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Optimizing The Supply Chain Management System Safety Equipment for Sea Vessels Increasing Company Productivity (Case Study of CV Bandar Bahari on Banjarmasin)

Bayu Satrya Nugraha[1], Zaenal Abidin[2], Paulus Raga[3], and Muhammad Fahrudin[4]*

[1,2,3] *Institut Transportasi dan Logistik Trisakti, Indonesia*

[4] *Universitas Safin Pati, Indonesia*

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A B S T R A C T

Supply chain efficiency is a key factor for companies in maintaining competitiveness and operational sustainability. CV Bandar Bahari, a provider of marine safety equipment, faces challenges arising from fluctuating demand for life jackets and other maritime safety products, which affect productivity and operational performance. This study aims to analyze supply chain performance, identify customer expectations in improving supply chain effectiveness, and formulate strategies for sustainable productivity improvement. This research employs a mixed-method approach with a case study design at CV Bandar Bahari. Qualitative data were collected through in-depth interviews, observations, and documentation studies involving internal parties directly engaged in supply chain activities, while quantitative data were obtained through questionnaires distributed to customers and supply chain partners. Data analysis was conducted using Interpretative Phenomenological Analysis (IPA) for qualitative data, as well as the Customer Satisfaction Index (CSI) and Importance–Performance Analysis (IPA) for quantitative data. The findings indicate that supply chain performance continues to face several constraints, including predominantly manual work systems, suboptimal technology utilization, limited human resources, and constraints in order picking and delivery due to route availability, resulting in longer lead times. This study emphasizes the importance of technology integration and human resource capacity development, including the management of environmental impacts. The proposed strategies focus on strengthening human resources and enhancing technology integration to achieve a sustainable supply chain management system at CV Bandar Bahari.

KATA KUNCI

Manajemen Rantai Pasok, Rantai Pasok Berkelanjutan, Peralatan Keselamatan Laut, Kepuasan Pelanggan, Produktivitas Perusahaan

A B S T R A K

Efisiensi rantai pasok merupakan faktor kunci bagi perusahaan dalam menjaga daya saing dan keberlanjutan operasional. CV Bandar Bahari sebagai perusahaan penyedia peralatan keselamatan laut menghadapi tantangan berupa fluktuasi permintaan jaket pelampung dan produk keselamatan maritim lainnya, yang berdampak pada produktivitas dan kinerja operasional. Penelitian ini bertujuan untuk menganalisis kinerja rantai pasok, mengidentifikasi ekspektasi pelanggan dalam meningkatkan efektivitas rantai pasok, serta merumuskan strategi peningkatan produktivitas yang berkelanjutan. Penelitian ini menggunakan pendekatan *mixed-method* dengan desain studi kasus pada CV Bandar Bahari. Data kualitatif diperoleh melalui wawancara mendalam, observasi, dan studi dokumentasi terhadap pihak internal yang terlibat langsung dalam aktivitas rantai pasok, sedangkan data kuantitatif dikumpulkan melalui kuesioner kepada pelanggan dan mitra rantai pasok. Analisis data dilakukan menggunakan *Interpretative Phenomenological Analysis* (IPA) untuk data kualitatif, serta Customer Satisfaction Index (CSI) dan *Importance–Performance Analysis* (IPA) untuk data kuantitatif. Hasil penelitian menunjukkan bahwa kinerja rantai pasok masih menghadapi berbagai hambatan, antara lain sistem kerja yang dominan manual, pemanfaatan teknologi yang belum optimal, keterbatasan sumber daya manusia, serta kendala pengambilan dan pengiriman barang akibat keterbatasan rute yang berdampak pada lamanya *lead time*. Penelitian ini menekankan pentingnya integrasi teknologi dan pengembangan kapasitas sumber daya manusia, termasuk dalam pengelolaan dampak lingkungan. Strategi yang diusulkan berfokus pada penguatan sumber daya manusia dan peningkatan integrasi teknologi guna mewujudkan sistem manajemen rantai pasok yang berkelanjutan di CV Bandar Bahari.

