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Performance Evaluation of Green Supply Chain Management in Canned Fish (Sardines) Production Unit: A Case of Indonesia

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Abstract— Indonesia's fishing industry, especially in East Java Province, shows great potential but also harms the environment. CV. Pasific Harvest Surabaya (CV. PHB) is a fish canning industry in Banyuwangi Regency, which is currently facing problems such as the supply of raw materials, which continues to decline; the company has not measured and planned the total consumption of energy, fuel, water and the problem of workers who have not received environmental training. Although a waste processing system is in place, the production process still carries the risk of environmental pollution. The researchers collected data through observation, interviews, literature studies, and paired comparison questionnaires. The results of the research reveal that CV. PHB manages three supply chain flows with four supply chain actors. The final performance score is 81.77, with 24 verified KPIs. The KPIs that need performance improvement are packaging time until the product is picked up by the delivery service (D4), time for handling customer complaints (R3), and environmental training for workers (E1).

Keywords— Fish Canning Industry, Green Supply Chain Management, GSCOR, Pairwise Comparison, Performance Evaluation.

I. INTRODUCTION

Indonesia is an agricultural country where many citizens depend on the agricultural sector for their livelihood [1]. One sector of agriculture is fisheries. Indonesia is the largest maritime country in the world, so it has abundant marine resource potential. 718 fish processing units spread throughout Indonesia, and total production reached 1.6 million tons in 2019 [2]. One of the provinces with fisheries industry potential is East Java Province, which has third place in the largest fisheries sector after Maluku and North Sumatra [3]. One of the potential fisheries sectors is in Muncar District, Banyuwangi Regency, which has a variety of processed fish products. The fish processing industry can cause environmental damage, such as strong-smelling and waste contamination in Muncar waters [4]. Environmental damage is the main challenge faced in reducing

waste in production, conserving energy, and eliminating the use of hazardous materials in the environment [5].

CV. PHB has a daily production capacity of up to 40 tons of fish daily. There were problems found that could affect the company's performance like the decline in the supply of Lemuru fish raw materials from year to year which was caused by overfishing by fishermen [4]. The pollution in Muncar waters causes Lemuru fish to move away, so fishermen must look for fish far from the strait line. In implementing supply chain management, the company needs to measure and make plans regarding energy consumption, fuel, and total water used. Apart from that, another problem is that workers still need to receive environmental training. The company has implemented waste processing by utilizing solid waste in animal feed and flour, and liquid waste is processed in the IPAL until it is safe when it leaves the factory. Companies must implement sustainable marketing strategies to face business challenges and uncertainties, focusing on environmental responsibility and consumer needs [6]. This way allows them to remain competitive while maintaining long-term sustainability. Evaluation of supply chain performance at CV. PHB needs to be carried out to measure how environmentally friendly the company's supply chain is. The concept continues to be emphasized to create an industry that cares about the environment [7].

Green Supply Chain Management (GSCM) is a series of supply chain activities that use an environmental management approach. It has environmentally friendly aspects and can reduce ecological impacts without reducing the quality, costs, and performance required [8]. Implementing green supply chain practices can be used to minimize or eliminate the impact of products on the environment (pollution, air, water, land) and eliminate or minimize resources such as energy, materials, and products, starting from receiving the company's raw materials to product disposal [9]. GSCM integrates environmental thinking in supply chain management, which includes water efficiency, energy efficiency, waste management, environmental

conservation, recycling, reuse, and transportation optimization [5]. Companies that want to achieve sustainability in environmental aspects must expand their management by improving environmentally related practices along the supply chain flow [10].

The company integrates environmental thinking into its supply chain management through GSCM. GSCM influences a company's sustainability by enhancing the efficiency of its supply chain. The company adopts GSCM to improve its image, build customer trust and satisfaction, and expand its market share [11]. The entire series of supply chain activities is managed by paying attention to environmentally friendly concepts. A processing unit can be called a green process if its production activities always prioritize the efficiency and effectiveness of each process unit and can handle the waste produced well [12]. The GSCM evaluation process can be carried out using the green SCOR model.

