Assessment of Green Supply Chain Management Implementation using Green SCOR Approach: Batik SME Tourism Jarum Village, Klaten

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Abstract: Batik is an artwork that has a high value. In 2009, the United Nations Educational, Scientific and Cultural Organization (UNESCO) established batik as a world cultural heritage. This has an effect on the increasing demand for batik production. Increasingly production of Batik is also contributing to the environmental problem due to the waste. Batik and textile industry is one of the producers of liquid waste originating from the coloring process. Besides the highly color substance, industrial waste from Batik and textile also consist of murky and thick synthetic materials. This colored liquid waste is the reason for the environmental problem. The color of liquid waste that was produced by a small textile industry mostly is a non-degradable organic compound that causes environmental pollution, especially water. The aim of this research is to implement Batik Green Supply Chain Management on Tourism Jarum Village SME, Klaten to obtain a percentage of 69% which means it includes into the good category. This study uses a quantitative method with the type of research is applied research, with there are 28 Batik SMEs as the respondents. The analytical method used is with Important Performance Analysis (IPA). The results showed that in performance the implementation of Green Supply Chain Management in the UKM Batik Jarum Tourism Village, Klaten received a percentage of 69% which means it was in a good category. The results of the analysis using the IPA method show that there are 5 statements that are the company's top priorities in making improvements, namely P4, P7, P9, P10, and P25.

1 INTRODUCTION

In order to participate in the sustainable development, SME sector must have capability to produce a qualified product and one with excellent competitiveness and innovation so that it can lead to consumer satisfaction and good effects on the environment, so that it is necessary for a step to produce a green product starting from production and until to consumers.

From results of a research conducted by Nurdalia in Santosa, Susanty & Tania (2017), there is an ineffective use of wax in the batik production stage, since there is spilled remaining wax or mark of used wax in the batik process that cannot be used anymore. There is an ineffective use of dye due to an error in the weighting of the amount of required dye, attaching or sediment in the used place, or spilled coloring place when it is poured.

Wax use inefficiencies are approximately 60%, the use of dyes ranges from 0.07% to 54.58% per year, and water use is estimated at between 10% and 30% per year. This inefficiency will aggravate environmental performance due to the high level of waste released as Non-Product Output (NPO). In addition, there is also another arising negative effect namely wastewater from the process of making batik containing Biological Oxygen Demand (BOD) of 366.45 kg/day, Chemical Oxygen Demand (COD) of 620.4 kg/day and Total Suspended Solid (TSS) of to 83.9 kg/day. In addition, wastewater originating from the process of batik production also produces oil fats of 0.0000108 kg/day and CNH-N of 0.0004431 kg/day (Suhartini, 2012).

Based on interviews conducted with consumers from natural batik pioneers in Jarum Tourism Village, there are 28 batik SMEs in the batik center, and 10 of them are environmentally friendly batik SMEs. Ten batik entrepreneurs in the batik Jarum Tourism village center have applied the Green Supply Chain Management (GSCM) concept. Based on the results

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of interviews with the owner of batik business, he explained that in the process of producing natural batik, a reuse system was used in wax used to do batik, the use of dyes obtained from the furniture industry's wood waste, the use of dyed water is used several times a day, the use of coloring materials is used for several dyeing processes and recycle process in the use of packaging made from recycled paper, coloring waste is used as fertilizer and use of remaining batik patchworks is another valuable product.

By the description, it is expected that each business actor can prepare a program to eradicate any existing negative effects, as described in Law Number 32 of 2009 concerning protection and management of life environment and by the development of consumer awareness on environmental issues requiring company to start to implement friendly environmental regulations, such as implementation of reuse, remanufacturing, and/or recycling in the business implementation. Implementation of various regulations related to environmentally sound aspects in a business is an implementation of Green Supply Chain Management (Djunaidi, Mufid & Sholeh, 2018).

