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# The Assessment Performance Indicator of Integrating the SDGs for Extraction Companies

*Alifia Herlyana[1], Raymond Boyska[2*], and Maria Ariesta Utha[3]*

[1,2 3] *Trisakti University, Indonesia*



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**A B S T R A C T**

Indonesia possesses vast natural resources and has established a robust mining sector that includes both mineral and coal industries. Mining plays a vital role in economic development but also poses significant sustainability challenges, particularly in balancing environmental, social, and economic dimensions. This study aims to develop a metric integrated aspect parameter sustainability assessment model by evaluating two major mining companies in Indonesia that have consistently published sustainability reports for over ten years and were awarded gold ratings in the 2024 PROPER assessment. This study adopts a mixed-methods approach that integrates qualitative issue mapping with quantitative analysis, focusing on three mining companies in Indonesia that achieved a Gold PROPER rating in 2024, namely PT AAA and PT BBB. The sampling method used was purposive sampling. Data analysis employed a composite index approach, integrating the Responsible Mining Index (RMI) and the Dow Jones Sustainability Index (DJSI). Out of 416 mapped indicators, the strongest alignment was observed with SDG 8 (Decent Work and Economic Growth), SDG 12 (Responsible Consumption and Production), SDG 13 (Climate Action), and SDG 16 (Peace, Justice, and Strong Institutions). In contrast, SDG 4 (Quality Education), SDG 7 (Affordable and Clean Energy), and SDG 17 (Partnerships for the Goals) were underrepresented.

**KATA KUNCI**

Kinerja Keberlanjutan, Tujuan Pembangunan Berkelanjutan, Industri Pertambangan, Lingkungan, *Sustainable Development Goals, Environmental, Social, and Governance*

**A B S T R A K**

Indonesia memiliki sumber daya alam yang melimpah dan telah mengembangkan sektor pertambangan yang kuat, mencakup industri mineral dan batubara. Pertambangan memainkan peran vital dalam pembangunan ekonomi, namun juga menimbulkan tantangan keberlanjutan yang signifikan, terutama dalam menyeimbangkan aspek lingkungan, sosial, dan ekonomi. Studi ini bertujuan untuk mengembangkan model penilaian keberlanjutan terintegrasi dengan parameter aspek yang terukur, dengan mengevaluasi dua perusahaan pertambangan besar di Indonesia yang secara konsisten menerbitkan laporan keberlanjutan selama lebih dari sepuluh tahun dan memperoleh peringkat emas dalam penilaian PROPER 2024. Studi ini menggunakan pendekatan campuran yang menggabungkan pemetaan isu kualitatif dengan analisis kuantitatif, berfokus pada tiga perusahaan pertambangan di Indonesia yang meraih peringkat emas PROPER pada tahun 2024, yaitu PT AAA dan PT BBB. Metode sampling yang digunakan adalah *purposive sampling*. Analisis data menggunakan pendekatan indeks komposit, menggabungkan *Responsible Mining Index* (RMI) dan *Dow Jones Sustainability Index* (DJSI). Dari 416 indikator yang dipetakan, keselarasan terkuat teramati dengan SDG 8 (Pekerjaan Layak dan Pertumbuhan Ekonomi), SDG 12 (Konsumsi dan Produksi yang Bertanggung Jawab), SDG 13 (Aksi Iklim), dan SDG 16 (Damai, Keadilan, dan Institusi yang Kuat). Di sisi lain, SDG 4 (Pendidikan Berkualitas), SDG 7 (Energi Terjangkau dan Bersih), dan SDG 17 (Kemitraan untuk Tujuan) kurang terwakili.

**CORRESPONDING AUTHOR**

rboyska@gmail.com

**DOI**

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## 1. Introduction

Indonesia possesses vast natural resources and has established a robust mining sector that includes both mineral and coal industries. The coal mining industry contributes significantly to national energy needs and export performance. In 2024, it accounted for approximately 12% of the national Gross Domestic Product (GDP) [1].