CORRESPONDING AUTHOR

nugraha2111@gmail.com

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1. Introduction

Sea transportation plays a critical role in global trade as the most efficient mode for moving goods. In Indonesia, growing international trade activities have increased the demand for domestic shipping services. According to SIMLALA data, approximately 60,000 vessels transport up to one billion tons of cargo through Indonesian waters annually, yet only 37% of these vessels are Indonesian-flagged [1]. As vessel traffic increases, the demand for marine safety equipment also rises, especially given the frequent accidents at sea that result in material losses and casualties. Effective supply chain management is therefore essential to support the provision of ship safety equipment and strengthen the implementation of safety management systems, which in turn improve operational performance [2].

In today's highly competitive global business environment, supply chain optimization has become a strategic imperative for enhancing efficiency and strengthening competitive advantage. Lean principles emphasize that a well-structured supply chain can significantly reduce waste and lower operational costs [3], whereas poor supply chain performance increases costs and diminishes customer satisfaction due to inefficiencies in procurement and distribution processes [4].

Indonesia's vast maritime sector presents substantial business opportunities for suppliers of marine safety equipment, including CV Bandar Bahari. Despite the consistently high demand for products such as life jackets, liferafts, and fire safety equipment, the company's productivity remains low due to a combination of external and internal challenges. Externally, CV Bandar Bahari faces intense competition from major distributors such as Velasco Indonesia, which controls around 60% of the national market. Government regulations related to maritime safety and logistics further shape the dynamics of the industry [5]. Internally, outdated operational systems, ineffective management practices, and complex work procedures contribute to production delays, product defects, and declining customer satisfaction.

Customer satisfaction is a crucial determinant of company productivity, as satisfied customers are more likely to repurchase and recommend products [6]. However, disruptions in CV Bandar Bahari's supply chain have negatively affected customer satisfaction levels, highlighting the urgent need to optimize its supply chain management. Supply chain management encompasses planning, coordinating, and controlling activities from procurement to distribution to enhance efficiency, quality, and value creation for customers [7]. Optimizing supply chain management enables stronger integration across all supply chain elements, ensuring product availability in the right quantity, at the right place, and at the right time thereby improving service quality and maximizing profitability. Supporting this view emphasizes that transportation is a critical component of the supply chain, influencing both overall costs and service quality. He describes transportation as an optimization problem that can be addressed through analytical approaches capable of generating near-optimal solutions, while also underscoring the importance of decision-support systems in transportation logistics management [8].

Within the maritime sector, digitalization further reinforces supply chain optimization efforts. The adoption of digital supply chain technologies enhances transparency, enables real-time tracking, and opens greater opportunities for efficiency improvements [9]. Previous studies have also highlighted the strategic role of supply chain management where found that supply chain management has a positive and significant effect on company performance [10], and other studies demonstrated that supply chain management and motivation influence employee performance [11].

Despite these valuable insights, prior research has predominantly focused on manufacturing, general logistics, and commercial industries, with limited attention to supply chain issues in marine safety equipment companies. Existing studies discuss procurement efficiency, distribution flows, digitalization, and sustainability, yet rarely within the context of medium-scale maritime safety equipment suppliers. Consequently, research addressing the specific operational challenges faced by companies such as CV Bandar Bahari particularly those involving inventory inconsistencies, manual processes, limited delivery routes, low technological integration, and declining customer satisfaction remains scarce.

Addressing this gap, the novelty of this study lies in its specific and comprehensive analysis of the current supply chain conditions for marine safety equipment at CV Bandar Bahari. The study integrates an in-depth assessment of the Plan, Source, Make, Deliver, and Return processes; an evaluation of supply chain sustainability across economic, social, environmental, and technological dimensions; and a measurement of customer satisfaction using the Customer Satisfaction Index (CSI) and Importance Performance Analysis (IPA). By combining phenomenological qualitative methods with quantitative analysis, this research provides a holistic understanding of how supply chain conditions affect operational performance and company productivity. Such an approach is still rarely applied in maritime safety equipment supply chain studies, positioning this research as a valuable theoretical and practical contribution to supply chain optimization in the maritime industry.

2. Research Method

This study employs a case study design using a mixed-method approach that combines qualitative and quantitative techniques. The research focuses on CV Bandar Bahari and examines the supply chain processes related to marine safety equipment to understand how these systems influence company productivity. The qualitative component adopts a phenomenological case study to explore real conditions within the company's supply chain operations, while the quantitative component measures customer satisfaction and performance indicators.

