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Vendor Evaluation and Selection for Forwarding Activities Using Stepwise Weight Assessment Analysis-Combined Compromise Solution (SWARA-CoCoSo) Method

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***Abstract* – PT Perusahaan Listrik Negara Suku Cadang has faced delays in receiving commodities requested by the Perusahaan Listrik Negara Group, resulting in materials arriving later than expected. These materials were supplied by PT Wartsila, a partner of PT Perusahaan Listrik Negara Suku Cadang, responsible for fulfilling the orders placed by the Perusahaan Listrik Negara Group. To uphold its reliability as a supply chain company, PT Perusahaan Listrik Negara Suku Cadang must ensure timely delivery of requested goods. One way to minimize delays is through vendor evaluation. The SWARA method, which assesses ten factors identified by four logistics division experts, is employed to select the best forwarding vendor. The CoCoSo method, along with PT Perusahaan Listrik Negara Suku Cadang's logistics performance evaluation, was used to determine the top vendor. Based on the CoCoSo results, PT Kurnia Purnama Jaya ranked first with a score of 4.06, followed by Mats International Indonesia with a score of 2.6, Perigi Raja Terpadu in third with 1.5, and Pos Logistik Indonesia in fourth with 1.4. According to the CoCoSo method's criteria weightings and vendor evaluation, PT Kurnia Purnama Jaya was selected as the most suitable vendor for PT Perusahaan Listrik Negara Suku Cadang.**

Keywords*— *Vendor Evaluation, SWARA Method, CoCoSo Method, Supply Chain Management, Logistic Performance.

I. INTRODUCTION

In the process of selecting a forwarding vendor, decision-making plays a crucial role, necessitating the use of decision support tools. Decision-making involves systematically choosing the most suitable option from various alternatives, and applying structured actions to resolve issues [1]. It requires selecting the optimal alternative through an efficient approach tailored to the current circumstances [2]. This can be accomplished either individually or within a group. The decision-maker, whether working alone or as part of a team, must implement appropriate and effective strategies to ensure the most accurate and optimal outcome.

To select the best freight forwarders, decision-makers need to establish evaluation criteria that suit their needs. Different criteria may be more or less important depending on the industry and the procurement context. Some studies try to find the most relevant criteria using regression-based methods, but these methods have limitations. The researcher assumes a linear and deterministic relationship between criteria and cannot capture the subjectivity of decision-makers [3].

PT Perusahaan Listrik Negara Suku Cadang (PLNSC) is a service company responsible for procuring materials and services for PLN units under the PT PLN Nusantara Power and PT PLN Indonesia

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Power groups. With high material demand and locations spread across Indonesia, PT. PLNSC needs to manage procurement efficiently. Additionally, the suppliers for these materials are located in various countries, including Finland, China, Germany, Korea, and Japan. This makes it essential for PT. PLNSC to carefully oversee the shipment of materials to Indonesia. Selecting the right forwarding vendors is crucial to ensuring that the requested materials are delivered to PLN units on time. PT. PLNSC must continue to improve its performance in material delivery to maintain the trust of the PLN group, which is vital to the company's operational success.

PT. PLNSC works with a wide range of manufacturers, traders, and spare parts distributors both locally and globally in conducting its business activities. With the rising competition in the market, companies are expected to reach a certain level of responsiveness to adequately meet customer demands [4]. To address these needs, the logistics department plays a crucial role in ensuring reliability, efficiency, and effectiveness. This involves well-organized processes such as inventory management, procurement, shipping, and warehousing, all of which require thorough planning and coordination to maximize efficiency [5], [6].

One of the manufacturers working with PT. PLNSC for material procurement is PT Wartsila. However, the lead time for delivering spare parts from PT Wartsila often surpasses customer expectations. This delay is mainly caused by production factors at PT Wartsila, where the availability of materials from third-party suppliers affects the overall readiness of spare parts for shipment. The availability of materials and the production process at PT Wartsila typically take a long time, with a lead time of up to 120 days.

From the issues identified, it can be concluded that the delays in PT Wartsila's spare part deliveries are primarily due to material supply readiness needed to support the production process. By mapping out PT Wartsila's spare part requirements over a specific period, early material supply planning can be implemented to enhance the production process. This would help streamline PT. PLNSC's delivery lead times. To address this, the logistics division of PT. PLNSC seeks reliable contracted partners that can provide forwarding services and support, ensuring that spare parts reach customers on time.

