariff barriers, such as high import duties and stringent quality regulations, reduce the competitiveness of Indonesia's copper slag exports. These tariff barriers can be identified through the requirements outlined in the PMK Number 98/PMK.010/2022, including export goods notification (PEB), commercial invoices, environmental permits from the Ministry of Environment and Forestry (KLHK), customs clearance, physical inspections of goods, export duties, customs duties, logistics, special export permits, testing and certification, and the use of digital systems (Kemkeu RI, 2022). One solution is through HS code verification, checking if it is registered under the ASEAN Trade in Goods Agreement (ATIGA), using the ASEAN Tariff Finder portal, and utilizing the ASEAN Single Window (ASW) to reduce production and export costs, enhance price competitiveness, and facilitate access to global markets (AFTA, 2015).

Market Diversification Strategy of PT Freeport

International trade is a crucial foundation for global economic growth, where exports are a key component that allows countries or companies to expand their market share. According to the theory of comparative advantage by David Ricardo, a country should focus on producing goods where it has lower opportunity costs compared to other countries. In the context of PT Freeport Indonesia, the export of copper slag to international markets, particularly in the construction sector, aligns with this theory, as the company has large production capacity and

absorption potential that has surpassed the domestic market. Additionally, Adam Smith's theory of free trade emphasizes the importance of economic freedom between countries to maximize economic benefits, especially in the current era of globalization.

Several concepts commonly used in international marketing include market segmentation, pricing strategies, product differentiation, and promotion. According to Kotler and Keller, international marketing strategies include product adaptation, developing local alliances, and adjusting pricing policies to compete with similar products in global markets (Kotler & Keller, 2024). PT Freeport Indonesia (PTFI) produces copper slag as a byproduct of the copper smelting process, which is utilized by cement companies such as Semen Gresik and Semen Indonesia as raw material for cement production (PT Freeport Indonesia, 2022). The use of copper slag in cement processing occurs during the raw material grinding stage, which consists of four main processes: mix pile combining clay and limestone; limestone pile, silica sand, and copper slag are mixed and then put into a device called a grinding mill (PT Semen Gresik, 2020).

Countries such as India, China, the United States, and several European nations routinely import copper slag from Indonesia, particularly for use in the construction and cement industries. These countries often import significant quantities due to the growing demand for cement and related construction materials.

PT Freeport's Compliance with Environmental Standards of Importing Countries

For support the smooth export of copper slag, PT Freeport must adhere to environmental standards and international certifications required by the destination countries in order to export products to countries such as Taiwan, Germany, Tanzania, Sri Lanka, Qatar, the United States, Russia, the Maldives, Spain, and Nigeria. The environmental standards in the importing countries include the Environmental Protection Administration (EPA) in Taiwan, the Bundesumweltamt (Federal Environment Agency) in Germany, the National Environmental Management Council (NEMC) in Tanzania, the Central Environmental Authority (CEA) in Sri Lanka, the Qatar Ministry of Environment and Climate Change in Qatar, the Environmental Protection Agency (EPA) in the United States, Rosprirodnadzor in Russia, the Ministry of Environment, Climate Change, and Technology in the Maldives, the European Union Waste Framework Directive in Spain, and the National Environmental Standards and Regulations Enforcement Agency (NESREA) in Nigeria.

Marketing policies in these importing countries also have their own regulations, including the Fair Trade Commission (FTC) in Taiwan, the Bundeskartellamt (Federal Cartel Office) in Germany, the Tanzania Communications Regulatory Authority (TCRA) in Tanzania, the Consumer Affairs Authority (CAA) in Sri Lanka, the Qatar Media Corporation (QMC) in Qatar, the Federal Trade Commission (FTC) in the United States, the Federal Antimonopoly Service (FAS) in Russia, the Maldives National Broadcasting Corporation (MNBC) in the Maldives, the Agencia Española de Protección de Datos (AEPD) in Spain, and the Advertising Practitioners Council of Nigeria (APCON) in Nigeria.