Nevertheless, the extractive industries are strongly linked to multifaceted sustainability issues, such as environmental damage, resource exhaustion, and social disputes. These challenges have led to growing demands for transparency, environmental accountability, and alignment with global sustainability frameworks [2], [3]. A large number of mining companies have yet to embed the SDGs into their fundamental business strategies or corporate governance. Rather than conducting thorough assessments, they tend to perform

surface-level mapping by associating SDGs with existing ESG concerns, without deeply examining their real positive and negative impacts on the goals [4].

Integrating of Environmental, Social, and Governance (ESG) frameworks with the Sustainable Development Goals (SDGs) has become a critical discourse in sustainability research. ESG indicators are widely used to evaluate corporate risk management and operational responsibility, while SDGs offer a global blueprint for long-term development outcomes [5]. Ideally, the two frameworks should be harmonized so that corporate sustainability initiatives genuinely support societal advancement. Yet, recent research questions the notion that strong ESG performance automatically translates into progress toward the SDGs [6].

Studies show little to no correlation between commonly used ESG ratings and SDG scores, indicating that high ESG performance does not necessarily translate to meaningful SDG progress [4]. ESG ratings play a key role in sustainable investing and research, yet they are often criticized for failing to represent corporate sustainability performance accurately. As a result, new measurement tools have been introduced to evaluate companies' contributions to the SDGs. Comparisons of ESG ratings with two SDG scores show no correlation between the SDG Indicator and the Mining Standard Sustainability Indicator [7].

Disconnecting current ESG indicators may not adequately capture the broader, systemic impacts of mining activities on sustainable development. Various ESG rating agencies and reporting frameworks (such as GRI, ICMM, RMI, and SASB) often emphasize different aspects and apply diverse methodologies in assessing ESG performance. Recent studies highlight significant challenges in the comparability and reliability of Environmental, Social, and Governance (ESG) reporting in the mining sector. Despite the use of standardized frameworks like the Global Reporting Initiative (GRI), sustainability performance remains difficult to measure and compare due to qualitative aspects, lack of compliance, and data heterogeneity [8]. Consequently, this results in limited comparability and reduced reliability of the reported data. Mining companies face significant challenges aligning ESG standard performance indicators with the SDGs. Key issues include superficial integration, selective reporting, weak action on critical SDGs, a disconnect between ESG ratings and SDG outcomes, lack of standardization, institutional barriers, and ongoing environmental risks. Addressing these issues requires more rigorous, transparent, and holistic approaches to ESG management and SDG integration [9].

In response, the Indonesian government has introduced a number of regulatory initiatives. One of them is the Program for Pollution Control, Evaluation, and Rating (PROPER), managed by the Ministry of Environment and Forestry. This program serves as a corporate responsibility mechanism aimed at controlling pollution, preventing environmental degradation, and managing waste as well as hazardous and toxic materials that affect public welfare, in accordance with prevailing laws and regulations [10]. This assesses corporate environmental performance across five rating tiers (Gold, Green, Blue, Red, and Black), as stipulated in Law No. 32/2009 and Ministerial Regulation No. 1/2021 [11]. Meanwhile, the Otoritas Jasa Keuangan (OJK) mandates sustainability disclosures for public companies through POJK No. 51/POJK.03/2017 [12]. These mechanisms reinforce the need for corporations to disclose ESG-related efforts and demonstrate measurable progress toward sustainable development.

In addition to national regulations, ESG principles have emerged as international benchmarks for assessing corporate sustainability, especially within high-impact sectors like mining. Although coal mining remains central to Indonesia's economic agenda, it is also associated with complex sustainability risks, including ecological degradation, social conflict, and governance gaps [2]. These circumstances highlight the importance to mining companies to align their practices with global sustainability commitments, particularly the SDGs.

At the international level, the SDGs have become the dominant framework for guiding and evaluating sustainability commitments. However, their integration within the mining sector is still fragmented. Previous research has suggested a partial approach, such as the quantitative index model proposed, which applies parameter scoring and normalization [2]. The qualitative indicator-mapping approach that links company-reported indicators to specific SDG targets [3]. However, a unified methodology that combines both approaches for a comprehensive assessment remains underexplored.

