Using Scorecard to Measure Supply Chain Performance in SMEs Hand-Stamped Batik

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This paper aims to present a supply chain performance assessment scorecard that measures the performance of key supply chain activities of a SMEs Batik under different performance dimensions. The scorecard was developed based on an extensive literature review and validated by interviews with owners of SMEs. The nine key performance indicator about the performance of supplier-SMEs relationship, two key performance indicators about the performance of internal-facing (cost and asset management efficiency), four key performance indicators about the performance of customer-facing (delivery reliability, responsiveness, and flexibility), and one key performance indicator about the performance of shareholder-facing (probability, effectiveness of return and equity performance), constituted the backbone of the assessment scorecard. The scorecard was pilot-tested on 18 local SMEs Batik which belong to Center of hand-stamped batik in Pekalongan, Solo and Yogyakarta. The results obtained from the scorecard provide a description of the performance of an internal supply chain activity of SMEs and performance of an internal supply chain activity between center of hand-stamped batik.

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I. INTRODUCTION

Supply chain management (SCM) is a set of approaches utilized to efficiently integrate suppliers, manufacturers, warehouses, and stores, so that merchandise is produced and distributed in the right quantities, to the right locations, and at the right time, in order to minimize systemwide costs while satisfying service level requirements (Simchi-Levi et al 2008). Not only for large enterprise, SCM also important for SMEs. In SMEs, supply and process costs represent 30 per cent of an average manufacturing budget of SMEs and

logistics cost incurs about 40 per cent of total supply spending (Jonh and Riley, 1985). SCM has both the positive and negative effects on the performance of SMEs. The positive effect, SCM can provide quality, cost, customer service, leverage and even risk reduction benefits for the SMEs. In order to guarantee a positive effect of SCM, SME must be able to support the inherent requirements of the supply chain (short lead times, high level consumer satisfaction, etc.) and the external requirements due to the environment (unpredictable mutation, competition, etc.). The negative effect, SCM can reduce private differentiation advantages of SMEs (Arend and Winser, 2005). Consequently, SME has to collaborate together in order to achieve their goals without losing their autonomy and identity (Villarreal et al. 2005)

One of the trending topics in SCM is supply chain performance. Srinivasan et al. (2011) defined supply chain performance for a firm as the performance of the various processes included within the firm's supply chain function. Examples of measures specifically used to assess supply chain performance of a firm include supplier performance (Davis, 1993), inventory costs, number of on-time deliveries, product availability performance and customer response time (Beamon, 1999), and customer satisfaction (Christopher, 2011). According to Lummus and Vokurka (1999) supply chain performance is limited by factors such as absence of frameworks to establish alliances among supply chain partners; lack of integrated information systems and electronic commerce firms; lack of trust inside and outside a company; lack of tools to measure the effectiveness of a supply chain alliance. The issues are more acute in case of SMEs, which are working under highly unorganized set up and limited bargaining power; so, one of the challenges that has not been widely explored is that of SME supply chain performance (Eyaa et al 2010). Based on this condition, the research

presented in this paper has therefore set out to present a supply chain performance assessment scorecard that measures the performance of key supply chain activities of a SMEs Batik under different performance dimensions. More detailedly, this research aims to: (i) determine the key performance indicators under different performance dimensions; (ii) built a scorecard as a tool for measuring supply chain performance in SMEs Batik; and (iii) using a scorecard to measure supply chain performance of each SME and center of hand-stamped batik and evaluate the result.

Batik is a fabric dying method using wax to create patterns and designs. This method makes use of a resist technique; applying areas of cloth with wax (a dye-resistant substance) to prevent them from absorbing colors when the cloth is dipped into dye. Not only as a dye-resistant substance, the wax which is applied also using to control colors from spreading out from a particular area to create motif when the dye is painted (Oparinde 2012). Two processes that represent the art of batik making are „batik-tulis‟ (hand-drawn batik) and „batik cap‟ (hand stamped batik). Hand-stamped batik was developed in the middle of the 19th century by the Javanese, revolutionizing the batik production. The hand-drawn batik is produced by painting the wax on the cloth using a traditional tool called the canting; whereas the hand-stamped batik is produced by stamping the wax on the cloth using a copper stamp to make the batik design. The other technique combines both the canting and the stamp in order to produce more creative designs (Gunaryo et al 2008). Batik industry in Indonesia has a strategic position. Batik has been recognized by UNESCO as an intangible cultural heritage generated by the Indonesian people. Batik industry in Indonesia is produced in nearly all regions in Indonesia with the characteristics of each area. Although there is no official record of the number of people working in the sector of batik, but based on reports from Solopos in 2012, there are