The green SCOR (GSCOR) model develops the SCOR model by adding several considerations related to the environment and makes this model a tool for managing the environmental impact of a company's supply chain [10]. The GSCOR model can be used to identify, evaluate, and monitor GSCM performance, which companies have carried out using five GSCOR work attributes: reliability, responsiveness, agility, flexibility, cost, and assets [13]. The research results can be used as evaluation material and information regarding the company's supply chain performance and to obtain recommendations for improving performance for the industry. Based on the background above, the researcher aims to evaluate the performance of GSCM at CV. PHB. This evaluation will use the GSCOR model to identify, evaluate, and monitor the performance of the company's supply chain, especially in terms of environmental aspects. This research also aims to provide recommendations for improving GSCM performance so that CV. PHB can develop a more environmentally friendly and sustainable fish processing industry.

II. MATERIALS AND METHOD

A. Materials

The tools used in this research were questionnaires, cameras, Ms. Excel, and Expert Choice Software to carry out pairwise comparisons. The materials used in this research include primary and secondary data. Primary data was obtained through observations, interviews, and questionnaires, while secondary data was obtained through literature and field studies. The data collected relates to GSCM process data for the fish processing industry, stakeholder identification, management process data, and waste management data.

B. Research Stage

GSCM KPI Identification

The KPI determination process was based on the GSCOR approach, which includes core work processes, work attributes, and performance indicators. KPIs are created and validated strictly through interviews and opinions from appointed experts. These experts, including PPIC, QC Supervisor, and Marketing/Exim Staff, have a crucial role in ensuring the accuracy and relevance of the selected KPIs.

KPI Weighting

Weighting was carried out on core supply chain processes, supply chain work attributes, and predetermined KPIs. Weighting was done by filling out a questionnaire containing pairwise comparisons with quantities that can describe the differences between one factor and another. The comparative assessment of the level of importance using a scale of 1 to 9. The results of filling out the questionnaire were processed using the Expert Choice 11 application with the provision that if the CR (Consistency Ratio) value was less than 0.1, then the criteria weight assessment was accepted because the answers of each expert are consistent. In contrast, if the CR value was more than 0.1, it needs to be reviewed because there were inconsistencies when determining pairwise comparisons.

KPI Assessment

KPI assessments were carried out by entering the actual value of each KPI based on company data. Each indicator in the GSCM performance process has different weights and units. Therefore, a data normalization process using Snorm de Boer is required. Snorm de Boer normalization was carried out to obtain values with the same parameters for each indicator [14]. The Snorm de Boer equation is carried out using the equation seen in Appendix 3. Furthermore, the values obtained from each indicator's Snorm de Boer normalization are categorized between values 0 to 100, and the value conversion monitoring system can be seen in Table I.

TABLE 1. PERFORMANCE INDICATOR MONITORING SYSTEM

Score	Performance Indicator Monitoring System
< 40	Poor
40 < x < 50	Marginal
50 < x < 70	Average
70 < x < 90	Good
> 90	Excellent

Performance Index Calculation

Performance measurement was carried out using the GSCOR method, which defines processes and sub-processes combined into one supply chain pattern. Each processing element has a performance matrix obtained through the core work processes: plan, source, make, deliver, return, and enable [15]. Each core work process has attributes or dimensions: reliability, responsiveness, agility/flexibility, cost, and asset management [16]. The final GSCM performance value was calculated by the overall value of the company's performance by multiplying the weight by the actual value from field data.

Performance Improvement Recommendations

The lowest value of the KPIs was identified to formulate recommendations for improving company performance [17]. A KPI value of less than 70 was analyzed to provide recommendations for improving performance. Recommendations for improvement are prepared based on the results of FGDs with experts to obtain the best recommendations from low-value indicators.