ESG disclosure practices have been advancing in developed countries like Canada and Australia, but concerns about greenwashing persist. While these nations are classified as having "rapidly improving ESG frameworks", they still face challenges in ensuring transparent and reliable ESG reporting [13]. The lack of standardized, mandatory ESG disclosure regulations increases the risk of greenwashing [14]. Studies show that firms may appear transparent by disclosing large amounts of ESG data while performing poorly in ESG aspects. To mitigate greenwashing, scrutiny from independent directors, institutional investors, and cross-listing can be effective [15]. In Canada, energy companies are adapting to evolving disclosure frameworks and proposed mandatory rules, but must navigate complex regulatory developments to avoid greenwashing allegations [16]. A global framework is needed to enhance comparability, transparency, and reduce complexity in ESG reporting.

Although many companies have integrated ESG disclosures into their reporting, these efforts often

remain fragmented, emphasizing narrative descriptions rather than tangible, measurable actions. A more comprehensive approach is needed for sustainability limitation-one that not only evaluates transparency but also assesses the extent to which sustainability commitments are translated into concrete action and measurable outcomes. Although ESG disclosures have grown in recent years, many mining companies still show limited clarity and consistency in aligning their reported initiatives with specific SDG targets. Frequently, these disclosures remain descriptive rather than offering measurable proof of progress [17]. This challenge reflects the absence of a standardized index that objectively links sustainability performance indicators to the SDGs.

This research seeks to fill that gap by introducing a hybrid framework that merges quantitative scoring techniques with qualitative indicator mapping to evaluate the sustainability performance of mining companies. The framework integrates parameters from globally acknowledged sustainability standards, the Responsible Mining Index (RMI), and the Dow Jones Sustainability (DJSI) and maps them against all 17 SDG targets [17].

This research focuses on a sample of two of the largest mining companies in Indonesia, each recognized for consistent performance under mineral mining criteria by PROPER evaluation. Both companies have consistently issued sustainability reports for more than a decade as publicly listed firms and achieved a gold rating in the 2024 PROPER evaluation, as established industry leaders, they provide important perspectives on whether a composite index can be effectively implemented in current reporting practices or if publicly available 2024 sustainability and annual reports, this study aims to develop a structed and replicable framework that identifies disclosure gaps, showcases best practices, and provides practical recommendations to enhance ESG strategies and strengthen alignment with the SDGs in the mining sector.

## 2. Research Method

This study adopts a mixed-methods approach that integrates qualitative issue mapping with quantitative analysis, focusing on three mining companies in Indonesia that achieved a Gold PROPER rating in 2024, namely PT AAA and PT BBB. The sampling method used was purposive sampling, ensuring inclusion only of companies that met specific criteria, such as:

a. Operating in the mineral and coal mining sector,

b. Receiving the highest PROPER rating (Gold) in 2024, and

c. Publishing publicly available sustainability and annual reports for the 2024 period.

The study employed a composite index approach for data analysis, combining the RMI and DJSI frameworks. These frameworks were used to evaluate and align company ESG indicators with relevant SDG targets through the following three stages:

a. Indicator mapping, by linking ESG metrics from company reports to the corresponding SDG targets.

b. Conducting a scoring process using a binary system, followed by mapping indicators to the appropriate SDG targets based on the RMI and DJSI frameworks, which can be seen on Table 1.

c. Composite index, aggregating scores to produce a company-level SDG alignment index.

Table 1. Scoring Levels for SDG Alignment Index Development [3]

| Score | Description |
|---|---|
| 0 | Indicated no correlation |
| 1 | Signified a correlation between the indicator and the assessed goal |

To ensure the reliability of indicators and consistency in aligning them with SDG targets. This approach was designed to assess the extent of the sampled companies' disclosures regarding their contributions to each SDG target, while also identifying priority areas and existing gaps in their sustainability performance.