Internal Factor Evaluation (IFE) Matrix Analysis

The Internal Factor Evaluation (IFE) Matrix is used to analyze the level of influence of various internal factors that affect the success of PT Freeport's copper slag export market expansion strategy. This analysis aims to evaluate the strategic internal factors, both strengths and weaknesses, that can impact the company's competitiveness in the international market.

The total value of the IFE matrix is obtained by summing the product of the weight and rating for each identified strategic internal factor. Strengths such as large production capacity and operational experience provide positive values that support the readiness for expansion.

On the other hand, weaknesses such as high logistics costs and challenges in understanding new markets are aspects that need improvement.

These factors are based on empirical data obtained from interviews with PT Freeport management, as well as observations and analysis of internal documents. This approach ensures that the analysis is based on relevant and trustworthy sources of information, providing an accurate picture of the company's internal readiness for expanding its export market.

Table 1
Internal Factor Evaluation (IFE) Matrix Analysis

Internal Factor	Value	Rating	Score
Strength			
1. Large Production Capacity	0.20	4	0.80
2. Market Diversification	0.15	4	0.60
3. Environmental Benefits Potential	0.10	3	0.30
4. Operational Experience	0.15	4	0.60
Total	**0.60**		**2.30**
Weakness			
1. Different Environmental Regulations	0.15	2	0.30
2. Logistics Costs	0.10	2	0.20
3. New Market Understanding	0.15	2	0.30
Total	**0.40**		**0.80**
TOTAL IFE	**1.0**		**3.10**

Source: Research data

Based on the analysis of the table, the strength aspects in the copper slag export market expansion strategy at PT Freeport received a score of 2.30, while the weakness aspects received a score of 0.80. When summed, the total score for internal factors reached 3.10.

This score is above the threshold of 2.5, indicating that overall, PT Freeport's internal aspects are strong. The score suggests that the company has a solid internal foundation to support its export market expansion strategy. However, it remains essential to address the identified weaknesses, such as high logistics costs and understanding new markets, to enhance the overall effectiveness of the strategy.

External Factor Evaluation (EFE) Matrix Analysis

The External Factor Evaluation (EFE) Matrix is used to analyze the level of influence of various external factors that affect the success of PT Freeport's copper slag export market expansion strategy. This analysis aims to evaluate the opportunities and threats in the company's external environment, particularly in international markets.

The total value of the EFE matrix is obtained by summing the product of the weight and rating for each identified external factor. Opportunities such as high international demand in countries with rapid infrastructure growth and the global sustainability trend provide significant potential for expansion. However, threats such as international market fluctuations and global competition present challenges that must be effectively managed.

These factors are based on empirical data obtained from market analysis, interviews with industry experts, and a review of literature on global trends and related regulations. This approach ensures that the analysis is based on relevant and trustworthy information, providing a clear picture of the opportunities and challenges faced by PT Freeport in the international market.

Table 2
External Factor Evaluation (IFE) Matrix Analysis

External Factor	Value	Rating	Score
Opportunities			

1.	International Demand	0.25	4	1.00
2.	Sustainability	0.20	4	0.80
3.	Product Innovation	0.15	3	0.45
Total		**0.60**		**2.25**
Weaknesses				
1.	International Market Fluctuations	0.20	2	0.40
2.	Import Regulatory Barriers	0.10	2	0.20
3.	Global Competition	0.10	3	0.30
Total		**0.40**		**0.90**
TOTAL IFE		**1.0**		**3.15**