III. RESULTS AND DISCUSSION

A. Overview of Industry

CV. PHB is an industry founded in 1993 on the edge of the Bali Strait, Muncar District, Banyuwangi Regency, which operates in the fishery product processing sector. CV. PHB has two processing factories, which were established on an area of approximately 6 hectares and operate with a production capacity of up to 40 tons of fish per day [18]. CV. PHB has superior products in the form of canned sardines under the Asahi and Lafish brands. Asahi canned sardines come in two variants: tomato sauce and spicy sauce, while Lafish is processed sardines with vegetable oil. Some CV. PHB products that are easy to find are ASAHI brand canned sardines with tomato sauce and spicy variants measuring 125 grams, 155 grams, and 425 grams. Sardine products with tomato and spicy sauce are intended for domestic sales. Sardines with vegetable oil are exported to several African countries, the Middle East, Eastern Europe, the Balkans, Western Europe, Southeast Asia, and Australia. The

products by CV. PHB can generally last up to 2 to 3 years and can be consumed by all groups.

B. Agro-industrial Supply Chain

The supply chain has three flows that companies must pay attention to from upstream to downstream and vice versa: the flow of goods or materials, the flow of information, and the flow of finance [19]. A simple supply chain model consists of four components, namely suppliers (raw material providers), producers (product producers), warehouses or distribution centers (shops and product ships), and end users who receive products [20]. Supply chain activities are carried out by actors with the same goals through planning activities, procurement of raw materials, processing, and distribution to consumers. Supply chain actors carry out interconnected activities to obtain canned fish products that can be distributed to consumers. CV. PHB's supply chain actors include fishermen as raw material suppliers and CV. PHB is a manufacturing company, distributor, and consumer. The structure and flow of the supply chain at CV. PHB can be seen in Figure 1.

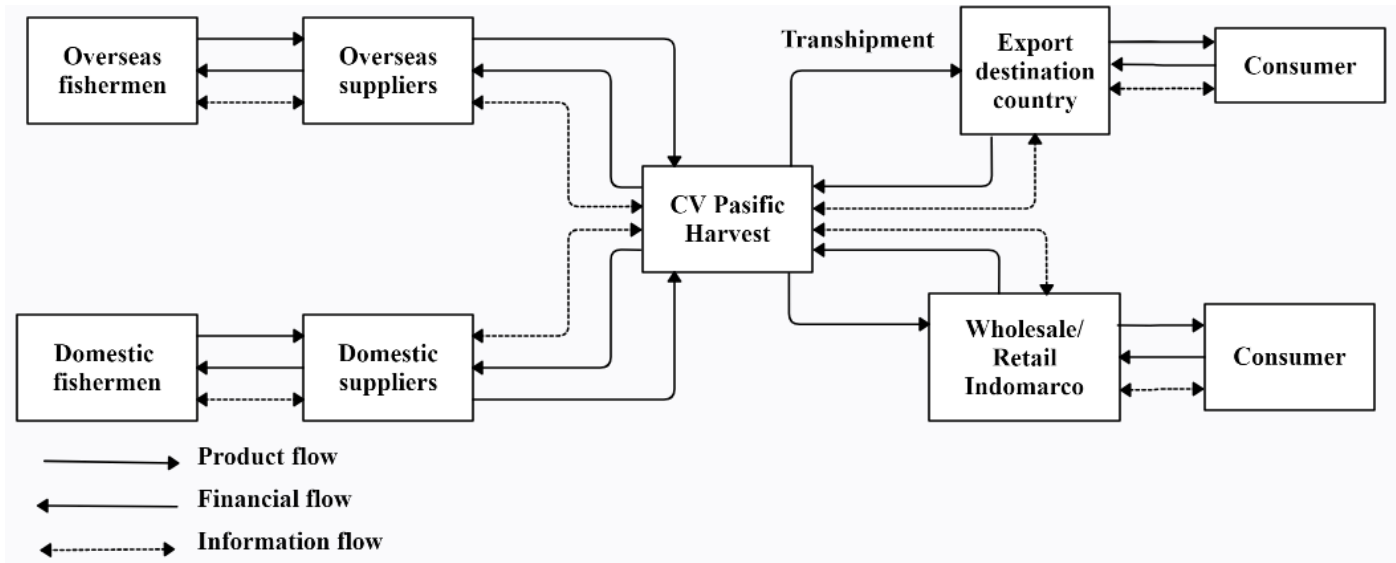


Fig. 1. The structure and flow of the supply chain at CV. PHB.