## 3. Result and Discussion

### 3.1. SDG Indicator Mapping Overview

Table 2 shows the distribution of DJSI and RMI indicators associated with each SDG. Among the 153 DJSI indicators and 247 RMI indicators, the largest contributions are linked to SDF 8 (Decent Work and Economic Growth), SDG 12 (Responsible Consumption and Production). SDG 13 (Climate Action), and SDG 16 (Peace, Justice, and Strong Institutions). This suggests that the sustainability reporting of the examined mining companies primarily emphasizes economic and governance aspects. The DJSI framework comprises 125 indicator questions, whereas the RMI framework contains 294. The figures shown in the tables represent the specific subset of indicators from each framework that are mapped to the respective SDGs.

### 3.2. Integration of RMI and DJSI into Composite SDG Index

Table 3 displays the mapping outcomes of the combined RMI and DJSI indicators into a unified composite index. Altogether, 416 indicators were effectively connected to the 17 Sustainable Development Goals (SDGs). The highest contributions were found in SDG 16 (64 indicators), followed by SDG 8 (62 indicators), SDG 12 (50 indicators), and SDG 13 (36 indicators), reflecting a strong focus on governance, labor, responsible production, and climate action. In contrast, the smallest contributions appeared in SDG 7 (3 indicators), SDG 4 (5 indicators), and SDG 17 (6 indicators). This suggests that affordable and clean energy, quality education, and

partnerships for the goals are still underrepresented in current sustainability practices and need to be strengthened going forward.

Table 2. Number or Aspect SDG correlated with the number of DJSI Indicator and RMI Indicator

| Aspect | SDG | Number of DJSI Indicator | Number of RMI Indicator |
|---|---|---|---|
| Social | 1 | 3 | 19 |
| Social | 2 | | 11 |
| Social | 3 | 8 | 19 |
| Social | 4 | 2 | 3 |
| Social | 5 | 6 | 23 |
| Environmental | 6 | 10 | 5 |
| Social | 7 | 2 | 1 |
| Economic | 8 | 31 | 31 |
| Economic | 9 | 4 | 5 |
| Economic | 10 | 5 | 19 |
| Social | 11 | 6 | 12 |
| Economic | 12 | 25 | 25 |
| Environmental | 13 | 23 | 13 |
| Environmental | 14 | | 12 |
| Environmental | 15 | 10 | 13 |
| Social | 16 | 32 | 32 |
| Social | 17 | 1 | 4 |
| TOTAL | | 153 | 247 |

Table 3. Integration of RMI and DJSI into Composite SDG Index

| SDG | Number of Integrated RMI & DJSI Indicators |
|---|---|
| 1 | 22 |
| 2 | 11 |
| 3 | 27 |
| 4 | 5 |
| 5 | 29 |
| 6 | 15 |
| 7 | 3 |
| 8 | 62 |
| 9 | 9 |
| 10 | 24 |
| 11 | 18 |
| 12 | 50 |
| 13 | 36 |
| 14 | 12 |
| 15 | 23 |
| 16 | 64 |
| 17 | 6 |
| TOTAL | 416 |

Figures 1 and 2 show that the social pillar dominates the integration of ESG and SDGs, accounting for more than 44% of the total aligned indicators. The economic pillar comes next with 35%, while the environmental pillar contributes around 21%. This distribution reveals a clear imbalance, indicating that the mining sector still prioritizes economic results such as operational performance and governance over long-term environmental and social sustainability.