approximately 165,000 people working in this sector (Iriani and Priyanto, 2013).

II. LITERATURE REVIEW

In this study, the scorecard was developed based on key performance indicator which is related to the performance of supplier-SMEs relationship, internal facing, customer facing, and shareholder facing. Knowing the key performance indicator which is related to the performance of supplier-SMEs relationship is important because a cooperation-based relationship between supply chain partners brings some advantages and the performance of the relationship between supplier and buyer is depend on the benefits perceived by both parts (Paiva 2008). Key performance indicator related to internal facing, customer facing, and shareholder facing is based on the "Supply Chain Operational Reference" (SCOR) which is a valuable tool to analyze supply chains. The SCOR model supports the operational evaluation metrics at some dimension (Bolstorff and Rosenbaum 2004).

2.1. Key Performance Indicator for Supply Chain Activities: Supplier-SMEs Relationship Performance

In today's world, the relationship has immense value for all organizations. The status of the relationship is not limited to the internal partners alone, but the thinking is much beyond that. The supplier is an important partner with any organization, and hence, maintaining relationship is important for an organization who is an industrial buyer (Mishra, 2011). Supplier-SMEs relationship management is very important for SMEs as it can ensure the supply of reliable and frequent deliveries in today's dynamic and competitive environment. In such relationship to be effective and long-term, it has to be beneficial for all parties, the SMEs and the supplier firms. Based on the literature review, this study proposes several key performance indicators to measure performance of supplier-SMEs relationship.

1. From the point of view supplier: the percentage of on-time invoice payment to the supplier
   The statistical results suggest that many buyer behaviors can have a significant effect on their suppliers' performance. Specifically, buyer behaviors directly manifest in supplier performance. This can give the buyer the false impression that the supply base is harming performance, when the real problem is the way the buyer manages the supply chain (Pagell and Sheu, 2001). In this study, the behavior of the buyer or SMEs batik is represented by the percentage of on-time invoice payment to the supplier. SMEs who have good behavior will try to pay its suppliers on time as they promise and it would be appreciated by the supplier as a good initiative to improve relations between them

2. From the point of view buyer
   Buyer (in this study, SMEs batik) will evaluate their supplier based on several key performance indicators. Several criteria for supplier evaluation and selection have been proposed by researchers since 1966. One significant study that considered the multi-objective nature of vendor selection was made by Dickson in 1966 (Weber et al., 1991). This study ranked the importance placed on as much as 23 criteria by purchasing agents and managers (Asamoah et al 2012). Weber and other researchers reviewed as many as 74 articles which address vendor selection criteria in manufacturing and retail environments (Weber et al., 1991). Their research made use of Dickson's 23 criteria in ranking and analyzing the various supplier selection and evaluation criteria that has appeared in the literature in recent times. The researchers discovered that net price, delivery and quality were discussed in 80%, 59% and

54% of the 74 articles reviewed respectively, and that these three criteria were rated as having extreme or considerable importance by Dickson. Moreover, production facilities and capability and technical capability were discussed in 31% and 20% of the articles respectively, and were also rated by Dickson as having considerable importance (Asamoah et al 2012). Different with Weber et al (2001), according to Simpson et al. In 2002, quality is the primary concern in every firm, which includes the largest amount of sub-metrics on the list of almost 2278 mentioned items introduced a list of supplier characteristic categories considered in evaluation system (Nguyem 2013). Over time a number of complementary dimensions have been proposed, but in practice the majority of supplier evaluations for long tended to be routinely viewed as consisting of just three factors: price/cost, quality, and delivery (Hirakubo and Kublin 1998)

Considering the factors which have been used for supplier evaluation and selection studies in the past an also in the recent times as well as the factors that the organization under study (SMEs Batik) considered important for evaluating their suppliers, the following criteria were selected as part of key performance indicators for supplier-SMEs relationship performance in the point of view of the supplier.