For vendor selection procedures under current business conditions, PT. PLNSC implements a bidding mechanism. PT. PLNSC will open bids to vendors who intend to do freight forwarding services. Then, the freight forwarders will send their respective bid prices. PT. PLNSC will review the price and determine the winner of the bidding based on the lowest price offered by each vendor. Many delays occurred in the delivery of materials from PT Wartsila, but this was not taken into consideration by PT. PLNSC. Even though it is an urgency in the process of shipping materials from PT Wartsila. For the existing problems, PT. PLNSC must evaluate the vendors who have worked with them to transport materials from PT Wartsila and PT. PLNSC needs to assess the performance of the best vendors to be able to establish a cooperation contract to transport materials from PT Wartsila. However, PT PLNSC lacks established criteria for selecting forwarding vendors.

II. Literature Study

A. Freight Forwarder

Assessing the level of service provided by freight forwarders can be difficult due to the industry's wide range of services, intangibility, and interdependence. The many factors that affect the liner shipping industry's service quality are discussed in this article, including the length of the trip, the directness of the sailings, the carrier's track record of reliability, the frequency of sailings, and the departure of the next ship. While many forwarders are skilled in providing standard logistics services and freight forwarding, it's possible that they lack the capacity to provide other value-added services [7].

B. Decision Making

To achieve certain goals, a thorough decision-making procedure needs to be followed. In academic literature, this method is often described as a plan or solution. Typically, a prescriptive decision-making approach involves offering guidance to decision-makers, where inputs and outputs guide the flow of the process. The inputs for the process come from various sources of decision-related information, such as financial reports and personnel details, and the outputs are recommendations that align with predetermined, generally unchanging, decision-making objectives. There are several different goals that can be pursued in vendor management. These goals may include evaluating potential suppliers, selecting the most suitable ones for a specific project or contract, and categorizing them into different groups based on assigned roles, such as classification, clustering, and sorting. Additionally, it is essential to develop and maintain a reliable network of vendors [8].

In decision-making processes, managers and engineers consider multiple factors shaped by their specific roles and responsibilities. For example, a safety manager is likely to prioritize safety concerns, whereas a production manager may focus more on minimizing production costs. Choosing the most appropriate maintenance strategy requires careful consideration of the unique industrial context, along with the decision-maker's priorities [9]. Furthermore, decisions often need to be made in uncertain conditions, which must also be factored in when selecting the optimal solution.

C. Multi Criteria Decision Making

An examination of recent Industry 4.0 research underscores the critical role of knowledge management and decision-making approaches within organizations. Through a review of management literature, this paper highlights the significance of knowledge management and outlines a framework for various decision-making styles [10]. In the realm of multi-criteria decision-making (MCDM), methodologies are typically categorized into two groups: Multi-Attribute Decision Making (MADM), which focuses on a limited and defined set of options, and Multi-

Objective Decision Making (MODM) or Multi-Objective Programming (MOP), which addresses scenarios involving multiple goals.

Multi-criteria decision making (MCDM) is the process of selecting an option set that is contingent upon meeting a number of requirements. An alternative approaches the criteria's requirements more closely the better it is. This is why choosing among numerous options, alternatives, or courses of action that have to simultaneously satisfy several, sometimes conflicting, requirements can be referred to as multi criteria decision making (MCDM) [11].

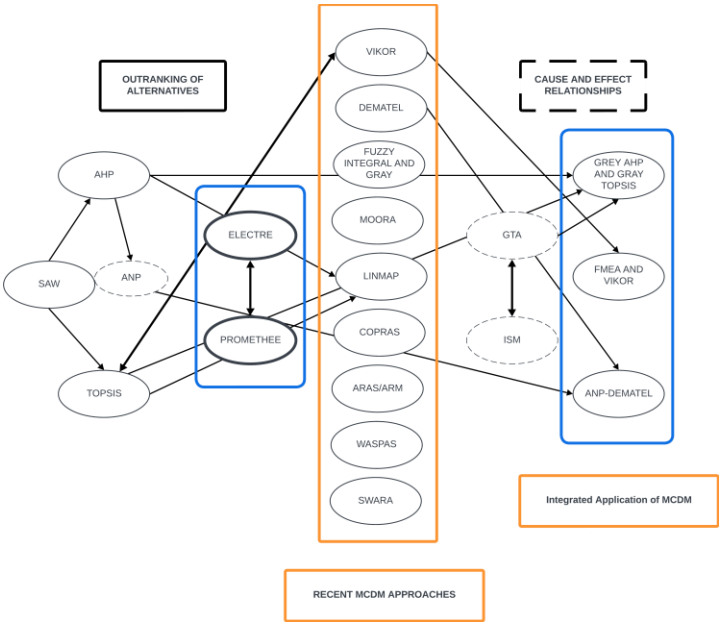

FIGURE 1. MCDM approaches.