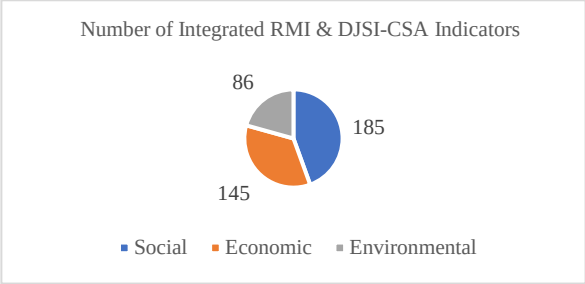


Figure 1. Number of Integrated RMI and DJSI Indicators with 3 Pillars SDG

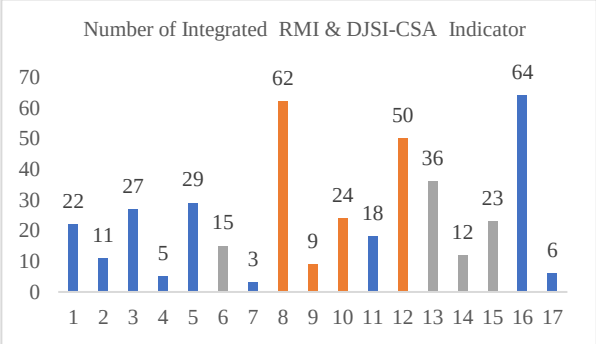


Figure 2. Number of Integrated RMI and DJSI Indicators with SDGs

These findings highlight the significance of the integrated framework developed in this study. The predominance of economic metrics suggests the industry tends to favor tangible, regulation-driven results—like those related to labor practices, ethical standards, and compliance—which are often highlighted in sustainability reporting standards such as RMI and DJSI.

Out of 416 indicators evaluated across two Indonesian mining companies, the highest alignment was with SDG 16 (Peace, Justice, and Strong Institutions) at 64 indicators, followed by SDG 8 (Decent Work and Economic Growth) with 62, and SDG 12 (Responsible Consumption and Production) with 50. Conversely, the companies showed the least alignment with SDG 7 (Affordable and Clean Energy), SDG 4 (Quality Education), and SDG 17 (Partnerships for the Goals), with only 3, 5, and 6 indicators, respectively.

This pattern indicates that companies tend to prioritize SDGs closely tied to business performance and governance. In contrast, broader systemic goals-especially those that demand cross-sector collaboration and long-term environmental investment receive comparatively less focus. These findings suggest that while progress toward SDG alignment is taking place, its implementation remains uneven. To create a more balanced and effective sustainability strategy, companies should better integrate the less-represented SDGs, especially in areas like clean energy, education, and partnerships.

3.3. Company-Level Analysis of SDG Correlations

3.3.1. Sample Mining Company PT AAA

Table 4. Indicator Correlations PT AAA

| Total Indicator | RMI | | DJSI | | Composite Index RMI and DJSI | |
|---|---|---|---|---|---|---|
| | Correlation | Non-Correlation | Correlation | Non-Correlation | Correlation | Non-Correlation |
| 416 | 201 | 93 | 74 | 51 | 275 | 114 |

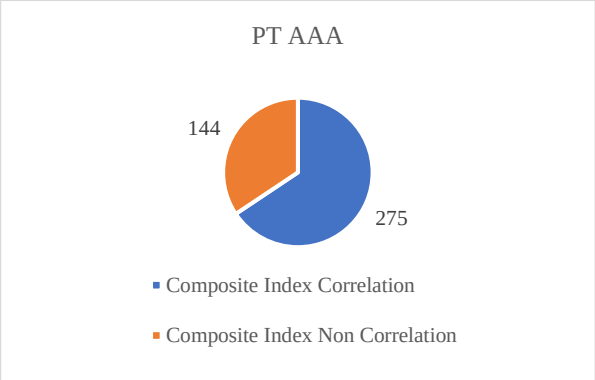


Figure 3. Composite Index PT AAA

As presented in Table 4 and Figure 3, PT AAA shows:

a. Higher correlation with RMI indicators (201 indicators) compared to DJSI (74 indicators).

b. A total of 275 indicators are aligned with at least one SDG.

Table 5. Correlation Composite Index Link SDGs PT AAA

| Aspect | SDGs | Total Correlation Composite Index Link SDGs | % Correlation Composite Index Link SDGs |
|---|---|---|---|
| Social | 1 | 28 | 3.44 |
| Social | 2 | 18 | 2.21 |
| Social | 3 | 73 | 8.98 |
| Social | 4 | 12 | 1.48 |
| Social | 5 | 90 | 11.07 |
| Environmental | 6 | 22 | 2.71 |
| Social | 7 | 10 | 1.23 |
| Economic | 8 | 102 | 12.55 |
| Economic | 9 | 14 | 1.72 |
| Economic | 10 | 52 | 6.40 |
| Social | 11 | 52 | 6.40 |
| Economic | 12 | 91 | 11.19 |
| Environmental | 13 | 52 | 6.40 |
| Environmental | 14 | 51 | 6.27 |
| Environmental | 15 | 51 | 6.27 |
| Social | 16 | 93 | 11.44 |
| Social | 17 | 2 | 0.25 |