Suppliers of fresh fish raw materials come from fishermen around the factory (Muncar, Bali, and Puger) and several suppliers from abroad (Pakistan, India, China, and Yemen). Fishermen who are CV. PHB partners use purse-type vessels to catch fish with a purse seine net. A purse seine is a fishing tool included in the ring net category. Regarding energy consumption efficiency, using purse seine nets is superior to other methods [21]. Fishermen send raw materials according to orders to meet industry demand of 40 tons daily, so the average raw material that must be available monthly is 1200 tons. There are different sizes of fish from each supplier, which are included in 4 categories, namely large size (15-20 fish per kilogram), medium size (20-30 fish/kg), small (30-40 fish/kg) and tiny (>40 fish/kg). The types of fish used are *Sardinella longiceps* (lemuru fish), *Sardinella fimbriata* (tembang fish), *Scomber australasicus*, and *Scomber japonicus*. Raw materials must be clean, free from odors that indicate rot, and organoleptically must meet criteria such as bright and clean eyes, fresh smell, and

elastic and dense texture. Raw materials must also be free from microbial, chemical, and heavy metal contamination with provisions by SNI 01-2729.1-2006, SNI 01-2729.2-2006, and SNI 01-2729.3-2006.

CV. PHB has a role in processing fish into processed canned fish according to the targets and production plans made until it is ready to be sent to customers. Canned fish processing is a preservation method used to extend the product's shelf life and maintain the fish's nutritional content [22]. CV. PHB will process these raw materials into processed canned sardines with processing processes including receiving raw materials, washing, filling fish into cans, cooking, filling media, sterilization, labeling, and incubation. The company also processes solid waste into livestock and fish oil through stakeholders and processes liquid waste through IPAL so that it is safe when it leaves the factory. Products sold domestically use the official CV. PHB brand, while products sold abroad are made according to client orders.

Finished goods will be distributed to the domestic marketing network through official distributors such as Indomarco and sold overseas. Distribution is carried out after the product is ready to be released and will later be sent to stakeholders (Indomarco), retail traders, and exporters (sale and drop scheme). Sales abroad use transshipment or export delivery service providers, requiring additional costs and taking longer. Selling through stakeholders can get products into consumers' hands more quickly because they can be found in local marketplaces. Stakeholder purchases in one transaction range from 2-3 containers with a capacity of around 3240 cartons each. The delivery process is based on a waiting list according to the purchase agreement.

Consumers are the final actors in the canned sardine supply chain. Products must be made according to consumer demand so that the market will accept them and consumers can purchase them continuously. The Marketing/Exim section bridges the information between the company and consumers, including ordering information, product prices, production status, product pickup, and delivery times. Consumers of canned sardine products are spread throughout Indonesia and several exporting countries. Export consumers have a sales system with large-scale purchases using a B2B (business-to-business) business scheme.

The product flow is the primary key to the production process so that it continues continuously. The product flow starts from the supplier or supplier of raw materials so that raw materials are always available and the production process is not disrupted[23]. CV. PHB will process these raw materials and convert them into processed canned sardines. Apart from raw materials, additional materials such as spices, oil, and packaging cans are obtained from stakeholders collaborating with CV. PHB. After processing, distributors will distribute the finished product to the domestic marketing network. The product flow can also occur the other way around or from downstream to upstream, namely returning products from consumers for various reasons; for example, the product does not match the order, is defective because the packaging leaks, or contains foreign material.

Product information flow in the supply chain makes the system run well between supply chain actors and consumers [24]. The flow of information runs in two directions, namely from upstream to downstream and vice versa. The flow of information between suppliers and companies includes the availability, condition, and delivery of raw materials. The Marketing/Exim section bridges the flow of information between the company and consumers, including ordering information, product prices, production status, product pickup, and delivery times. Financial flows are financial flows that take place in the company's supply chain from downstream to upstream[25]. Financial flows occur when there are purchases of raw materials or sales of products to consumers. Transactions that occur between companies and consumers or companies and suppliers are carried out on credit following the agreement that has been made between the two parties. Financial flows between companies and consumers include payments for products ordered, while between companies and raw material suppliers, payments for raw materials ordered by the company.