Various decision-making tools are frequently utilized, including the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), Simple Additive Weighting (SAW), Elimination and Choice Translating Reality (ELECTRE), Analytic Hierarchy Process (AHP), Analytic Network Process (ANP), Complex Proportional Assessment (COPRAS), VIsekriterijumska Optimizacija i KOmpromisno Resenje (VIKOR), Preference Ranking Organization Method for Enrichment Evaluations (PROMETHEE), Multi-Objective Optimization based on Ratio Analysis (MOORA), Stepwise Weight Assessment Ratio Analysis (SWARA), and Complex Proportional Assessment with Grey Relations (COPRAS-G) [12]

D. Vendor Selection

For a long time, the conventional method for selecting suppliers was largely centered around price. However, businesses have realized that relying solely on price is not effective for supplier selection. As a result, they have adopted a more comprehensive multi-criteria approach. In recent years, the criteria for selecting suppliers have become more intricate, incorporating factors such as environmental impact, social responsibility, political conditions, and customer satisfaction, in addition to the traditional focus on quality, delivery, cost, and service [13].

In Dickson's study, 23 key performance indicators (KPIs) were identified, varying based on the purchasing context and circumstances. The study highlights that quality, delivery, performance, warranties, and claim processes are particularly important factors. Conversely, reciprocity was found to be the least significant among the arrangements considered [14].

While the criteria for selecting a freight forwarder vendor can be seen in Table 1.

TABLE 1. Example of table.

Criteria	Explanation	Sources
Service Quality	The vendor's ability to manage and prepare key customs documents, such as the Bill of Lading, BC 1.1, Forwarder's Cargo Receipt (FCR), and Airway Bill	[15]
Communicative	Communicative criteria pertain to how responsive a vendor is in providing information regarding delivery activities.	[7]
Performance History	Performance history criteria involve evaluating the vendor's past performance based on historical data and KPIs.	[13]
Quality Certification	The vendor's standards refer to certifications and quality benchmarks they adhere to, such as ISO, IFS, FIATA, and other relevant standards.	[2] , [3]
Price	The vendor's ability to provide services at a reasonable price refers to their capacity to deliver quality services or products while maintaining competitive and fair pricing.	[3], [4]
Technical Capability	The service vendor's competence refers to their capability to perform forwarding activities in line with established standards and requirements.	[13]
Document Procedural Compliance	The vendor's understanding of regulations involves their knowledge and adherence to rules regarding the completeness and accuracy of procurement documentation and billing records (invoices).	[13]
K3 Compliance	K3 Compliance criteria refer to the service provider's ability to meet health and safety regulations.	[8]
Delivery Time	Forwarding time is the duration from when the vehicle arrives at the border crossing until customs processing is finished and the vehicle is cleared.	[2] , [3]
Reputation	Reputation indicates a company's value in the market to users.	[5]

E. SWARA Method

The steps outlined below demonstrate the calculation process using the conventional SWARA method [15]:

- Identify the relevant evaluation criteria and rank them in order of importance based on their expected significance
- Assess the relative importance s_j of the criterion j compared to the preceding criterion $(j-1)$ criteria. Begin with the second criterion and continue this process for each subsequent criterion.
- Assess the coefficient k_j using (1):

$$k_j = \begin{cases} 1 & j = 1 \\ s_j + 1 & j > 1 \end{cases} \quad (1)$$

- Determine the recalculated weight q_j using (2):

$$q_j = \begin{cases} 1 & j = 1 \\ \dfrac{q_{j-1}}{k_j} & j > 1 \end{cases} \quad (2)$$

