Enhancing Competitiveness of Ready Made Garment Small-Medium Enterprises through Logistics Performance Measurement Using SCOR Method

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***Abstract*—Performance measurement is one of the things that are important in the process of continuous improvement. Performance measurement method used in this study is the SCOR (Supply Chain Operations Reference). Fuzzy AHP calculation used to calculate criteria weights, they are: Reliability, Responsiveness, Agility, Cost and Asset Management. Based on the calculation of logistics system performance assessment at SME XYZ obtain performance measurement results of 99% (Excellent), and there are attributes that can be repaired is Additional Delivery Volume.**

Keywords: performance measurement, supply chain, logistic system, SCOR, fuzzy AHP

I. INTRODUCTION

Competition between products that occurred in Indonesia is very strict, beside to competing with domestic products, Indonesia product also have to compete with imported products. This is because Indonesia has signed free trade AFTA (ASEAN Free Trade Area), which has been signed since 2003, ACFTA (ASEAN China Free Trade Area) in 2010, and MEA in 2015.

Agenda MEA (ASEAN Economic Community) requires Indonesia to have high competitiveness as a provider of textile products. This is because the MEA aims to minimize the constraints in economic activity across the region.

Indonesia had to work hard to exceed the competition and to survive, and compete in both the national and international markets, thus its main products are hosted in their own country. [1]

SMEs have different characteristics with big companies. The difference is partly related to the resource, the number of customers, strategy, and corporate structure. SME has a number of resources and the number of fewer customers, operating in a limited market, the structure is flat and flexible, and have a strategy that is informal and dynamic compared to large companies [2]. Given the performance measurement approach that is currently being developed by a big company background, application of performance measurement approach for SME context requires a number of adjustments.

This research will be conducted performance measurement of supply chain management in the logistics system SME XYZ that produces readymade garment especially for women. The method used in this research is the future SCOR is expected to help and make suggestions on the SME in improving their performance and determine which indicators are in need to be improve by recommendations.

II. OBJECTIVES

The objectives of this research are: (1) Assess the performance measurement of the supply chain on the logistics system in every SME, (2) Identify any indicators that has not reached the target and in need to be improve, and (3) Provide recommendations for improvements in the indicators that under the target.

III. THEORITICAL BACKGROUND

A. State of The Art

Base on observation findings show that barriers to SMEs [3] in accessing productive resources contained in the financing and marketing (64,29%), business networks (57,14%) and technology (42,86%). That condition requires accompaniment as an effort to improve SMEs' access to productive resources.

A research that used SCOR as performance indicator at textile garment industry [4]. This research used 29 industries, 10 industries from Columbia dan 19 industries from South

China. It defined two variables, there are performance and demand fluctuation. Demand fluctuation came from costumer's order to supplier. Result of this research are: (1) Connection between and among textile suppliers, (2) Demand fluctuation has a high influence to supplier and textile garment performance, (3) It has a few unique differences between supplier and textile garment industry.

A research on retail in SCOR [5]. They built a framework of retail enterprise supply chain risk management based on SCOR. Retail enterprise is an important actor in supply chain. This research determined the risk factors in retail enterprise, there are: (1) Based on planning process: retailers demand forecast, (2) Based on procurement process: purchase price, exchange rate fluctuation, supplier selection, procurement of quality goods, and asymmetric information, (3) Based on sales process: uncertainty demand and the environment exchange, (4) Based on distribution process: the instability of the process, delivery delays, and (5) Based on returned processes: risk of product quality risk dan risk of service quality.

Research conducted based on performance assessment [6] entitled "Implementing the SCOR Model Best Practices for Supply Chain Improvement in Developing Countries" states that some companies in developing countries adopt best practices to improve their industrial performance. It is done to increase the productivity in their industrial operations. But what happens is best practice implementation is not in accordance with the environmental conditions the industry is.

Other studies related to the performance assessment [7] entitled "Aligning the Supply Chain Operations Reference (SCOR) Model with Enterprise Applications: Real-time Value Chain Intelligence" stated the integration of products, processes, and information. Global business environment is very complex and rapidly changing, thus affecting customer demand.

Technological advances force companies utilize optimally information system. So that coordinated with suppliers, partners and customers. It is very real challenges of effectively using information technology to identify, communicate and continuously improve internal and external processes of companies. This study uses the Supply Chain Operations Reference (SCOR) model as a methodology for process management.

B. Privious Research

Conducted research titled "Improvement of Competitiveness of Small and Medium Industries Commodities Textile and Textile Product Derivatives in West Java through Development Information System Web-Based for Production Planning and Control Integrated" managed to identify problems that some textile SME yet have a standard method in planning order materials to the supplier, the impact industry is not able to meet an increasing demand from consumers, and often there is excess materials resulting accumulate working capital in warehouse inventory [1].

Distribution planning system has been used in previous research by DRP. DRP model helped SME preparing number of release and receipt order. Time and quantity are the main factors in DRP [8].