From results of the interview with Mr. Sarwidi as the natural batik pioneer as well as the owner of Batik Natural SME in Tourism, Jarum Village Klaten described that Batik SME in Jarum Village has implemented GSCM practice in the business but for the measurement of GSCM implementation is yet applied. To assess the implementation of GSCM, it can use Green Supply Chain Operation Reference (Green SCOR) approach. Implementation of Green SCOR model can identify supply chain performance indicators showing a company supply chain process so that it can be used as an evaluation to improve company performance (Anggani, Syawarni & Wahyuniardi, 2017)

Thus, it is necessary for batik SME to implement GSCM practice in order to minimize any arising problems in business practices. This research aims to conduct an assessment on the implementation of GSCM practice in Tourism Jarum Village Klaten by making an assessment using Green SCOR approach.

2 RESEARCH METHODS

Population.
According to Sugiyono (2013), a population is a regional generalization consisting of objects/subjects that have certain qualities and characteristics set by researchers to be studied and then drawing conclusions. The populations used in this study are all SME members in Tourism Jarum Village Klaten, namely, there are 28 SMEs.

Samples.
According to Sugiyono (2013), the sample is part of the number and characteristics of the population. In this study, it uses a saturated sampling technique. According to Sugiyono (2013), saturated sampling is a sampling technique if all members of the population are used as samples. This is often done if the population is relatively small, less than 30 or wants to make generalizations with very little errors. So, in this study, researchers use all 28 members of the Batik SMEs in Tourism Jarum Village as the samples.

Data Collection Technique.
According to Sugiyono (2014), Data collection techniques applied in quantitative research can be done by tests, questionnaires, interviews, structured observations. In this study, it uses questionnaires, interviews, observation and literature studies.

Variable Operationalization.
Research variable is an attribute, property or value of people, object or activity with specific variations set by researchers to be studied or drawn a conclusion (Darmawan, 2013) which can be seen in table 1.

Table 1: Variable Operationalization.

Variable Dimension	Indicators
Plan	Plans to minimize harmful energy and material use (P1, P2)
	Plan for control and hazardous material storage (P3, P4)
	Plans for cleaning ordinary waste and hazardous waste (P5, P6)
	Plan for adjustments from all supply chain activities (P7, P8)
Source	Selecting suppliers with a positive environmental record (P9, P10)
	Selecting environmentally friendly materials (P11, P12)
	Determining packaging requirements (P13, P14)
	Determining shipping requirements to minimize transportation and maintenance requirements (P15,P16)
Make	Schedule production to minimize energy consumption (P17, P18)
	Managing waste results during the manufacturing process (P19, P20)
	Managing emissions (air and water) from the manufacturing process (P21, P22)
Deliver	Minimizing the use of packaging material (P23, P24)
	Plan for delivery to minimize fuel consumption (P25, P26)
Return	Schedule of aggregate transportation and shipping to minimize fuel consumption (P27, P28)

Source: Researcher Processing, 2018

According to (Indrawati, 2015) validity shows the extent to which a measuring device can measure what is willing to be measured so that it can be said that higher validity of a measuring instrument will lead to the increasingly possible measuring device to hit the target. In this test, it uses a significance level of 5% ($\alpha = 0.05$) and is obtained r-Table of 0.374. Looking at the results of data processing, it shows that results of the validity test of this study are valid with R arithmetic values greater than R Table (0.374) (R arithmetic > R Table) then the statement is valid and can be understood or accepted by the respondents.

According to Suhartanto (2014), an instrument is said to be a reliable measuring device is it is used to measure similar items to give consistent results. The following table 2 is the results of reliability testing results of questionnaire data from 28 respondents.

Table 2: Results of Reliability Test.

Statements (N of items = 25)	*Cronbach's Alpha*	Notes
Performance	0,943	Reliable
Expectation	0,947	Reliable

Source: Testing Results of *SPSS version 23*, 2018.

Based on the results of questionnaire data reliability test shown in the Table above, the Cronbach's Alpha coefficient is greater than 0.70 which is equal to 0.943, so the category can be said to be reliable.