- Assess the relative weights of the evaluation criteria using the equation (3):

$$w_j = \frac{q_j}{\sum_{k=1}^{n} q_k} \quad (3)$$

- Establishing a ranked list of evaluation criteria based on their expected importance can be challenging when using the SWARA method in a group setting, as respondents may have varying opinions on the criteria's significance. Consequently, the appropriate s_j values should be assigned as outlined in (4)

$$s_j = \begin{cases} > 1 \; when \; C_j > C_{j-1} \\ 1 \; when \; C_j = C_{j-1} \\ < 1 \quad C_j < C_{j-1} \end{cases} \quad (4)$$

- Getting the value of s_j, the calculation continue with the equation (5):

$$k_j = \begin{cases} 1 & j = 1 \\ 2 - s_j & j > 1 \end{cases} \quad (5)$$

F. CoCoSo Method

Yazdani et al. introduced the CoCoSo technique, which has since been expanded for use in various decision-making scenarios across different fields [16]. The CoCoSo method, along with MABAC, MAIRCA, EAMR, and TOPSIS, has been employed for multi-criteria decision making in various domains. Comparisons among these five methods show that CoCoSo offers superior stability in the solution rating process compared to the other methods (MABAC, MAIRCA, EAMR, TOPSIS) [18]. The effectiveness of the CoCoSo approach has been demonstrated through its application to real-world scenarios, such as evaluating logistics companies in France. Comparative studies further confirm the stability of the CoCoSo algorithm, showing results comparable to other MCDM techniques [15].

The suggested approach combines a simple additive weighting model with an exponentially weighted product model, working together to produce a range of compromise solutions. Once the alternatives and corresponding criteria have been determined, the subsequent steps are validated to resolve a Combined Compromise Solution (CoCoSo) decision-making problem:

- Equation (6) is the initial decision-making matrix.

$$x_{ij} = \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1n} \\ x_{21} & x_{22} & \cdots & x_{2n} \\ \cdots & \cdots & \cdots & \cdots \\ x_{m1} & x_{m2} & \cdots & x_{mn} \end{bmatrix}; i = 1,2,3,\ldots,m; j = 1,2,\ldots,n \quad (6)$$

- The criteria values are normalized using a compromise normalization (7) and (8)

$$r_{ij} = \frac{x_{ij} - \min\limits_i x}{\max\limits_i x_{ij} - \min\limits_i x_{ij}}; \; for \; benefit \; criteria \quad (7)$$

$$r_{ij} = \frac{\max\limits_i x_{ij} - x_{ij}}{\max\limits_i x_{ij} - \min\limits_i x_{ij}}; \; for \; cost \; criteria \quad (8)$$

- The overall weighted comparability sequence and the cumulative sum of the relative weights for each option's comparability sequences can be computed using equations (9) and (10)

$$S_i = \sum_{j=1}^{n} (w_j r_{ij}) \quad (9)$$

X`this S_i value is achieved based on grey relational generation approach.

$$P_i = \sum_{j=1}^{n} (r_{ij})^{w_j} \quad (10)$$

this $P_i$value is also achieved according to the WASPAS multiplicative attitude.

- The next step involves applying several aggregation procedures to calculate the relative weights for each of the options. During this phase, three different appraisal scoring methods are employed, which help to determine the relative importance of the alternatives. These calculations are derived based on equations (11), (12), and (13).

$$\kappa_{ia} = \frac{P_i + S_i}{\sum_{i=1}^{m} (P_i + S_i)}, \quad (11)$$

$$\kappa_{ib} = \frac{S_i}{\min\limits_i S_i} + \frac{P_i}{\min\limits_i P_i}, \quad (12)$$

$$\kappa_{ic} = \frac{\lambda(S_i) + (1-\lambda)(P_i)}{\left(\lambda \max\limits_i S_i + (1-\lambda) \max\limits_i P_i\right)}; \; 0 \leq \lambda \leq 1 \quad (13)$$

It is generally assumed that equation (11) represents the arithmetic mean of the combined WSM and WPM scores, while equation (12) highlights the relative sum of WSM and WPM scores in comparison to the optimal option. On the other hand, equation (13) calculates a balanced compromise between the WSM and WPM model results, with decision-makers often choosing a value of λ=0.5 in this equation. Nevertheless, the flexibility and robustness of the CoCoSo method can be influenced by additional variables.