Published paper base on previous research in title "Planning Route Distribution of SME DM using The Methods Vehicle Routing Problem (VRP) and Shourtest-Route Algorithm" shown that SME has not default delivery route by optimization. This research conducted route and distance optimization by VRP and shourtest-Route Algorithm [9].

Preliminary research has been done with the title "Model of Business Plan Development Policy Small and Medium Industries Textile Commodities Textile in the county and the city of Bogor" stated that SME's problem is the continuity of the industry existence.

The first previous research [10] concluded that the constraints experienced by SME Textile and Clothing Industry is the capital, marketing and understanding the concept of development of new products. The second previous research [11] developed SME Textile and Clothing Industry scenarios with dynamic system simulation approach by using software Powersim 2000.

IV. RESEARCH METHOD

This research was preceded by a previous research conducted from literature study. First step of this research is assess the performance measurement of the supply chain on the logistics system in SME. The performance measurement is conducted base on mapping SCOR metrics first, second and third level. To determine SME performance, fuzzy AHP used to calculate the percentage weight of criteria.

The score that below performance target are identify based on gap analysis. And then, this research goes to find out the main problems using root cause analysis. And finally, this research will give recommendations to SME. Research method is shown on Figure 1.

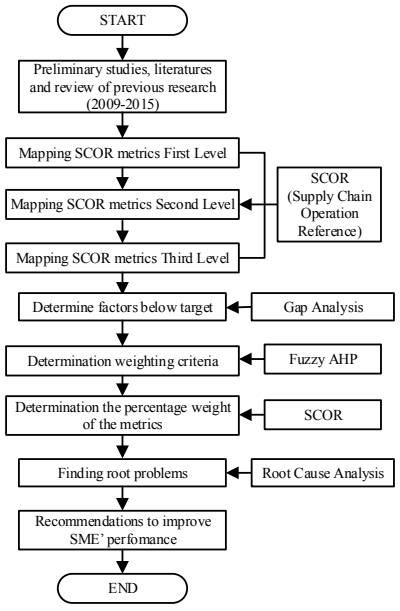

FIGURE 1. RESEARCH METHOD

V. RESULT

A. PERFORMANCE MEASUREMENT OF LOGISTIC

SCOR model divides the supply chain processes into five core processes: plan, source, make, deliver and return. In this research, the five processes can be described as follows: (1) Plan (Planning). The owners of SMEs planning that covers the needs of distribution and make adjustments to the existing financial condition; (2) Source (Procurement). The owners of SMEs activities in Bandung purchase of raw materials and pay directly at the time of purchase of raw materials; (3) Make (Production). This type of process in SME XYZ is make-to - order for SMEs XYZ make products according to the number of orders from customers; (4) Deliver (Shipping).

SME XYZ make delivery of finished goods after the goods of ABC Collection Bandung to SMEs and consumers have to make a payment in advance; and (5) Return (Return) This SME does not scheduled the return. Figure 2 is shown SME XYZ business process.

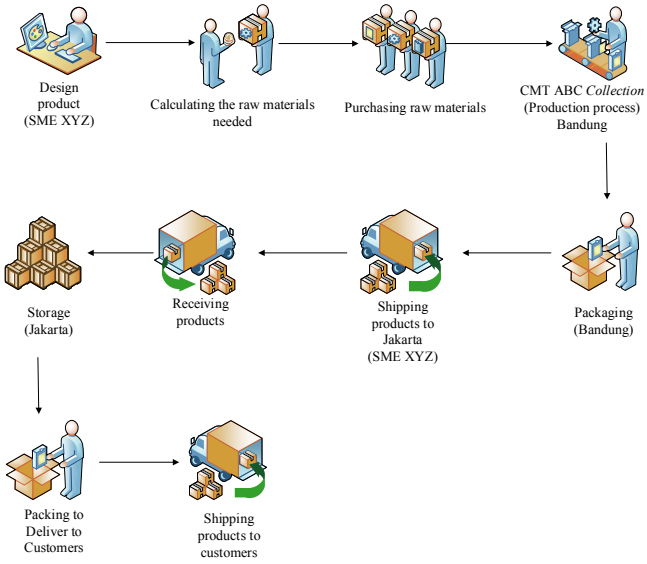

FIGURE 2. SME XYZ BUSINESS PROCESS

Mapping the business process of logistics by using SCOR metrics first, second and third level is shown by Table 1.

Matrix pairwise comparison that used to determine the weighting criteria, so the performance measurement can be identify. Matrix pairwise comparison is build based on Fuzzy AHP. Thus, we must use the linguistic scale based on triangular fuzzy number. Table 2 is shown the matrix.