Data were collected through interviews, observations, documentation reviews, and questionnaires. The qualitative data were obtained from semi-structured, in-depth interviews with three purposively selected employees who are directly involved in the company's supply chain activities. Interviews were supported by direct observations of operational procedures and reviews of internal documents related to supply chain management. Secondary data were gathered from company records and relevant literature. Quantitative data were collected through structured questionnaires distributed to customers and supply chain partners to measure their perceptions of supply chain performance and satisfaction levels.

Qualitative data were analyzed using Interpretative Phenomenological Analysis (IPA), which involves repeated reading of transcripts, exploratory notes, identifying emerging themes, and connecting patterns across cases. Quantitative data were analyzed using the Customer Satisfaction Index (CSI) to measure overall satisfaction and the Importance–Performance Analysis (IPA) model to identify service attributes that require improvement. The CSI method evaluates satisfaction based on the importance and performance scores of specific attributes, while the Importance Performance grid helps visualize priority areas for managerial action. Through the integration of qualitative insights and quantitative measurements, this mixed-method approach provides a comprehensive understanding of how supply chain optimization can enhance company productivity.

3. Result and Discussion

3.1. Instrument Validity and Reliability Test

This instrument testing is conducted to examine the validity and reliability of the questionnaire, as well as to perform a descriptive analysis of each item distributed to the users of CV Bandar Bahari's services. The validity test is used to determine the extent to which the measurement tool accurately reflects the respondents' actual conditions. Results of the validity test for the supply chain management situation questionnaire will be presented in Table 1.

Table 1. Results of the Validity Test for the Supply Chain Management Situation Questionnaire

Indicator	r value	r table	Description
Plan	0.482	0.210	Valid
Source	0.704	0.210	Valid
Make	0.686	0.210	Valid
Deliver	0.693	0.210	Valid
Return	0.613	0.210	Valid

The results of the validity test for the supply chain management questionnaire show that the calculated r-value is higher than the r-table value. This indicates that all indicators of the supply chain management situation are valid. Results of the validity test for the sustainable supply chain management questionnaire can be seen in Table 2.

Table 2. Results of the Validity Test for the Sustainable Supply Chain Management Questionnaire

Indicator	r value	r table	Description
Economy	0.658	0.210	Valid
Social	0.771	0.210	Valid
Environment	0.757	0.210	Valid
Technology	0.646	0.210	Valid

The results of the validity test for the sustainable supply chain management questionnaire show that the calculated r-value is higher than the r-table value. This indicates that all indicators of sustainable supply chain management are valid. Results of the validity test for the sustainable supply chain management strategy questionnaire which will be presented in Table 3.

Table 3. Results of the Validity Test for the Sustainable Supply Chain Management Strategy Questionnaire

Indicator	r value	r table	Description
Supply Chain Strategy	0.758	0.210	Valid
Asset & Facility	0.716	0.210	Valid
Human Resource	0.636	0.210	Valid
Information, Communication & Technology	0.762	0.210	Valid

The results of the validity test for the sustainable supply chain management strategy questionnaire show that the calculated r-value is higher than the r-table value. This indicates that all indicators of sustainable supply chain management are valid. The reliability test is indicated by a Cronbach's Alpha (CA) value greater than 0.60, meaning that the survey is considered reliable. The results of the reliability test are presented in Table 4. The Cronbach's Alpha values for each variable are above 0.60, indicating that all variables are considered reliable and can be used.

Table 4. Reliability Test

Variable	Cronbach's Alpha	Description
Supply Chain Management Situation	0.637	Reliable
Sustainable Supply Chain Management	0.659	Reliable
Sustainable Supply Chain Management Strategy	0.678	Reliable

3.2. Descriptive Analysis

The descriptive analysis presents the mean and standard deviation of each questionnaire item. This analysis illustrates the current supply chain management situation at CV Bandar Bahari and the strategies that can be implemented to establish a sustainable supply chain management system. The descriptive analysis of CV Bandar Bahari's service users is presented in the Table 5.