- The final ranking of the alternatives is determined using (14)

$$\hbar_i = (\hbar_{ia}.\hbar_{ib}.\hbar_{ic})^{\frac{1}{3}} + \frac{1}{3}(\hbar_{ia}+\hbar_{ib}+\hbar_{ic}) \quad (14)$$

III. RESEARCH METHODOLOGY

To achieve the objectives of this research, several research steps were carried out, as shown in Figure 2. It starts from initial observation, then problem identification, followed by defining the criteria for vendor assessment, conducted the survey to get an assessment from the expert. Subsequently, the SWARA method procedure continues with the calculation of criteria results based on the data obtained from the completed questionnaires. The final step in the CoCoSo method procedure involves calculating the results for the identified alternatives.

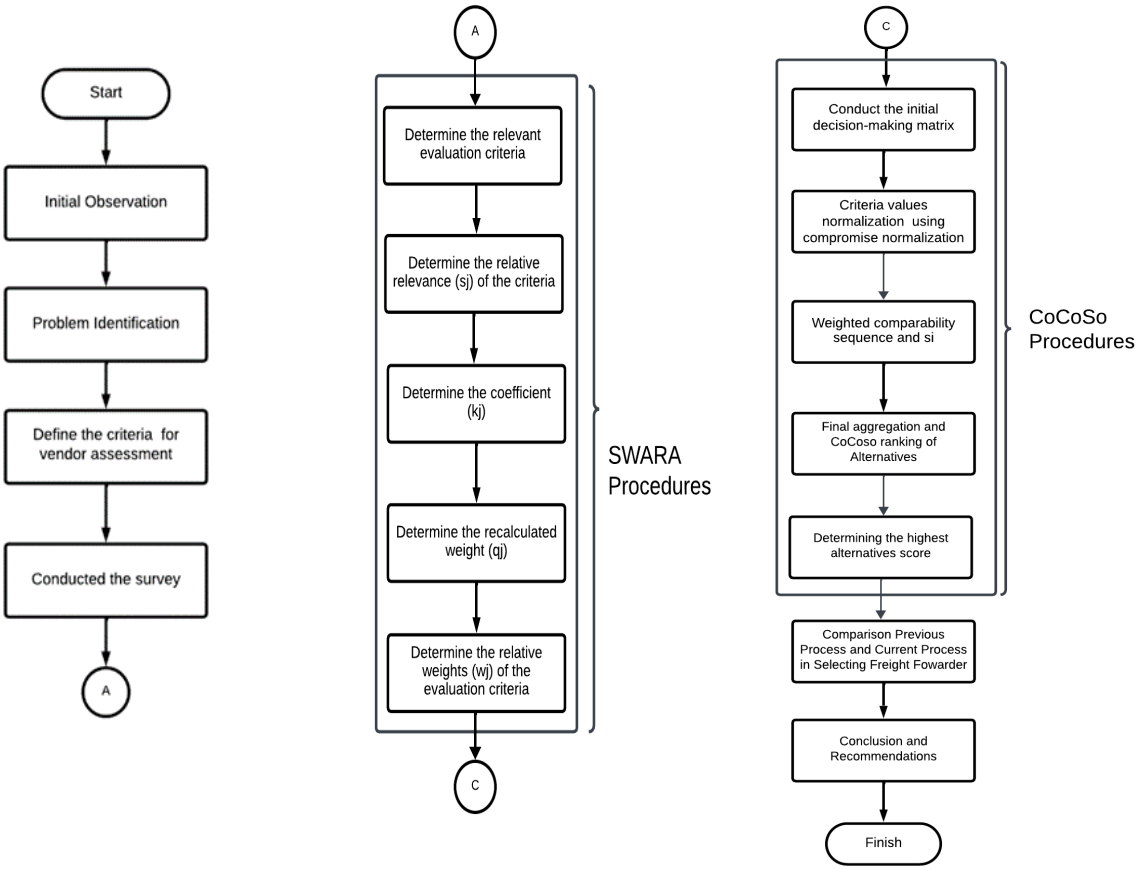

FIGURE 2. Research framework.

IV. RESULT AND DISCUSSION

A. SWARA Method

To determine the final ranking of freight forwarders, the weight of each observed criterion must be established first. Experts assessed the criteria based on their importance, from most to least significant, and then the remaining steps of the SWARA method were applied. Four experts participated in the criteria evaluation. The geometric mean of their judgments was used to derive a single value for each criterion. The results of the SWARA calculations are presented in Table 2.