C. KPI Identification

Key Performance Indicator (KPI) measures a collection of facts in the form of quantitative data whose results are used to improve product quality and processes and assess and measure company performance [26]. This research uses the GSCOR approach with six main work types and performance attributes, which function as a tool for grouping advanced processes. Based on the results of verification carried out by selected experts, 24 KPIs were produced from the initial KPI of 32 KPIs. The results of the adjustments based on company conditions determine two work attributes for each core work process, reliability and responsiveness, by expert validation.

TABLE 2. RESULTS OF KPIS VALIDATION FOR GSCM AT CV. PHB

Process Type	Performance Attributes	KPI
Plan	Reliability	Planning for the Use of Chemical Synthetic Materials (P1)
		Daily Production Planning (P2)
Source	Reliability	Raw Material Procurement Planning (P3)
		The quantity and quality of raw materials is not defective (S1)
		Suppliers who have KKP certification (S2)
	Responsiveness	Hazardous Material Weight (S3)
		Order Time Until Received by the Warehouse (S4)
Make	Reliability	Frequency of Raw Material Received on Time (S5)
		Production Material Efficiency (M1)
		Weight of Liquid Waste Disposed of (M2)
		Weight of Recycled Solid Waste (M3)
		Number of BOD in waste (M4)
		Number of COD in Waste (M5)
	Responsiveness	Number of Defective Products (M6)
		Time Required to Make a Product (M7)
Deliver y	Reliability	Timely Delivery (D1)
		Registered and Documented Delivery (D2)
		Proper Delivery of Items (D3)
Return	Reliability	Time for Packing Until the Delivery Service Picks Up the Product (D4)
		Finished Products Returned by Customers (R1)
	Responsiveness	Number of Complaints Related to the Environment (R2)
		Customer Complaint Handling Time (R3)
Enable	Reliability	Return Time for Returned Products (R4)
		Workers who have been given environmental training (E1)

D. KPIs Weighting

The pairwise comparison method determines the weight of GSCOR core work processes, work attributes, and KPIs, so a chart is necessary to determine the relationship and each indicator. Figure 2 shows the pairwise comparison structure of

GSCOR at CV. PHB and the results of pairwise weighting using Expert Choice Software.