- Quality

  It is important that the supplier and the buyer have the same idea of what satisfactory quality is (Leenders and Fearon, 1997). They need to agree on the basic requirements of the transaction, the way in which the requirements are to be realized, how to check that the requirements are fulfilled and the measures to be taken when the expectations are not met (Weele, 2010). In this study, the quality factor is represented by the percentage of defect parts criteria.

- Price.

  Quality in itself is not sufficient to ensure that the suppliers can avoid extra costs while offering the right quality. Basically, price containment leads to supplier attractively. The firm always requires the minimum price of the product to increase the profitability. The firm therefore must find a low-cost supply base where it can minimize manufacturing cost related to the production of the product (Mwikali and Kavale 2012). In this study, the price factor is represented by offering price criteria and quantity of discount criteria. Offering price refers to the comparison between the sale price offered by the supplier with a purchase price demanded by the SMEs, whereas, discount price refers to price reductions provided by the supplier after negotiations

- Delivery

  Delivery performance describes the efficiency rate of business operations when preparing and delivering an order to a customer (Gallego, 2011). Delivery performance is evaluated primarily in terms of delivery precision. In this study, delivery performance is represented by short lead time in order fulfillment, on time delivery rate, and flexibility of order fulfillment criteria. Lead time defined as the time it takes from the moment an order is placed until it arrives. In related to performance of suppliers, short lead time refers to the capability of the supplier to deliver the order in the short time since the order is placed. On time delivery rate, referring to the frequency of occurrence of delay in delivery of goods by the supplier; whereas flexibility of order fulfillment refers to

the ability of the supplier to respond the changes based on the customer's demand, price structure, order frequency and order volume.

- Services

  Besides quality, price, and delivery, this study propose services as a factor for evaluating the performance of the supplier. Service factor is used as criteria for supplier evaluation in previous studies conducted by Weber et al (1991), Prahinski and Benton (2004), Chang et al. (2007). Donaldson (1994) defined service as all those activities provided by the seller that enhance or augment the product and have value for the buyer, thus increasing customer satisfaction and encouraging patronage and loyalty between the parties. In this study, service factor is represented by ease the warranty claim process, ease of ordering process, and ease of communication. Ease the warranty claim process refers to the extent to which the supplier is able to provide simple procedures that make it easier to return the goods which are not in accordance with the specifications. Ease of ordering process refers to the extent to which the supplier is able to carry out cooperation in the procurement of goods in accordance with simple procedures, whereas ease of communication refers to the extent to which the supplier is able to provide effective communication with the SMEs because suppliers have cultural similarity, same communication language and electronic data interchange capabilities.

2.2. Key Performance Indicator for Supply Chain Activities: SCOR Model Approach

The Supply Chain Council has developed a SCOR model, which considers the performance requirements of partner firms in a supply chain. There are some dimensions measured in SCOR model, i .e: internal facing, customer facing, and shareholder facing. Internal-facing measures are concerned with the efficiency with which a supply chain operates, e.g. cash-to-cash cycle time. Customer-facing measures are concerned with how well a supply chain delivers products/services to customers, e.g. the delivery performance. Shareholder facing measures is concerned with the profitability and effectiveness of return (Bolstorff and Rosenbaum 2004).

III. RESEARCH DESGIN/METHODOLOGY

3.1. Scorecard to Measure Supply Chain Performance in SMEs Batik

The nine key performance indicator about the performance of supplier-SMEs relationship (percentage of on-time invoice payment to the supplier, ease of communication, percentage of defect rate, on time delivery, offering price, ease the warranty claim process, short lead time in order fulfillment, flexibility of order fulfillment, and ease of ordering process); two key performance indicators about the performance of internal-facing (warranty/returns processing costs and cash-to-cash cycle time); five key performance indicators about the performance of customer-facing (line item on time and full, perfect order fulfillment; order fulfillment cycle time, order fulfillment flexibility, and upside supply chain flexibility); and one key performance indicator about the performance of shareholder-facing (percentage of net income), constituted the backbone of the assessment scorecard.