Based on the results in Table 2, it can be concluded that the three most important criteria are communicative, K3 compliance, and service quality, with weights of 0.2858, 0.2373, and 0.1971, respectively. Conversely, reputation, quality certifications, and document procedural compliance are the three least important criteria, with weights of 0.0087, 0.0036, and 0.0013, respectively. After establishing the ranking of the criteria, each criterion will be assigned a code for further analysis.

TABLE 2. Result of SWARA method.

Criteria	Initial weight	Sj	kj	qj	wj	Rank	Code
Communicative	5	-	1	1	0.28	1	C1
K3 Compliance	5	0.20	1.20	0.83	0.23	2	C2
Service quality	4.73	0.20	1.20	0.68	0.19	3	C3
Technical Capability	4.73	0.61	1.61	0.42	0.12	4	C4
Delivery time	4.73	0.61	1.61	0.26	0.07	5	C5
Price	4.40	0.61	1.61	0.16	0.04	6	C6
Performance history	4.23	1.22	2.22	0.07	0.02	7	C7
Reputation	4.23	1.43	2.43	0.03	0.008	8	C8
Quality certifications	4	1.43	2.43	0.012	0.003	9	C9
Document procedual compliance	4	1.84	2.84	0.004	0.001	10	C10

Following the assessment of criteria weights from four experts using the SWARA method and calculating each alternative's results with the geometric mean formula, the researcher has established the overall weights for evaluating the available options. The outcomes of the evaluation for the four vendors are detailed in Table 3.

TABLE 3. Vendor evaluation based on criteria weight.

Alternatives	Criteria									
	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
Mats International Indonesia	1.064	1.122	0.635	0.394	0.263	0.141	0.073	0.034	0.014	0.005
Pos Logistik Indonesia	0.832	1.004	0.591	0.611	0.206	0.235	0.042	0.044	0.018	0.004
Perigi Raja Terpadu	0.990	1.004	0.591	0.271	0.282	0.141	0.073	0.044	0.016	0.004
Kurnia Purnama Jaya	1.278	1.187	0.734	0.578	0.321	0.141	0.083	0.035	0.018	0.006

Based on the calculation using the average value, the ranking of each alternative for each criterion weight that has been determined is obtained. The details can be seen in Table 4.

TABLE 4. Assesment weight of each alterbative.

Alternatives	Assessment Weight	Rank
Mats International Indonesia	3.746	2
Pos Logistik Indonesia	3.587	3
Perigi Raja Terpadu	3.416	4
Kurnia Purnama Jaya	4.380	1

B. CoCoSo Method

The initial vendor evaluation matrix was constructed with input from four experts, and the final values were derived using the geometric mean method. This evaluation considered criteria including communicativeness (C1), K3 compliance (C2), service quality (C3), technical capability (C4), delivery time (C5), price (C6), performance history (C7), reputation (C8), quality certifications (C9), and document procedural compliance (C10). Each freight forwarder was assessed on a scale from 1 to 5, reflecting the decision-makers' previous experiences. The details of this matrix are outlined in Table 5.

TABLE 5. Initial matrix.

Alternatives	Criteria									
	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
	B	B	B	B	C	C	B	B	B	B
Mats International Indonesia	4	5	3	3	3	3	3	4	4	4
Pos Logistik Indonesia	3	4	3	5	3	5	2	5	5	3
Perigi Raja Terpadu	3	4	3	2	4	3	3	5	4	3
Kurnia Purnama Jaya	4	5	4	5	4	3	4	4	5	4
Min	2.91	4.23	3	2.21	2.71	3	2	3.94	4	3
Max	4.47	5	3.72	5	4.23	5	3.94	5	5	4.47

At this point, the criteria values are normalized using the compromise value formula, considering a total of ten criteria. Out of these, eight are identified as benefit criteria, which are better with higher values, while two are cost criteria, which are better with lower values. The differences between these two groups of criteria can be calculated using equations (7) and (8). To obtain the normalization value (r_{ij}) for benefit criteria (B), equation (7) will be applied. For cost criteria (C), equation (8) will be utilized for the calculation. Table 6 shows the result of normalization matrix (r_{ij}) value.

TABLE 6. Normalization matrix.