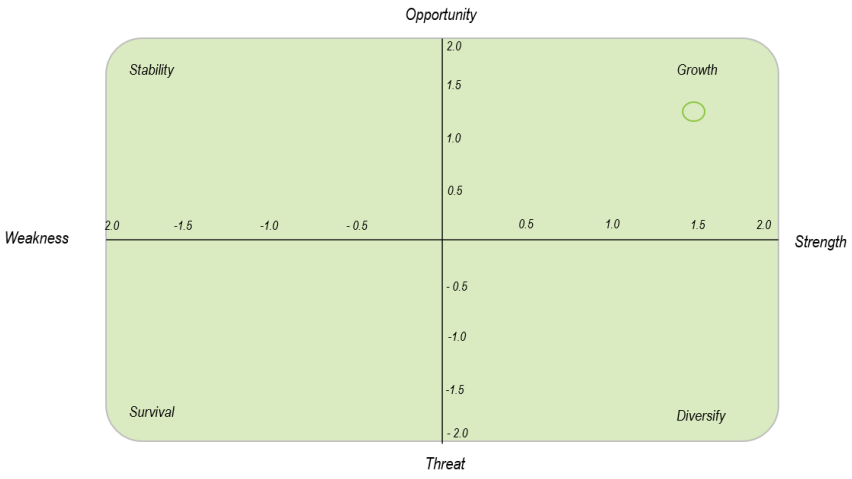
Source: Research data

Based on the results of the table analysis, the opportunity aspect in the export market expansion of copper slag at PT Freeport received a score of 2.25, while the threat aspect scored 0.90. When summed, the total score of the external factors reached 3.15. This figure is also above the threshold of 2.5, indicating that the overall external environment offers significant opportunities for PT Freeport to expand its export market. However, threats such as international market fluctuations and global competition need to be effectively managed to avoid hindering the expansion process.

Based on the analysis results, it can be concluded that each aspect evaluated in the copper slag export market development strategy shows significant results. The strength aspect scored 2.30, while the weakness aspect scored 0.80, resulting in a positive difference of 1.50. On the other hand, for the external factors, the opportunity aspect scored 2.25, while the threat aspect scored 0.90, with a positive difference of 1.35. These results indicate that the internal strengths are more dominant compared to weaknesses, and external opportunities have a more significant influence compared to threats.

The significant positive difference in both factors indicates that PT Freeport has a great potential for success in expanding the copper slag export market, by leveraging its internal strengths and external opportunities, while proactively managing any weaknesses and threats that may arise.

These findings can be visualized through a SWOT diagram, which provides a comprehensive strategic overview of PT Freeport's position in international market expansion. This diagram helps to identify priorities and strategic actions that need to be taken to enhance competitiveness in the global market.



Source: Research Results

Figure 3. SWOT Analysis

After conducting the SWOT analysis, the author can formulate and determine strategies to support PT Freeport's copper slag export market expansion using the SWOT matrix. This SWOT matrix is constructed by integrating each factor: the Strength-Opportunity (SO) strategy, Weakness-Opportunity (WO) strategy, Strength-Threat (ST) strategy, and Weakness-Threat (WT) strategy. This approach allows the combination of internal strengths and external opportunities to maximize potential, while minimizing internal weaknesses and anticipating external threats. Each strategy focuses on leveraging the company's strengths and opportunities, addressing weaknesses, and mitigating external threats. By using this integrated approach, PT Freeport can craft a balanced strategy that enhances its competitive position in the global market while overcoming the challenges that might arise during the export market expansion process.

Table 3
Strategies Using the SWOT Matrix

	Weakness	Strength
Opportunities	1. Invest in foreign market research to understand regulations and the needs of new markets. 2. Reduce logistics costs by partnering with international logistics companies or using efficient shipping technology.	1. Maximize production capacity to meet demand in countries with rapid infrastructure growth. 2. Promote copper slag as an environmentally friendly material supporting the circular economy.
Threats	1. Enhance operational efficiency to compete with global players. 2. Ensure that the product complies with international environmental regulations to address import barriers.	1. Use operational experience to mitigate market fluctuations by establishing long-term contracts. 2. Diversify export markets to reduce dependence on specific markets and mitigate risks.