Table 5. Descriptive Analysis

Variable	Total	Mean	Std. Deviation
Service Users			
Supply Chain Management Situation	150	19.65	2.235
Sustainable Supply Chain Management	150	16.13	2.054
Sustainable Supply Chain Management Strategy	150	15.52	2.019
Internal			
Supply Chain Management Situation	5	20.80	2.387
Sustainable Supply Chain Management	5	18.00	0.000
Sustainable Supply Chain Management Strategy	5	16.00	1.225

Based on the table above, it is known that there are 150 service-user respondents and 5 internal respondents. The questionnaire on the supply chain management situation shows an average score of 19.65 for service users and 20.80 for internal respondents. The sustainable supply chain management questionnaire shows an average score of 16.13 for service users and 18.00 for internal respondents. The sustainable supply chain management strategy questionnaire shows an average score of 15.52 for service users and 16.00 for internal respondents. These results indicate that the average scores from internal respondents are higher than those from service users.

3.3. Average Data Scoring

The average values of each indicator in both the performance dimension (Sustainable Supply Chain Management/P) and the expectation dimension (Sustainable Supply Chain Management Strategy/I) will be used for the Customer Satisfaction Index (CSI) analysis. The average scoring values are presented in the Table 6.

Table 6. Average Scoring Data

Indicator	Management/P	Strategy/I
Economy	4.23	3.79
Social	4.10	4.03
Environment	3.96	3.84
Technology	3.86	3.87

Based on the scoring results in Table 15, the minimum score of 3.84 appears in the expectation dimension under the environmental indicator, while the maximum score of 4.23 appears in the performance dimension under the economic indicator. These results indicate that Sustainable Supply Chain Management falls within the range of >3 and <5, meaning that it is considered fairly important to important in the current situation, and fairly satisfactory to satisfactory in terms of the applied strategies.

The average scoring results in Table 15 were then used to calculate the difference between each item, referred to as the Service Quality gap. The complete results are presented in Table 16. Table 16 shows the gap produced for each management indicator. A score of **0** indicates no service gap, a positive score indicates that the management performance is satisfactory, and a negative score indicates a problem in the management process. The overall average is derived from the total mean values of the performance indicators (P) and expectation indicators (I). The resulting value is positive, which means that the service quality is generally above average. The service quality scores are shown in the Table 7.

Table 7. Service Quality Scores

Indicator	Management/P	Strategy/I	Gap
Economy	4.23	3.79	0.44
Social	4.10	4.03	0.07
Environment	3.96	3.84	0.12
Technology	3.86	3.87	-0.03

Based on the table above, it is shown that the four indicators used in this study economic, social, environmental, and technological each exhibit a gap. The technological indicator shows a negative gap, indicating that both the current sustainable supply chain management and the applied strategies related to technology are experiencing problems.

3.4. Customer Satisfaction Index

The Customer Satisfaction Index (CSI) is used to determine the overall level of customer satisfaction by considering the importance of each product or service attribute, expressed as the percentage of customers who are satisfied in a customer satisfaction survey. Customer Satisfaction Index which will be presented in Table 8.

Table 8. Customer Satisfaction Index

Indicator	Management/P	Strategy/I	Score = P × I
Economy	4.23	3.79	16.00
Social	4.10	4.03	16.51
Environment	3.96	3.84	15.21
Technology	3.86	3.87	14.85
Total	2419		62.57

The results of the CSI calculation will be presented in Equation (1).

$$CSI = \frac{Score\ Total}{5(Total\ Management)} \times 100\% \qquad (1)$$

$$CSI = \frac{62{,}57}{5(2419)} \times 100\%$$

$$CSI = 51{,}73\%$$

The obtained CSI value is 51.73%**,** indicating that service users are fairly satisfied with the performance of

the current system. To achieve a higher level of satisfaction in the future, CV Bandar Bahari must improve the management aspects that have not yet met user expectations.

3.5. Index Performance Analysis (IPA)

The Importance Performance Analysis (IPA) links the level of importance of an attribute (importance) with the actual performance perceived by users (performance). Based on the IPA results, which can be seen on Table 9, the economic indicator (supply chain strategy), the social indicator (assets and facilities), and the environmental indicator (human resources) show inefficiencies within CV Bandar Bahari. Furthermore, the technological indicator becomes the top priority for improving supply chain service performance. Cartesian Diagram of CV Bandar Bahari which will be presented in Figure 1.