Table 5 consists of four main columns:

a. Aspect – Represents the specific category or dimension being analyzed.

b. SDGs – Refers to the Sustainable Development Goals (SDGs) relevant to the given aspect.

c. Total Correlation Composite Index Link SDGs – represents the overall composite index score that connects the aspect to the SDGs, providing a measure of their relationship.

d. % Correlation Composite Index Link SDGs – Show the percentage correlation between the composite index and the SDGs, indicating the strength of the linkage.

Explanation of the '% Correlation' Results:

The correlation percentage indicates the extent of interconnection of each SDG within the analyzed composite index framework. A higher percentage signifies that the SDG holds a more central or influential role in relation to the others in this model. The results are summarized as follows:

a. SDG 8 (Decent Work and Economic Growth) has the highest percentage (12.55%) and the strongest linkage to other goals.

b. SDG 16 (Peace, Justice and Strong Institutions), SDG 12 (Responsible Consumption and Production), and SDG 5 (Gender Equality) also

demonstrate strong correlation, with 11.44%, 11.19%, and 11.07% respectively.

c. The SDGs related to the Environmental aspect (SDG 6, 13, 14, and 15) show mid-to-low correlation levels, ranging from 2.71% to 6.40%.

d. SDG 17 (Partnerships for the Goals) has the lowest correlation, at just 0.25%

Result of the SDGs with the Highest and Lowest Correlation:

a. SDG with the Highest Correlation

According to the data, the SDG that demonstrates the strongest correlation or the highest number of linkages within the index is SDG 8: Decent Work and Economic Growth (12.55%). This high proportion shows that SDG 8 serves as a central driver with substantial influence over many other SDGs. Promoting inclusive economic growth and decent employment forms the foundation for advancing other objectives, such as poverty reduction (SDG 1), better health outcomes (SDG 3), industrial innovation (SDG 9), and reducing inequalities (SDG 10). In this analysis, SDG 8 proves to be a key driver within the network of interlinkages.

b. SDG with the Lowest Correlation

The SDG that demonstrates the weakest correlation or the fewest connections within this index is SDG 17: Partnerships for the Goals (0.25%). This is an interesting finding. Although SDG 17 conceptually serves to "bind" all goals together through partnership, it's very low percentage in this index could suggest that its direct, quantitative impact is harder to measure than other economic or social indicators. SDG 17 acts more as a *means* or an *enabler* for achieving the other goals. Therefore, its direct quantitative correlation might appear small in this model, even though its strategic role is critically important.

### 3.3.2. Sample Mining Company PT BBB

Table 6. Indicator Correlations PT BBB

| Total Indicator | RMI | | DJSI | | Composite Index RMI and DJSI | |
|---|---|---|---|---|---|---|
| | Correlation | Non-Correlation | Correlation | Non-Correlation | Correlation | Non-Correlation |
| 416 | 222 | 72 | 78 | 47 | 300 | 119 |

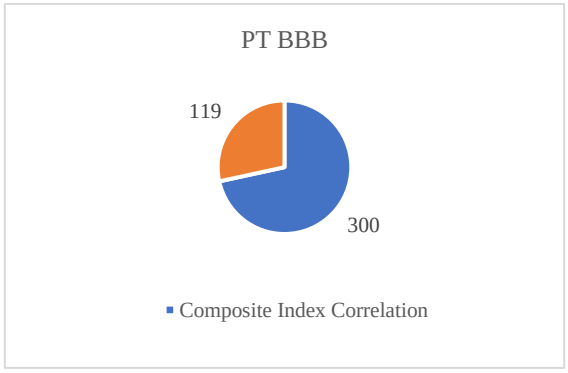


Figure 4. Composite Index PT BBB

From Table 6 and Figure 4, PT BBB shows:

a. Stronger alignment with DJSI indicators (78) and RMI indicators (222).

b. A total of 300 indicators correlated with SDGs.