TABLE 1. SCORECARD TO MEASURE SUPPLY CHAIN PERFORMANCE IN SMES BATIK

Criteria (weight)	Sub-criteria (weight)	Key Performance Indicators (weight)			Category	Scale
Supplier-SMEs Relationship Performance (0.480)		The percentage of on-time invoice payment to the supplier	KPI-01	0.034	Higher is better	1-5
		Ease of communication	KPI-02	0.042	Higher is better	1-5
		Percentage of defect rate	KPI-03	0.075	Lower is better	1-5
		On time delivery	KPI-04	0.067	Higher is better	1-5
		Offering price	KPI-05	0.064	Higher is better	1-5
		Ease the warranty claim process	KPI-06	0.056	Higher is better	1-5
		Short lead time in order fulfillment	KPI-07	0.054	Higher is better	1-5
		Flexibility of order fulfillment	KPI-08	0.061	Higher is better	1-5
		Ease of ordering process	KPI-09	0.028	Higher is better	1-5
Internal-facing Performance (0.119)	Cost (0.025)	Warranty/Returns Processing Costs	KPI-10	0.023	Lower is better	1-5
	Asset management efficiency (0.093)	Cash-to-Cash Cycle Time	KPI-11	0.102	Higher is better	1-5
Customer-facing Performance (0.306)	Reliability (0.225)	Line Item On Time and Full	KPI-12	0.084	Higher is better	1-5
		Perfect Order Fulfillment	KPI-13	0.085	Higher is better	1-5
	Responsiveness (0.050)	Order Fulfillment Cycle Time	KPI-14	0.047	Lower is better	1-5
	Flexibility (0.031)	Order Fulfillment Flexibility	KPI-15	0.043	Higher is better	1-5
		Upside Supply Chain Flexibility	KPI-16	0.029	Lower is better	1-5
Shareholder-facing Performance (0.096)	Profitability (0.096)	Percentage of net income	KPI-17	0.106	Higher is better	1-5

Totally, there were seventeen key performance indicators constituted the backbone of the assessment scorecard. These indicators are the result of elimination of twenty-six indicators proposed to the owners of SMEs batik.

The Analytic Hierarchy Process (AHP) has been used in this scorecard to determine the importance weights of each criteria, sub criteria, and key performance indicator; whereas, a five-point of a scale ranging from 1 (poor condition) to 5 (excellent condition) has been used in this scorecard as a measurement scale of each key performance indicator. In this case, each value on the measurement scale has a unique meaning depend on the condition asked by indicator. It is because each of key performance indicators has multi-item scales, so the respondents had to indicate the extent to which condition with the statement on a five-point scale (1–low, 5–high) with higher scores reflecting the better condition. For example, the meaning of value 1 to 5 for an indicator percentage of on-time invoice payment to the supplier which belong to higher is better can be described as follows: value 1 means the percentage of on-time invoice payment to the supplier 0% to 20% of 100 times the transactions conducted; value 2 means the percentage of on-time invoice payment to the supplier more than 20% to 40% of 100 times the transactions conducted; value 3 means the percentage of on-time invoice payment to the supplier more than 40% to 60% of 100 times the transactions conducted; value 4 means the percentage of on-time invoice payment to the supplier more than 60% to 80% of 100 times the transactions conducted; and value 5 means the percentage of on-time invoice payment to the supplier more than 80% to 100% of 100 times the transactions conducted. Another example, the meaning of value 1 to 5 for a percentage of defect rate, which belongs to lower is better can be described as follows: value 1 means the percentage of defect rate more than 8%; value 2 means the percentage of defect rate more than 6% to 8%; value 3 means the percentage of defect rate more than 4% to 6%; value 4 means the percentage of defect rate more than 2% to 4%; and value 5 means the percentage of defect rate 0% to 2%. In detail, scorecard which is used to measure Supply Chain Performance in SMEs Batik can be seen in Table 1.