Alternatives	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
	B	B	B	B	C	C	B	B	B	B
Mats International Indonesia	0.52	1	1	0.40	0.50	0	0.76	0	0	0.49
Pos Logistik Indonesia	0	0	0	0.71	1	1	0	1	0	0
Perigi Raja Terpadu	0	0	0.58	0	0.33	0	0.76	1	0	0
Kurnia Purnama Jaya	1	1	1	1	0	0	1	0	1	1

To calculate the S_i and P_i values, start by comparing the weight sequences with the overall weight to determine the total. The S_i value is computed by multiplying each criterion's weight by the normalized results for each alternative, as detailed in equation (9). The results for S_i are presented in Table 7.

TABLE 7. Initial matrix.

Alternatiives	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	Total Si
Mats International Indonesia	0.15	0.15	0.06	0.04	0.04	0.05	0.02	0	0	0	0.51
Pos Logistik Indonesia	0	0	0	0.12	0.08	0	0	0.01	0	0	0.21
Perigi Raja Terpadu	0	0	0.00	0	0.03	0.05	0.02	0	0	0	0.199
Kurnia Purnama Jaya	0.29	0.24	0.20	0.11	0	0.05	0.02	0	0	0	0.90

The Pi value is obtained by means of normalization results using the weight value of each criterion as in (10). Table 8 shows the calculation results of Pi.

TABLE 8. The relative weight of comparability squence (PI).

Alternatives	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	Total Si
Mats International Indonesia	1	1	1	1	0.038	1	1	0	0	1	6
Pos Logistik Indonesia	0	0	0	1	0.076	0	0	1	1	1	4
Perigi Raja Terpadu	1	0	0	0	0.025	1	1	1	1	0	4.75
Kurnia Purnama Jaya	1	1	1	1	0.000	1	1	0.976	1	1	8.96

The aggregation method is employed to determine the relative weights of alternatives. This involves using three assessment score methodologies to derive these weights and other possibilities. The calculation of Kia, using equation (11), represents the arithmetic mean of the Si and Pi values. The Kib calculation, according to equation (12), reflects the sum of the relative S_i and P_i scores in relation to

the best alternative. The Kic calculation, performed with equation (13), computes a balanced compromise between the S_i and P_i model scores, with decision-makers typically choosing λ = 0.5. The results for Kia, Kib, and Kic are detailed in Table 9.

TABLE 9. Result of Kia, Kib, Kic.

Alternatives	Kia	Kib	Kic
Mats International Indonesia	0.267	4.131	0.704
Pos Logistik Indonesia	0.164	2.054	0.434
Perigi Raja Terpadu	0.190	2.168	0.503
Kurnia Purnama Jaya	0.379	6.727	1

The final ranking of the alternatives (ki) is determined using (14). The result of ki calculation can be seen in Table 10.

TABLE 10. Alternative rank.

Alternatives	Ki	Rank
Mats International Indonesia	2.619400094	2
Pos Logistik Indonesia	1.411515719	4
Perigi Raja Terpadu	1.54572918	3
Kurnia Purnama Jaya	4.067374269	1

V. CONCLUSION

The SWARA technique was utilized to determine the importance of various criteria for assessing freight forwarding vendors. Ten key criteria were identified: communicativeness, K3 compliance, service quality, technical capability, delivery time, price, performance history, reputation, quality certification, and document procedure compliance. The weighting process involved insights from four experts in the logistics field. The results indicated that communicativeness and K3 compliance were prioritized as the most crucial factors, while quality certification and document procedure compliance were ranked as less critical.

The CoCoSo calculation method differentiates between benefit and cost criteria, applying distinct treatments for each type. The final ranking of alternatives is determined using three aggregation strategies. The results indicate that Kurnia Purnama Jaya achieved the highest score with a weight of 4.06, followed by Mats International Indonesia with a weight of 2.61, Perigi Raja Terpadu with a weight of 1.54, and PT POS Logistik Indonesia with a weight of 1.41. Kurnia Purnama Jaya received the highest score because it excelled in the most important criteria, namely communicativeness and K3 compliance, as evaluated by the experts. This result is further supported by the three aggregation strategies employed in the CoCoSo method.

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AUTHOR CONTRIBUTIONS

Bilqis Adillah Rachman: Conceptualization, Data Curation, Methodology, Validation, Writing – Original Draft Preparation;

Anastasia L. Maukar: Project Administration, Writing – Review & Editing;

Johan K. Runtuk: Project Administration, Supervision, Writing – Review & Editing.

CONFLICT OF INTERESTS

No conflict of interests were disclosed.

ETHICS STATEMENTS

Our research work follows The Committee of Publication Ethics (COPE) guideline. https://publicationethics.org.

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