TABLE 2. MATRIX PAIRWISE COMPARISON

	Reliability	Responsiveness	Agility	Cost	Asset Mgt
Reliability		E	W	E	W
Responsiveness			W	E	E
Agility				E	W-1
Cost					W
Asset Management					

The eigenvalues from the calculation criteria for Reliability (0,2514), Responsiveness (0.2541), Agility (0.1346), Cost (0.2227), and Asset Management (0.1344). We may use these values, because they have consistency index 0,0721 or below 0,1.

Percentage performance in SME XYZ is at 99 %, it means that the SME included into the category Excellent as a result of performance is at a value >90. And, the percentage of the metrics is 25% (Reliability), 25% (Responsiveness), 12% (Agility), 23% (Cost), and 13% (Asset Management). This means that the most prioritized metrics is Reliability and Responsiveness.

B. RECOMMENDATIONS

Only one problem that occurred in the SME XYZ, it is additional delivery. The first factor that affects the problem is the method, SMEs does not use forecasting methods that used to predict the amount of products at any time if there is any additional order.

The next factor is the man, the constraint of human knowledge about forecasting. For money factors, the constraint of cost limitations for adding items. For material factors, the constraint of the limited number of raw materials to make additions goods, because the owner only buy raw materials based on customer demand. Rootcause additional delivery volume diagram contained in Figure 3.

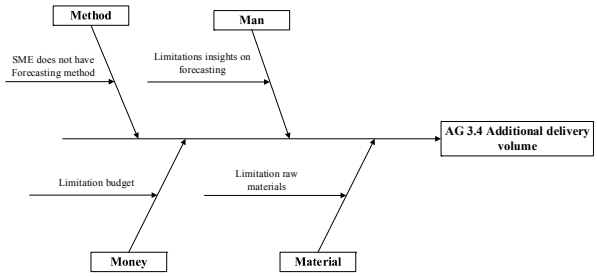

FIGURE 3. ROOTCAUSE ANALYSIS

Recommendations to improve the SME is save an additional stock of products from other types of apparel Valisha. For this type of apparel that can be done adding the stock, can be any type of clothing that is most in demand by consumers, so it can be met if there is additional shipments for the same type so there is no shortage. IKM Valisha can do forecasting method to predict the demands.

VI. CONCLUSION

The results of performance measurement of supply chain logistics system in SME XYZ is at 99%, the percentage included into the category of Excellent for the value of supply chain performance is at a value >90%. In addition, there is at level 3 attribute whose value is consistently below 99% so as not to reach the target is Agility for attribute Deliver Additional Volume (59%).

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TABLE 1. SCOR METRICS FIRST, SECOND AND THIRD LEVEL

Goal	%	Matrik	%	Level 1	%	Level 2	%	Level 3	%
Logistic Syatem	99%	Reliability	25%	RL 1.1 Perfect Order Fulfillment	100%	RL 2.2 Delivery Performance to Customer	100%	RL 3.34 Delivery Location Accuracy	100%
								RL 3.32 Customer Commit Date Achivement Time Customer Receivir	100%
		0.2541				RL 2.4 Perfect Condition	100%	RL 3.41 Orders Delivered Damage Free Conformance	100%
								RL 3.42 Orders Delivered Defect Free Conformance	100%
		Responsiveness	25%	RS 1.1 Order Fulfillment Cycle Time	100%	RS 2.1 Source Cycle Time	100%	RS 3.112 Schedule Product Deliveries Cycle Time	100%
								RS 3.8 Authorize Supplier payment Cycle Time	100%
		0.2541				RS 2.3 Deliver Cycle Time	100%	RS 3.126 Ship Product Cycle Time	100%
								RS 3.51 Load Vehicle & Generate, Shipping Documentation Cycle Ti	100%
		Agility	12%	AG 1.2 Upside Supply Chain Flexibility	90%	AG 2.8 Upside Deliver Flexibility	80%	AG 3.32 Current Deliver Volume	100%
								AG 3.4 Additional Deliver Volume	59%
		0.1346				AG 2.10 Upside Deliver Return Volume	100%	AG 3.31 Current Deliver Return Volume	100%
								AG 3.3 Additional Deliver Return Volume	100%
		Cost	23%	CO 1.1 Total Supply Chain Management Cost	100%	CO 2.4 Cost to Deliver	100%	CO 3.172 Quantity per Shipment	100%
								CO 3.188 Transportation Costs	100%
		0.2272				CO 2.5 Cost to Return	100%	CO 3.131 Cost to Source Return	100%
								CO 3.35 Cost to Deliver Return	100%
		Asset Management	13%	AM 1.1 Cash to Cash Cycle Time	100%	AM 2.1 Days Sales Outstanding	100%	AM 3.34 Percentage Excess Inventory in Transportation	100%
								AM 3.32 Percentage Defective Production Inventory in Transportati	100%
		0.1344				AM 2.2 Days Payable Outstanding	100%	AM 3.11 Deliver Fixed Asset Value	100%
								AM 3.12 Deliver Return Cycle Time	100%
		1.00							