3.2. Data Collection

In-depth interviews were performed three times during July to September 2013 which included participant of eighteen of owner of SMEs Batik in Center of Stamped-Batik in Solo, Pekalongan, and Yogyakarta (Laweyan, Kauman, and Wijirejo) and the chief of each center. The three regions that became the object of this study can be seen in the figure 1. The first in-depth interviews were conducted to explore the key performance indicators which are considered important for evaluating supply chain performance in stamped-batik. The second in-depth interviews were conducted to explore the relative importance of two criteria, two sub-criteria, and two key performance indicators. For example, in evaluating the relative importance of criteria "Supplier-SMEs Relationship Performance" and "Internal-facing Performance", the typical question would be: "Of the two criteria, Supplier-SMEs Relationship Performance and Internal-facing Performance, which one is you consider more important, and by how many times, with respect to increase supply chain performance in stamped-batik?". Then, the third in-depth interview was conducted to respond each of key performance indicators using a five-point of a scale ranging from 1 (poor condition) to 5 (excellent condition). The first and third in-depth interview addressed to owner of SMEs batik; whereas the second interview addressed to chief of center of stamped-batik in Solo, Pekalongan and Yogyakarta.
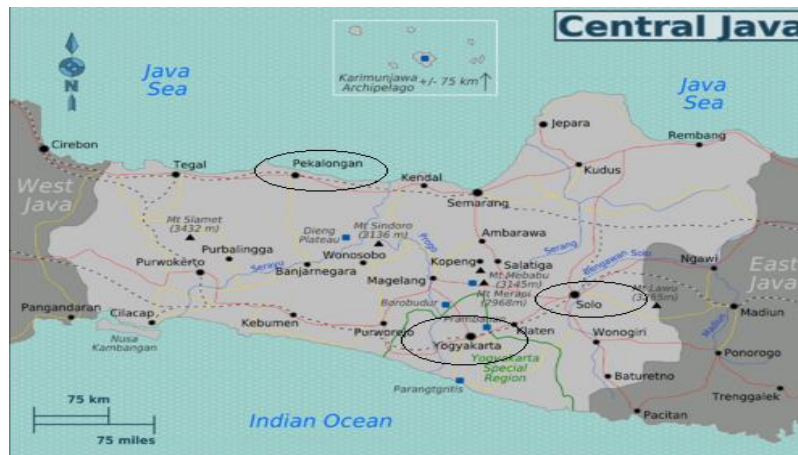
FIGURE 1. THREE REGIONS THAT BECAME THE OBJECT OF THIS STUDY

TABLE 2. SUPPLY CHAIN PERFORMANCE OF EACH SMEs STAMPED-BATIK IN PEKALONGAN

Key Performance Indicators (weight)			SMEs Stamped-Batik in Pekalongan							
			P1	P2	P3	P4	P5	P6	P7	Avg
The percentage of on-time invoice payment to the supplier	KPI-01	0.03	4	5	5	4	3	5	5	
Ease of communication	KPI-02	0.04	5	5	5	5	4	5	5	
Percentage of defect rate	KPI-03	0.08	3	5	4	3	2	4	4	
On time delivery	KPI-04	0.07	5	5	5	4	3	5	4	
Offering price	KPI-05	0.06	3	4	4	3	3	4	3	
Ease the warranty claim process	KPI-06	0.06	5	5	5	4	4	5	5	
Short lead time in order fulfillment	KPI-07	0.05	4	5	5	5	4	5	5	
Flexibility of order fulfillment	KPI-08	0.06	4	5	4	4	4	4	4	
Ease of ordering process	KPI-09	0.03	5	5	5	5	5	5	5	
Total Score of Supplier-SMEs Relationship Performance			1.98	2.34	2.21	1.91	1.64	2.21	2.07	2.05
Warranty/Returns Processing Costs	KPI-10	0.02	4	5	3	4	3	4	4	
Cash-to-Cash Cycle Time	KPI-11	0.1	3	4	3	5	2	4	3	
Total Score of Internal-facing Performance			0.40	0.52	0.38	0.60	0.27	0.50	0.40	0.44
Line Item On Time and Full	KPI-12	0.08	5	5	5	4	4	5	4	
Perfect Order Fulfillment	KPI-13	0.09	5	5	5	4	3	4	5	
Order Fulfillment Cycle Time	KPI-14	0.05	4	4	5	4	4	4	4	
Order Fulfillment Flexibility	KPI-15	0.04	4	5	4	4	4	4	5	
Upside Supply Chain Flexibility	KPI-16	0.03	2	4	5	2	2	3	4	
Total Score of Customer-facing Performance			1.26	1.36	1.40	1.09	1.01	1.21	1.28	1.23
Percentage of net income	KPI-17	0.11	2	2	3	4	2	3	2	
Total Score of Shareholder-facing Performance			0.21	0.21	0.32	0.42	0.21	0.32	0.21	0.27
Total Score			3.85	4.44	4.30	4.03	3.13	4.23	3.96	3.99