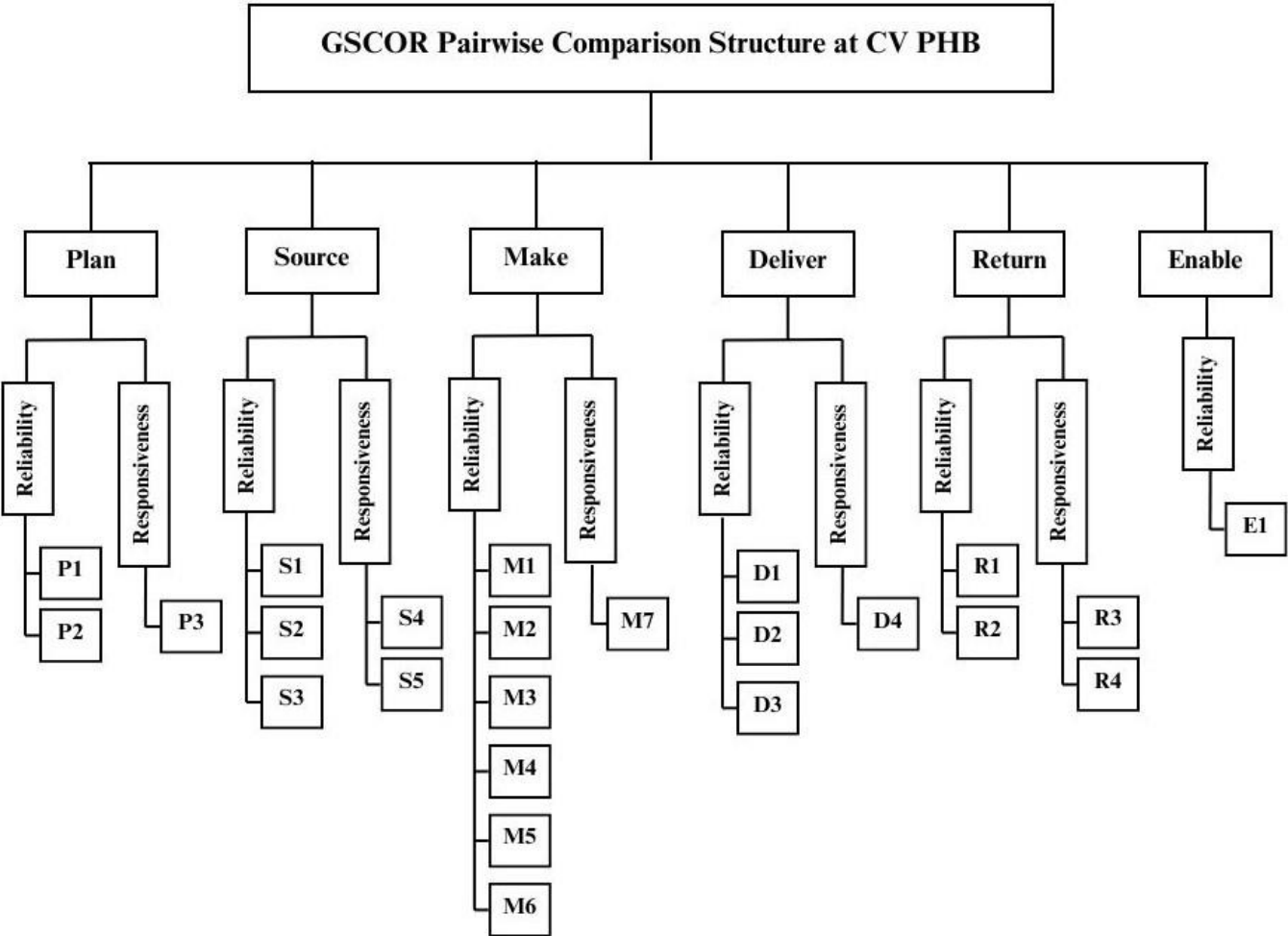


Fig. 2. The pairwise comparison structure of GSCOR at CV. PHB.

Pairwise weighting uses Expert Choice Software to compare GSCOR CV. PHB elements in pairs. The weighting results using the pairwise comparison method show different results for each indicator, which shows that each indicator has

a different level of importance [27]. The higher the weight, the higher the level of importance of the indicator, and vice versa. Table III shows the results of pairwise weighting for process type, work attributes, and KPI.

TABLE 3. WEIGHTING RESULT FOR PERFORMANCE DIMENSION

Process Type	Weight	Performance Attributes	Weight	Code	Weight
Plan	0.195	Reliability	0.591	P1	0.442
				P2	0.558
		Responsiveness	0.409	P3	1
Source	0.148	Reliability	0.409	S1	0.389
				S2	0.205
				S3	0.407
		Responsiveness	0.591	S4	0.369
				S5	0.631

Process Type	Weight	Performance Attributes	Weight	Code	Weight
Make	0.318	Reliability	0.781	M1	0.248
				M2	0.067
				M3	0.109
				M4	0.164
				M5	0.168
				M6	0.244
		Responsiveness	0.219	M7	1
Delivery	0.091	Reliability	0.5	D1	0.49
				D2	0.17
				D3	0.34
		Responsiveness	0.5	D4	1
Return	0.133	Reliability	0.33	R1	0.5
				R2	0.5
		Responsiveness	0.67	R3	0.366
				R4	0.634
Enable	0.115	Reliability	1	E1	1

The results of weighting each core work process, work attributes, and performance indicators obtained the lowest value for the deliver core work process, namely 0.091, and the highest value for the make work process, namely 0.318. The make work process is considered more important than other work processes because make is a manufacturing activity that supports the entire supply chain. The make-work process includes processing raw materials and distributing waste, which is necessary for supply chain performance. The core delivery work process received the lowest scale score because it involves delivery services that connect the company with stakeholders, so it is not the company's main focus.

E. KPIs Assessment

GSCM performance measurement is carried out by calculating the actual value for each performance indicator. The actual values have different units, it is necessary to normalize the data using Snorm de Boer to equalize the parameters of the work indicators. This is the formula used in data normalization.