Table 9. Index Performance Analysis

Indicator	Management/P	Strategy/I	IPA
Economy	4.23	3.79	P > I
Social	4.10	4.03	P > I
Environment	3.96	3.84	P > I
Technology	3.86	3.87	P < I

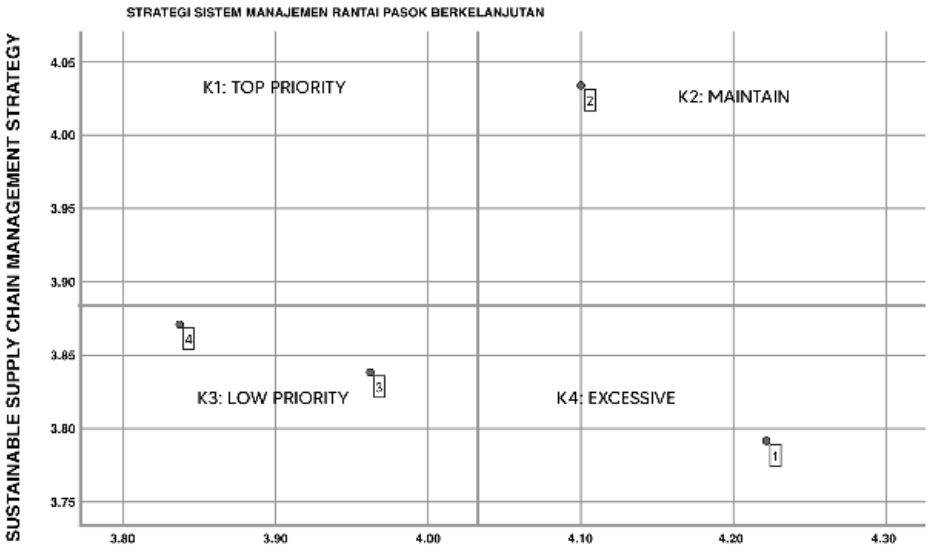

Figure 1. Cartesian Diagram of CV Bandar Bahari

3.6. Interpretative Phenomenological Analysis (IPA)

Five participants who met the research criteria were interviewed. The analysis of the interview transcripts identified one overarching theme, five superordinate themes, and two specific themes.

3.6.1. Supply Chain Management Situation

To understand the current condition of the marine safety equipment supply chain at CV Bandar Bahari, this study analyzes the supply chain management situation based on the five key elements of the SCOR model, namely Plan, Source, Make, Deliver, and Return, as presented in the Table 10.

Table 10. Supply Chain Management Situation

Overarching Theme	Superordinate Theme	Result
Supply Chain Management Situation	Plan	The supply chain planning process—from supplier demand to customer orders begins with customer purchase requests. The PPIC then submits raw material requirements to suppliers. Once materials arrive, production begins, followed by the delivery process.
	Source	Limited human resources result in multiple tasks being handled by a single individual at CV Bandar Bahari, leading to neglected systems and reduced operational effectiveness.
	Make	The disposal of solid and liquid waste indicates that the supply chain system does not adequately support environmentally friendly production practices at CV Bandar Bahari.
	Deliver	Delivery activities show efforts by CV Bandar Bahari to ensure timely shipment of goods to customers.
	Return	Return processes are delayed because shipments must follow aligned delivery routes. Insufficient manpower also leads to delayed communication and slow processing of returns.

This study found that the relationship between CV Bandar Bahari and its suppliers is hindered by inconsistencies in fulfilling supply agreements and weak communication resulting from manual systems, leading to suboptimal coordination and information flow. This finding is consistent emphasizes that trust, commitment, and satisfaction significantly influence supply chain performance in the maritime sector [12], and is further

supported, that strong communication and trust enhance service flexibility and customer relationships [13]. In contrast, CV Bandar Bahari exhibits limited structured communication, compounded by human resource constraints and suboptimal waste management practices, aligning who explains that weaknesses in raw materials, production facilities, warehousing, and consumption patterns reduce supply chain efficiency [14]. In the distribution aspect, reliance on undocumented telephone communication causes routing errors, delivery delays, and return process disruptions, reinforcing findings that logistical inefficiencies increase operational costs and reduce supply chain reliability [15]. Additionally, delays in raw material supply and product delivery are exacerbated by low levels of digitalization, who notes that the maritime sector continues to face resistance to digital transformation, limiting supply chain integration and information transparency [16].