IV. DATA ANALYSIS

The results obtained from the scorecard of each SMEs and each center of hand-stamped batik can be seen in Table 2, Table 3, and Table 4. Then, this study compared the result of scorecard which belong to eighteen SMEs stamped-batik and compared the result of scorecard which belongs to three centers of stamped-batik.

The total mean score of above 3.00 according to the five point scale indicates that SMEs in Center of Stamped-Batik in Pekalongan (Kauman) which being respondents in this study already have good enough supply chain performance. A range of performance values held by SMEs was 3.13 to 4.44 and there were four SMEs with a total score above 4.00.

The total mean score of above 3.00 according to the five point scale indicates that SMEs in Center of Stamped-Batik in Solo (Laweyan) which being respondents in this study already have good enough supply chain performance. A range of performance values held by SMEs was 3.40 to 4.65 and only one SMEs with a total score above 4.00.

TABLE 3. SUPPLY CHAIN PERFORMANCE OF EACH SMES STAMPED-BATIK IN SOLO

Key Performance Indicators (weight)			SMEs Stamped-Batik in Solo					
			S1	S2	S3	S4	S5	Avg
The percentage of on-time invoice payment to the supplier	KPI-01	0.03	5	5	5	5	4	
Ease of communication	KPI-02	0.04	5	5	5	5	4	
Percentage of defect rate	KPI-03	0.08	4	1	1	1	3	
On time delivery	KPI-04	0.07	5	5	2	4	5	
Offering price	KPI-05	0.06	4	3	3	2	3	
Ease the warranty claim process	KPI-06	0.06	5	4	4	5	5	
Short lead time in order fulfillment	KPI-07	0.05	5	5	5	4	5	
Flexibility of order fulfillment	KPI-08	0.06	5	5	5	4	5	
Ease of ordering process	KPI-09	0.03	5	5	5	5	5	
Total Score of Supplier-SMEs Relationship Performance			2.27	1.92	1.72	1.73	2.05	1.94
Warranty/Returns Processing Costs	KPI-10	0.02	5	3	3	2	4	
Cash-to-Cash Cycle Time	KPI-11	0.10	5	3	4	2	3	
Total Score of Internal-facing Performance			0.63	0.38	0.48	0.25	0.40	0.43
Line Item On Time and Full	KPI-12	0.08	5	5	5	4	4	
Perfect Order Fulfillment	KPI-13	0.09	5	5	5	5	5	
Order Fulfillment Cycle Time	KPI-14	0.05	5	4	4	3	1	
Order Fulfillment Flexibility	KPI-15	0.04	5	5	5	5	4	
Upside Supply Chain Flexibility	KPI-16	0.03	5	4	4	3	2	
Total Score of Customer-facing Performance			1.44	1.36	1.36	1.20	1.04	1.28
Percentage of net income	KPI-17	0.11	3	2	3	2	2	
Total Score of Shareholder-facing Performance			0.32	0.21	0.32	0.21	0.21	0.25
Total Score			4.65	3.87	3.88	3.40	3.70	3.90