Large is Better

$$Snorm = \frac{(Si - Smin)}{Smax - Smin} \times 100 \quad (1)$$

Small is Better

$$Snorm = \frac{(Smax - Si)}{Smax - Smin} \times 100 \quad (2)$$

Formula (1) is used if the higher the value obtained, the better, while formula (2) is used if the lower the value obtained, the better.

Supply chain performance achievements can be measured within three months, six months, or one year [28]. Table IV shows the actual average value for three months and the results of data normalization.

TABLE 4. DATA NORMALIZATION

KPI	Unit	Character	Smin	Smax	Si	Storm
P1	%	Small is better	0	100	10	90
P2	%	Large is better	0	100	90	90
P3	%	Large is better	50	100	90	80
S1	%	Large is better	0	100	87	87
S2	%	Large is better	0	100	100	100
S3	mg/kg	Small is better	0	>5	0.25	95
S4	day	Small is better	1	14	3	84.62

KPI	Unit	Character	Smin	Smax	Si	Storm
S5	%	Large is better	0	100	85	85
M1	%	Large is better	0	75	62.89	83.85
M2	%	Large is better	0	100	90	90
M3	%	Large is better	0	100	100	100
M4	mg/l	Small is better	0	>50	4.69	100
M5	mg/l	Small is better	0	>150	53.76	100
M6	%	Small is better	0	100	0.91	99.09
M7	hour	Small is better	10	24	14	71.43
D1	%	Large is better	0	100	80	80
D2	%	Large is better	0	100	100	100
D3	%	Large is better	0	100	99	99
D4	day	Small is better	13	98	45	62.35
R1	%	Small is better	0	25	0	100
R2	%	Small is better	0	25	0	100
R3	day	Small is better	1	7	3	66.67
R4	day	Small is better	2	14	4	83.33
E1	%	Large is better	0	100	45	45

Based on the actual values obtained from observations for three months, relatively high values were obtained, but several indicators received low values. This data is influenced by field conditions, which fluctuate every month. A score of 100 on the KPI for suppliers with KKP certification is because the company's suppliers are KKP certified or have a suitability certificate issued by the Ministry of Maritime Affairs. This certificate is a mandatory requirement that must be possessed by fishermen who wish to become suppliers of fish raw materials to CV. PHB. The KPI for the weight of recycled solid waste, BOD content, and COD content in waste received perfect scores because all solid waste generated during the production process was reprocessed into animal feed and flour. BOD and COD levels in liquid waste released by the company received a score of 100 because it is still within the maximum threshold of the Minister of Environment Regulation No. 06 of 2007. The Minister of Environment Regulation No. 6 2007 states that the maximum limit for BOD levels contained in wastewater is 75 mg/L and 150 mg/L for COD levels. The KPI for recorded and documented deliveries gets a score of 100 because the company always archives sales and delivery records as proof of documentation and administrative requirements. The KPI for finished products returned by customers and the number of complaints related to the environment received a value of 100 because, in the period during which the research was conducted, there were no products returned or customer complaints related to the environment. The lowest weight is found in the indicator of workers who have been given environmental training, namely 45. This is because there are still workers who have not received environmental training, especially workers unrelated to the production process.

F. GSCM Performance

Performance refers to the level of success of an individual, team, or unit in achieving predetermined strategic goals, by showing behavior that meets the target [29]. Performance measurements are used by companies to evaluate and improve performance, as well as find out whether further improvements are needed [30]. The results of performance measurements provide a basis for agencies to make improvements to improve company performance, which will ultimately increase the company's competitiveness in the market. The GSCM performance calculation is carried out by multiplying the normalized KPI value with the weight of the Expert Choice calculation results. The values obtained from each KPI element are then totaled based on performance attributes and added to determine the final performance value [31]. GSCM Performance calculations can be seen in Table V.