Source: Research data

CONCLUSION

Based on the analysis conducted in this study, it can be concluded that PT Freeport Indonesia has significant potential to expand its copper slag export market, although there are several challenges that need to be managed effectively. Based on the Internal Factor Evaluation (IFE) and External Factor Evaluation (EFE) matrices, the company possesses relatively solid internal strengths, such as large production capacity, extensive operational experience, and the potential environmental benefits of its products. These factors provide a strong foundation for PT Freeport to optimize its market expansion efforts.

However, there are some internal weaknesses that need to be addressed, including high logistics costs and limited understanding of new markets. Externally, the available opportunities are substantial, particularly with the high international demand in countries with rapid infrastructure growth and the global sustainability trend that supports the use of environmentally friendly materials like copper slag. Nonetheless, threats such as international market fluctuations and intense global competition remain challenges that need to be carefully managed.

The strategies suggested to support the copper slag export market expansion include key actions such as investing in foreign market research to understand regulations and market needs, as well as efforts to reduce logistics costs through partnerships with international logistics partners or more efficient shipping technologies. Additionally, the company can maximize its

production capacity to meet demand in countries with rapid infrastructure growth and promote copper slag as an environmentally friendly material supporting the circular economy. To address external threats, the company is advised to enhance operational efficiency and ensure compliance with international environmental regulations.

By implementing these strategies, PT Freeport can leverage its internal strengths and external opportunities to strengthen its competitiveness in the global market, while proactively managing internal weaknesses and external threats. This study demonstrates that PT Freeport has immense potential for success in developing the copper slag export market, with the right strategic measures to address challenges and maximize available opportunities.

Limitations and Recommendations

Limitations

This study has several limitations, primarily related to data collection and analysis constraints. The reliance on in-depth interviews and document analysis introduces potential biases due to the subjective nature of responses, while restricted access to certain company reports and industry data limits the comprehensiveness of the findings. Additionally, logistical challenges in gathering real-time export data hinder the ability to capture the most up-to-date market trends, particularly regarding fluctuating international demand and pricing structures. The dynamic nature of trade policies and environmental regulations in various export destination countries also presents a constraint, as changes in regulatory frameworks could impact the feasibility and competitiveness of copper slag exports. Furthermore, while the SWOT analysis offers valuable insights into market expansion strategies, the absence of a detailed financial feasibility assessment limits the study's ability to evaluate long-term economic sustainability.

Recommendations

To address these limitations, future research should integrate both qualitative and quantitative methodologies, incorporating financial feasibility studies, econometric modeling, and real-time market data analytics to provide a more comprehensive assessment of copper slag export potential. Expanding the scope to include a broader range of stakeholders, such as international buyers, logistics service providers, and regulatory authorities, would offer a more holistic perspective on export challenges and opportunities. Additionally, leveraging digital trade monitoring tools and forming partnerships with industry associations and government trade agencies can enhance access to reliable data and insights into evolving trade regulations. By adopting these approaches, future research can strengthen strategic decision-making, optimize market expansion efforts, and ensure compliance with global environmental and trade policies.

REFERENCES

AFTA. (2015). The Asean Free Trade Area (AFTA). *AFTA*, 12.

Badan Standardisasi Nasional. (2019). Persyaratan Beton Struktural untuk Bangunan Gedung. *Sni 2847-2019*, *8*, 720. https://tekonsipil.sv.ugm.ac.id/wp-content/uploads/sites/938/2020/01/SNI-2847-2019-Persyaratan-Beton-Struktural-Untuk-Bangunan-Gedung-1.pdf

Belotti Pedroso, C., Tate, W. L., Lago da Silva, A., & Ribeiro Carpinetti, L. C. (2021). Supplier development adoption: A conceptual model for triple bottom line (TBL) outcomes. *Journal of Cleaner Production*, *314*(April 2020), 127886. https://doi.org/10.1016/j.jclepro.2021.127886