TABLE 4. SUPPLY CHAIN PERFORMANCE OF EACH SMEs STAMPED-BATIK IN YOGYAKARTA

Key Performance Indicators (weight)			SMEs Stamped-Batik in Yogyakarta							
			Y1	Y2	Y3	Y4	Y5	Y6	Y7	Avg
The percentage of on-time invoice payment to the supplier	KPI-01	0.03	5	5	5	5	5	5	5	
Ease of communication	KPI-02	0.04	5	5	4	4	4	5	4	
Percentage of defect rate	KPI-03	0.08	5	4	3	4	3	3	4	
On time delivery	KPI-04	0.07	5	4	3	5	4	4	5	
Offering price	KPI-05	0.06	2	3	3	4	3	3	4	
Ease the warranty claim process	KPI-06	0.06	5	5	4	4	4	5	4	
Short lead time in order fulfillment	KPI-07	0.05	5	5	5	5	4	5	4	
Flexibility of order fulfillment	KPI-08	0.06	4	4	4	4	3	4	4	
Ease of ordering process	KPI-09	0.03	5	5	4	5	4	4	4	
Total Score of Supplier-SMEs Relationship Performance			2.15	2.07	2.15	2.07	1.81	2.11	1.76	1.97
Warranty/Returns Processing Costs	KPI-10	0.02	5	3	3	4	4	4	4	
Cash-to-Cash Cycle Time	KPI-11	0.10	4	3	3	4	3	4	3	
Total Score of Internal-facing Performance			0.52	0.38	0.52	0.38	0.38	0.50	0.40	0.50
Line Item On Time and Full	KPI-12	0.08	5	5	5	5	5	4	4	
Perfect Order Fulfillment	KPI-13	0.09	5	5	5	5	5	4	4	
Order Fulfillment Cycle Time	KPI-14	0.05	4	4	4	3	4	4	3	
Order Fulfillment Flexibility	KPI-15	0.04	5	4	3	4	4	4	4	
Upside Supply Chain Flexibility	KPI-16	0.03	2	4	5	2	2	3	4	
Total Score of Customer-facing Performance			1.31	1.32	1.31	1.32	1.31	1.22	1.26	1.12
Percentage of net income	KPI-17	0.11	3	1	2	1	2	2	2	
Total Score of Shareholder-facing Performance			0.32	0.11	0.32	0.11	0.21	0.11	0.21	0.21
Total Score			4.30	3.88	4.30	3.88	3.70	3.93	3.63	3.81

The total mean score of above 3.00 according to the five point scale indicates that SMEs in Center of Stamped-Batik in Yogyakarta (Wijirejo) which being respondents in this study already have good enough supply chain performance. A range of performance values held by SMEs was 3.63 to 4.30 and only one SMEs with a total score above 4.00.

Despite the high score of supply chain performance held by SMEs in center of stamped-batik in Solo, in average, SMEs in center of stamped batik in Pekalongan (Kauman) has a slightly better supply chain performance score than SMEs in center of stamped batik in Solo (Laweyan) and Yogyakarta (Wijirejo). SMEs in the center of the stamped-batik in Pekalongan (standard deviation= 0.400) and SMEs in center of stamped-batik in Solo (standard deviation=0.413) have more variance in supply chain performance than SMEs in center of stamped-batik in Yogyakarta (standard deviation=0.221). Then, for further clarification, a one-way analysis of variance (ANOVA) was conducted in this study.