TABLE 5. FINAL CALCULATION OF GSCM

Process Type	Score	Weight	Final score
Plan	85.91	0.195	16.75
Source	88.19	0.148	13.05
Make	89.92	0.318	28.59
Delivery	76.11	0.091	6.93
Return	84.75	0.133	11.27
Enable	45.00	0.115	5.18
Total	81.77		

The final calculation results of GSCOR performance show a final score of 81.77, where the final score is in the good category ($70 < x < 90$). The good category shows that the company has performed well [14]. The highest final score was found in the make work process, namely 28.59, considered a vital core work process. Performance indicators in the making process are related to manufacturing or product creation activities, from raw materials to finished products, impacting the company's supply chain process. Based on the final calculation results above, three core work processes with low scores were obtained, starting from return with a score of 11.27, deliver with a value of 6.93, and enable with a value of 5.18. The return work process gets the third lowest score from the bottom because there is a KPI for returning goods with an actual score of 66.67. This process takes a relatively long time because, in the return process, there is a search for why the product is being returned, and the production process is repeated until the goods are sent back to the consumer. In the core delivery work process, indicators are related to product delivery to stakeholders. The delivery process starts when the product is packaged and continues until the delivery service picks it up. The final delivery value is low because, in the KPI, the time to package until the delivery service picks up the product requires a relatively long waiting time, namely up to 2 months, so it gets a low value. The long waiting time is due to waiting on the waiting list during transportation, so many products are stored in the storage warehouse. The lowest final score for the enabled work process is 5.17. In the Enable work process, there are indicators that workers who are given environmental training get low scores. This low score is because most workers at the company have yet to receive environmental training, so attention is needed. The KPIs contained in the low-value primary performance process are then used as a reference in formulating recommendations for improving company performance and GSCM performance.

G. Performance Improvement Recommendations

The results of measuring GSCM performance using the GSCOR method show that several low-value indicators influence the company's supply chain performance. These indicators need evaluation and improvement recommendations.

Problems that exist in the time to package until the product is picked up by the delivery service (D4) received a score of 62.35, so performance needs to be improved. The performance improvement recommendations are increasing efficiency in the product delivery process, including preparing a more optimal delivery schedule. Choosing the right time must be done to avoid delays caused by shipping vessels late at the dock. The next step is to choose shipping services and various shipping methods to reduce the risk of delays related to shipping delays. Carry out continuous assessment and monitoring of the performance of the delivery services used if there are repeated delays, so there is a need to consider a comprehensive evaluation of the performance of existing delivery services. Finally, explore alternatives that are more reliable in supporting the efficiency of the delivery process to reduce waiting time for products ready to be shipped.

The customer complaint handling time indicator (R3) received an actual value of 66.67, indicating a need for improvement. To enhance performance, it is crucial to ensure effective communication channels between various departments

handling customer complaints, including customer service and other related departments. Implementing a complaint tracking system that allows real-time monitoring of customer complaint status will further streamline our operations and ensure timely solutions to customer issues.

The indicator for workers given environmental training (E1) gets a score of 45 and requires performance improvement. Workers who are given environmental training are an essential indicator in helping the company's supply chain activities run smoothly. Some workers have received environmental training, but not all of them. Most workers who receive environmental training are office employees who deal with production and processing processes. Meanwhile, contract workers or daily workers have yet to receive environmental training. The recommendation for improvement is that the company can provide continuous training to workers. The training provided can be in the form of workshops or seminars on the environment and individual follow-up to determine the ability of workers to realize an environmentally friendly industry.

IV. CONCLUSION

There are four supply chain actors at CV. PHB: fishermen, canned fish processing units, distributors, and consumers. The supply chain flow pattern starts with local fishermen and overseas fishermen as raw material providers, canned fish processing units, wholesalers and retailers for local sales, overseas sales (B2B), and final consumers. 2. The final GSCM performance score for CV. PHB was 81.77, which is in the good category. 3 KPIs require performance improvement, including time for packaging until the product is picked up by the delivery service (D4), time for handling customer complaints (R3), and workers who are given environmental training (E1). Recommendations for improvement given are carrying out evaluations and looking for alternative expeditions to reduce waiting times; making internal communications more effective, especially in terms of returning goods and creating a tracking system for returned goods; and providing training related to the environment through seminars or workshops and carrying out further follow-up.

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