3 RESULTS AND DISCUSSION

3.1 GAP Analysis

In this study, it is obtained the average results of all statements of performance and expectations. To determine the gap value, it can be seen from the difference between the performance and expectation values. The following is the results of a gap analysis between performance conditions and expectations.

Based on the Table.3, all statements have negative gaps. This indicates that the actual conditions in the field are still not in accordance with the expected conditions.

Table 3: GAP Analysis.

STATEMENTS	PERFORMANCE	IMPORTANCE	GAP
P1	3.64	4.36	-0.71
P2	3.54	4.54	-1
P3	3.54	4.39	-0.86
P4	3.25	4.5	-1.25
P5	3.46	4.64	-1.18
P6	3.89	4.39	-0.5
P7	3.07	4.57	-1.5
P8	2.68	4.39	-1.71
P9	3.07	4.46	-1.39
P10	3.00	4.46	-1.46
P11	3.68	4.43	-0.75
P12	3.43	4.36	-0.93
P13	3.61	4.36	-0.75
P14	3.46	4.46	-1
P15	3.18	4.29	-1.11
P16	3.36	4.36	-1
P17	3.64	4.46	-0.82
P18	4.14	4.43	-0.29
P19	3.54	4.54	-1
P20	3.79	4.54	-0.75
P21	2.61	4.39	-1.79
P22	3.04	4.39	-1.36
P23	4.04	4.46	-0.43

Source: Researchers' Processing Results, 2018.

3.2 Important Performance Analysis

According to Hideki & George (2011), Important Performance Analysis (IPA) is an evaluation tool used to determine attribute priority that must be corrected and can be used as guidelines in strategic development". In addition, it is also explained that the two-dimensional science model is divided into 4 quadrants with importance on x-axis and performance on the y-axis as the following figure 1.

Based on the Cartesian diagram Figure, it is obtained results of variable mapping based on its priority scale with IPA method as follow:

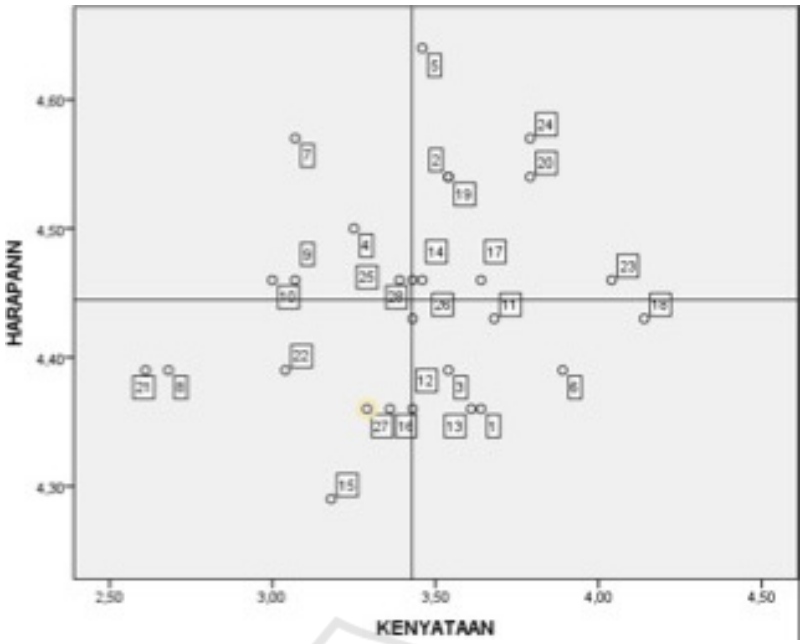

Figure 1: Cartesians diagram of importance performance analysis. (Source: Testing results of SPSS version 23, 2018).