ISO 14001:2015. (2015). *ISO 14001:2015 Environmental management systems — Requirements with guidance for use*. Organization for Standardization (ISO). https://www.iso.org/standard/60857.html

ISO 14040:2006. (2006). *ISO 14040:2006 Environmental management — Life cycle assessment — Principles and framework*. Organization for Standardization (ISO). https://www.iso.org/standard/37456.html

ISO 15686:2011. (2011). *ISO 15686:2011 Buildings and constructed assets — Service life planning*. Organization for Standardization (ISO). https://www.iso.org/standard/45798.html

Kemenperin RI. (2020). *eraturan Menteri Perindustrian (Kemenperin RI) Nomor 16 Tahun 2020 Tentang Ketentuan dan Tata Cara Penghitungan Nilai Tingkat Komponen dalam Negeri Produk Farmasi*. https://peraturan.go.id/id/permenperin-no-16-tahun-2020#:~:text=Peraturan Menteri Perindustrian Nomor 16,Komponen dalam Negeri Produk Farmasi

Kemkeu RI. (2022). Penetapan Barang Ekspor Yang Dikenakan Bea Keluar dan Tarif Bea Keluar. *Peraturan Menteri Keuangan Republik Indonesia No 39/PMK.010/2022 Tentang Penetapan Barang Ekspor Yang Dikenakan Bea Keluar Dan Tarif Bea Keluar*, Jakarta. https://peraturanpajak.com/2017/02/20/pmk-13pmk-0102017/

Kotler, P., & Keller, K. L. (2024). Management & Marketing. In *Journal of Clinical Orthodontics* (14th Editi, Vol. 58, Issue 1). Prentice Hall.

Market Reports World. (2024). Global and United States Copper Slag Market Report & Forecast 2024-2030. *Market Reports World*, 79.

Permen LHK. (2015). Peraturan Menteri Lingkungan Hidup Dan Kehutanan Republik Indonesia Nomor 10 Tahun 2023 Tentang Pedoman Tata Naskah Dinas. *Angewandte Chemie International Edition, 6(11), 951–952.*, *1*(April).

Permen LHK. (2020). *Peraturan Menteri Lingkungan Hidup Dan Kehutanan (Permen LHK) Nomor 10 Tahun 2020 tentang Tata Cara Uji Karakteristik dan Penetapan Status Limbah Bahan Berbahaya dan Beracun*. https://peraturan.bpk.go.id/Details/163482/permen-lhk-no-10-tahun-2020

PP. (2021). *Peraturan Pemerintah (PP) Nomor 22 Tahun 2021 tentang Penyelenggaraan Perlindungan dan Pengelolaan Lingkungan Hidup*. https://peraturan.bpk.go.id/Details/161852/pp-no-22-tahun-2021

PT Freeport Indonesia. (2022). *ANTAM to Transport 50 Tons of Freeport Gold*. PT Freeport Indonesia. https://ptfi.co.id/en/news/detail/antam-to-transport-50-tons-of-freeport-gold#:~:text=12 September 2022,smelter in Gresik%2C East Java

PT Semen Gresik. (2020). *Proses Produksi*. PT Semen Gresik. https://semengresik.sig.id/id/prosesproduksi

Strakova, J., Simberova, I., Partlova, P., Vachal, J., & Zich, R. (2021). The value chain as the basis of business model design. *Journal of Competitiveness*, *13*(2), 135–151. https://doi.org/10.7441/JOC.2021.02.08

UU. (2009). *Undang-undang (UU) Nomor 32 Tahun 2009 tentang Perlindungan dan Pengelolaan Lingkungan Hidup*. https://peraturan.bpk.go.id/Details/38771/uu-no-32-tahun-2009

Volza. (2024). *Copper Slag Imports in World - Market Size & Demand based on Import Trade Data*. Vollza, Grow Global. https://www.volza.com/p/copper-slag/import/