3.6.2. Sustainable Supply Chain Management System

To assess the extent to which CV Bandar Bahari has implemented sustainability principles within its supply chain, this study evaluates the sustainable supply chain management system across four key dimensions: economic, social, environmental, and technological. Each dimension is examined using indicators that reflect cost efficiency, regulatory compliance, waste management, and the utilization of energy and technology.

As summary of the sustainability status of the company's supply chain, the sustainability status of CV Bandar Bahari's supply chain is assessed through economic indicators such as cost reduction in materials and consumption, waste management efficiency, and improved return on investment. These efforts involve cost analysis, regulatory compliance, and adherence to safety-equipment supply chain standards. The environmental dimension is considered "near sustainable," reflected in ongoing efforts to reduce solid waste, wastewater, and air emissions from production activities. Meanwhile, the technology sustainability indicator shows moderate progress, particularly in improving energy savings through conservation measures and more efficient technological practices.

The sustainability analysis of CV Bandar Bahari indicates that the four main dimensions that is economic, social, environmental, and technological-are not yet fully integrated into the company's supply chain practices. In the economic dimension, the company is categorized as "almost sustainable" due to efforts in raw material cost efficiency and waste management aimed at improving Return on Investment (ROI), although the consistency of implementation still depends on internal responsiveness and negotiations with suppliers. These findings align emphasized the importance of cost optimization, logistics flow, and meeting customer requirements to maintain supply chain stability [8], as who indicated that Maritime Green Supply Chain Management (MGSCM) effectively promotes economic sustainability when environmental and social issues are addressed from the outset [17].

In the social dimension, sustainability still needs to be strengthened through compliance with regulations, including Law No. 17 of 2008 on Shipping and the Safety of Life at Sea (SOLAS), as well as the implementation of audits and sanctions as control mechanisms. This is consistent who stated that the maritime sector is shifting from mere regulatory compliance toward integrating sustainability as a core business strategy, including through stronger supplier relationships and sustainable service standards [18][19].

In the environmental dimension, the "almost sustainable" status is reflected in efforts to reduce solid waste and utilize liquid waste, although waste management is not yet systematic. This aligns with who emphasized that emission reduction, transportation mode optimization, and Green Supply Chain Management (GSCM) practices are crucial elements for improving environmental performance in maritime logistics, even though their implementation is often inconsistent [20][21].

In the technological dimension, the company has not yet fully utilized modern technology and energy efficiency, making increased digitalization and automation an urgent need. Digitalization including real-time tracking, data analytics, and automation is a key foundation for building a responsive, transparent, and customer-centered maritime supply chain [22]. The delayed adoption of technology is also evident in the lack of system integration and energy conservation, that technology-lagging maritime companies tend to meet only minimum standards without achieving true sustainability performance [21]. Overall, CV Bandar Bahari remains in a transitional stage toward a sustainable supply chain. The complexity of maritime supply chains requires multi-criteria management covering cost, time, emissions, and reliability as well as the implementation of a more structured green supply chain model to reduce uncertainty and enhance operational efficiency [23].

3.6.3. Sustainable Supply Chain Management System Strategy

To formulate efforts that support the improvement and sustainability of the supply chain at CV Bandar Bahari, this study identifies several strategic directions derived from interviews and data analysis. These strategies encompass supply chain strategy alignment, asset and facility enhancement, human resource development, and improvements in information, communication, and technology systems.