I-Quadrant.
The existing attributes in this quadrant represent necessary areas to be improved by being the top priority as follows:
(P4) SMEs implement an environmental management system; (P7) SMEs plan for coloring waste treatment; (P9) SMEs choose suppliers that produce environmentally friendly waste; (P10) SMEs choose suppliers who implement environmental management systems in their production processes; (P25) SMEs are scheduling deliveries directly to consumers to reduce overall transportation

II-Quadrant.
The existing attributes in this quadrant represent the company strengths and pillars, the following is the company prides, namely:

(P2) SMEs plan to reduce hazardous materials in the production process; (P5) SMEs calculate the amount of waste produced from the production process; (P14) SMEs use recyclable packaging; (P17) SMEs make production schedules to minimize energy consumption; (P19) SMEs recycle produced dye waste during the production process; (P20) SMEs recycle produced fabric waste during the production process; (P23) SMEs do not use plastic packaging in each product unit; (P24) SMEs do product packaging using reusable materials

III-Quadrant.
The attributes in this quadrant are considered not important and result in no treats for the company, as follow:

(P8) SMEs plan the implementation of WWTP; (P15) SMEs choose the shortest route in the process of raw material transportation; (P16) SMEs reduce the use of transportation fuels by using vehicles based on the company demand capacity; (P21) SMEs manage the results of waste water in the production process with the presence of WWTP; (P22) SMEs switch from the use of wood to gas in the batik process in order to reduce air pollution; (P27) SMEs make delivery scheduling according to slots.

IV-Quadrant.
This quadrant shows any attributes with much pressure given by the organization, thus the company must reflect to these attributes, instead of focusing on this quadrant, it is better for the company to allocate solutions to improve I quadrant. The following is the attributes in the IV quadrant:

(P1) SMEs plan to minimize energy consumption in the production process; (P3) SMEs have a place to store non-organic raw materials (wax for batik making); (P6) SMEs plan to use wax; (P11) SMEs use environmentally friendly raw materials; (P13) SMEs use packaging from environmentally friendly materials; (P18) UKM puts HR according to the needs of each production unit.

After determining results from I quadrant until IV quadrant, it is obtained 3 statements including in median points **(P12; P26; P28**) meaning that performance and expected one is well-adjusted since the gap value is similar to zero.

Based on the IPA analysis conducted by the researchers, this research focuses on I quadrant since this Quadrant includes any necessary aspects to improve and used as the main priority and the statements above include in the *plan* **(P4; P7)**, *source* **(P9; P10)** and *deliver* **(P25)** dimensions. This implies that in the GSCM implementation, these three dimensions are the companies main priority for improvement since the aspects in this quadrant are yet applied appropriately.

4 CONCLUSIONS

Based on the research results, it can draw some conclusions that are expected to answer any problems formulated in this research. The conclusions are as follow:

1. Based on the descriptive analysis results regarding expectation *value* from the *Green Supply Chain Management* implementation in Batik SMEs in Jarum Tourism Village, Klaten, it is obtained the percentage of 89% from total average importance value with an excellent category. This indicates that there is a very important importance value on the implementation of Green Supply Chain
2. Based on the descriptive analysis results regarding performance *value* from the *Green Supply Chain Management* implementation in Batik SMEs in Jarum Tourism Village, Klaten, it is obtained the percentage of 69% from total average importance value with the good category. This indicates that there is the implementation of Green Supply Chain in Batik SMEs, Jarum Tourism Village, Klaten has been good. However, it is still necessary for improvement in some aspects which still have scores below the good category namely by applying environmental management system, WWTP implementation plan, selecting supplier producing environmental friendly waste, selecting supplier applying environmental management system in the production process, selecting the shortest route in the process of raw material transportation, reducing the use of transportation fuels by using vehicles based on the company demand capacity, managing the results of waste water in the production process with the presence of WWTP, switching from the use of wood to gas in the batik process in order to reduce air pollution, making delivery scheduling according to slots
3. Based on the analysis results of *Important Performance Analysis,* it can be seen 5 statement items as the main attention for improvement namely applying environmental management system, making plans for coloring waste management, selecting suppliers producing environmental friendly waste, selecting supplier applying environment management system in the production process and scheduling direct transportation to consumers to reduce overall transportation.

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