Table 7. Correlation Composite Index Link SDGs PT BBB

| Aspect | SDGs | Total Correlation Composite Index Link SDGs | % Correlation Composite Index Link SDGs |
|---|---|---|---|
| Social | 1 | 37 | 4.55 |
| Social | 2 | 23 | 2.83 |
| Social | 3 | 82 | 10.09 |
| Social | 4 | 10 | 1.23 |
| Social | 5 | 100 | 12.30 |
| Environmental | 6 | 16 | 1.97 |
| Social | 7 | 11 | 1.35 |
| Economic | 8 | 120 | 14.76 |
| Economic | 9 | 15 | 1.85 |
| Economic | 10 | 62 | 7.63 |
| Social | 11 | 52 | 6.40 |
| Economic | 12 | 95 | 11.69 |
| Environmental | 13 | 61 | 7.50 |
| Environmental | 14 | 52 | 6.40 |
| Environmental | 15 | 53 | 6.52 |
| Social | 16 | 102 | 12.55 |
| Social | 17 | 4 | 0.49 |

Explanation of the '% Correlation' Results:

The correlation percentage in this table indicates how central each SDG is within the framework. A higher percentage signifies a stronger connection to the other goals.

a. There are five SDGs with a correlation percentage above 10%: SDG 8 (14.76%), SDG 16 (12.55%), SDG 5 (12.30%), SDG 12 (11.69%), and SDG 3 (10.09%). This shows that these five goals hold strong interlinkages in the composite index.

b. The SDGs from the Environmental theme (SDG 6, 13, 14, and 15) display correlation values ranging from low to medium, between 1.97% and 7.50%.

c. Several SDGs from the Social theme, such as SDG 4 (Quality Education) and SDG 7 (Affordable and Clean Energy), have relatively low correlations, at 1.23% and 1.35% respectively.

d. SDG 17 (Partnerships for the Goals) again shows the lowest correlation percentage, at 0.49%.

Result of the SDGs with the Highest and Lowest Correlation:

a. SDG with the Highest Correlation

Based on the data in this table, the SDG with the highest correlation is: SDG 8: Decent Work and Economic Growth (14.76%). With the dominant highest percentage, SDG 8 is again proven to be the center of the SDG interconnection network in this analysis. This underscores that sustainable and inclusive economic growth and job creation are key drivers that have a broad impact on achieving other goals, from poverty eradication (SDG 1), health (SDG 3), equality (SDG 5 & 10), to innovation (SDG 9).

b. SDG with the Lowest Correlation

The SDG that shows the lowest level of correlation in this analysis is SDG 17: Partnerships for the Goals (0.49%). This outcome aligns with the earlier analysis. The particularly low correlation score for SDG 17 (0.49%) in this quantitative index is likely because it functions as a ”process-oriented” or “enabling” goal. Partnerships serve as the underlying mechanism that facilitates the achievement of all other goals. Still, its impact is difficult to measure directly in a correlation model like this compared to concrete indicators in economic, social, or environmental fields. Although its value is small, its strategic role remains fundamental.

## 4. Conclusion

This study offers key insights into how two major mining companies integrate Sustainable Development Goals (SDGs) into their ESG practices, with 416 performance indicators mapped to various target, showing strong alignment with economic and social goals such as SDG 8 (Decent Work and Economic Growth), SDG 16 (Peace, Justice, and Strong Institutions), and SDG 5 (Gender Equality). However, SDG 17 (Partnerships) consistently showed the weakest correlation, likely due to measurement challenges rather than lack of engagement, while other goals such as SDG 4 (Quality Education) and SDG 7 (Affordable and Clean Energy) also remain underrepresented. These findings the mining sector, as highlighted in previous studies, but also reveal imbalances in addressing broader systemic goals. To strengthen contributions to global sustainability agendas, mining companies in Indonesia need to adopt a more comprehensive and balanced approach by reinforcing frameworks that encourage multistakeholder collaboration and providing incentives to integrate underrepresented collaboration and providing incentives to integrate underrepresented SDGs, ensuring that all goals are addressed proportionally and strategically within ESG practices.

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