The sustainable supply chain strategy implemented by CV Bandar Bahari encompasses several key

components: supply chain strategy alignment, enhancement of assets and facilities, strengthening of human resources, and improvements in information, communication, and technology systems. Sustainable supply chain management system for marine safety equipment at CV Bandar Bahari should focus on four main dimensions: supply chain strategy, assets and facilities, human resources (HR), and information, communication, and technology. The supply chain strategy dimension involves the formulation of policies, planning, and control of the supply chain aligned with the company's vision and mission. Although the existing strategies have been formulated, their implementation is not yet optimally structured, which limits the effectiveness of the supply chain in supporting company productivity. Strengthening standard operating procedures (SOPs), coordinating with suppliers and customers, and integrating Lean, Green, and Agile practices are strategic measures to enhance flexibility, efficiency, and reduce operational costs, in line in the context of maritime supply chain management [24], [25].

The assets and facilities dimension are crucial for ensuring smooth production processes. The study shows that upgrading production machinery and work tools can accelerate production, reduce accident risks, and prevent losses due to production failures, in accordance with company regulations and SOPs. The importance of implementing energy-efficient technologies and renewable energy to support operational sustainability and minimize environmental impact [26].

The human resources dimension is also a key factor. The Purchasing Division at CV Bandar Bahari is responsible for activities ranging from ordering to communication with suppliers and customers. Interviews indicate the need to improve HR quality through training and coaching to effectively perform supply chain management functions. The using Internet technologies in maritime supply chain management requires competent personnel to manage data, increase flexibility, and reduce operational costs [25]. The implementation of Lean, Green, and Agile practices requires trained HR capable of effectively leveraging technologies such as IoT, Big Data, and Blockchain, fostering a sustainable supply chain culture [24].

The aspect of information, communication, and technology represents the next key pillar in supply chain management. Currently, recording and documentation at CV Bandar Bahari are still largely conducted manually, often causing delays in decision-making and feedback provision. The use of Internet technology in maritime supply chains enables real-time performance monitoring, fault detection, and strategy adjustments in response to operational cost dynamics [25]. The role of the Internet of Things (IoT) in supporting real-time monitoring, process automation, and information sharing among stakeholders to enhance supply chain efficiency [27]. That digitalization including the implementation of digital twins, can improve operational efficiency and productivity optimization while minimizing risks in the maritime sector [28]. The digital technology enables more accurate logistics and product monitoring and supports faster decision-making [29].

In addition, the concept of smart ports and the integration of Industry 4.0 technologies have proven to enhance operational efficiency, safety, and environmental sustainability. Supply chain digitalization and smart ports allow the integration of advanced technologies to strengthen efficiency and environmental sustainability [30]. The implementing Industry 4.0 technologies supports business model innovation, new product development, and collaboration among stakeholders within the supply chain. This digital transformation also requires changes in human resource behavior and the development of a digital culture through technical and managerial training to ensure that technology can be fully utilized [31].

Integrating sustainability principles is an additional strategic focus. The sustainable supply chain management strategy at CV Bandar Bahari not only aims to improve productivity but also integrates environmental, social, and economic aspects, from raw material procurement to final product distribution. Such practices minimize negative environmental impacts, ensure ethical business conduct, and improve operational efficiency. That sustainability in maritime transportation is increasingly critical, particularly in managing procurement and supply chain relationships [18], while that implementing Lean and Green practices supports building a sustainable supply chain culture in shipbuilding sectors [24].

In conclusion, while sustainable supply chain management strategies at CV Bandar Bahari have been implemented, their application is not yet optimal. Improvements should focus on refining supply chain strategies, enhancing assets and facilities, developing competent HR, leveraging digital technologies and IoT, and integrating environmental, social, and economic sustainability principles. This combination of strategies is expected to increase company productivity, operational efficiency, supply chain resilience, and support sustainable digital transformation.

4. Conclusion

Based on the findings, the study concludes that the current distribution and supply chain management of marine safety equipment at CV Bandar Bahari still faces significant challenges. The system remains largely manual, with limited technological support, insufficient human resources, and delivery and return processes that depend on specific routes, resulting in operational delays. Supply chain performance also indicates the need for technological enhancement and improved

human resource capacity, particularly in environmental management, although the company has already implemented cost-reduction efforts and established basic SOPs. To achieve an ideal and sustainable supply chain system that supports higher productivity, the company must prioritize workforce expansion and technological strengthening. These improvements are essential for ensuring accurate documentation, increasing efficiency, and optimizing overall productivity.

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