TABLE 5. RESULT OF ONE-WAY ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Supplier-SMEs Relationship Performance						
Between Groups	0.0383	2	0.0191	0.4369	0.6535	3.6337
Within Groups	0.7007	16	0.0438			
Total	0.7390	18				

Source of Variation	SS	df	MS	F	P-value	F crit
Internal-facing Performance						
Between Groups	0.0005	2	0.0003	0.0243	0.9760	3.5915
Within Groups	0.1784	17	0.0105			
Total	0.1789	19				

Source of Variation	SS	df	MS	F	P-value	F crit
Customer-facing Performance						
Between Groups	0.0151	2	0.0075	0.5281	0.5997	3.6337
Within Groups	0.2287	16	0.0143			
Total	0.2438	18				

Source of Variation	SS	df	MS	F	P-value	F crit
Shareholder-facing Performance						
Between Groups	0.0199	2	0.0100	1.4520	0.2634	3.6337
Within Groups	0.1097	16	0.0069			
Total	0.1296	18				

ANOVA was conducted to investigate any differences in SMEs stamped-batik in Pekalongan (Kauman), Solo (Laweyan), and Yogyakarta (Wijirejo) across the four criteria which is used (supplier-SMEs relationship, internal-facing performance, customer-facing performance, and shareholder-facing performance). The result of one-way ANOVA can be seen in Table 5. The results of this analysis were in some ways disappointing because we found that the four criteria used in this study showed no significant differences between any of SMEs stamped-batik. In other word, SMEs stamped-batik in Pekalongan (Kauman), Solo (Laweyan) and Yogyakarta (Wijirejo) did not have differences in their performance across the four criteria which is used.

V. CONCLUSION

This paper aims to present a supply chain performance assessment scorecard that measures the performance of key supply chain activities of a SMEs Batik under different performance dimensions. Although there has been a lot of literature which attempts to measure a supply chain performance in SMEs, the proposed measurement method has several advantages. First, it is flexible because it can handle different key performance indicator which have multi-item scales. Second, the method is user friendly because it is made up of simple and understandable tools. This scorecard should be regarded as a starting point for an assessment of the need for supply

chain performance measurement and from the interviews with the owners of SMEs, these key performance indicators practically indicated the supply chain performance of their SMEs. The key performance indicators help the owner discovering their SMEs problems that never realized before.

In our effort to investigate the supply chain performance in SMEs, we encountered several limitations that are common in survey-based research. First, due to the difficulty of generating a sufficiently large sample, we only used small sample which is avoiding generalization of the key performance indicators constituted the backbone of the assessment scorecard in SMEs stamped-batik. In the future, the same study will be extended to a much larger region of batik, so that more representative key performance indicators may be obtained for the SMEs stamped-batik industry scenario. Second, we did not survey multiple key respondents per SMEs; but, given the background of the respondents and the usage of objective secondary data, we believe that this is not problematic. Third, qualitative and quantitative performance measures included in a scorecard not separated and the proportion of qualitative and quantitative performance measures can lead to varying results. The separation between qualitative and quantitative and appropriate combination of these measures has to be addressed in future research.

VI.   REFERENCES

Arend, R.J. and Winser, J.D., ''Small Business and Supply Chain Management: is there a fit?'', Journal of Business Venturing, 20 (3), 2005, 403-436.

Asamoah, D., Annan J., and Nyarko, S., "AHP Approach for Supplier Evaluation and Selection in a Pharmaceutical Manufacturing Firm in Ghana", International Journal of Business and Management, 7(10), 2012, 49-62

Beamon, B., "Measuring Supply Chain Performance", International Journal of Operations and Production Management, 19(3), 1999, 275–292.

Bolstorff, P., and Rosenbaum, R., Supply Chain Excellence-A Handbook for Dramatic Improvement Using the SCOR Model (2nd ed), AMACOM, New York, USA, 2004

Chang, S. L., Wang, R. C., and Wang, S. Y.,"Applying a Direct Multigranularity Linguistic and Strategy-Oriented Aggregation Approach on the Assessment of Supply Performance," European Journal of Operational Research, 177 (2), 2007, 1013–1025

Christopher, M., Logistics and Supply Chain Management (4th ed) (Financial Times Series), Prentice-Hall, UK, 2011.

Davis, T., "Effective Supply Chain Management", Sloan Management Review, 34(4), 1993, 35-46

Donaldson, B., "Supplier Selection Criteria on The Service Dimension: Some Empirical Evidence," European Journal of Purchasing & Supply Management, 1(4), 1994, 209–217

Eyaa, S., Ntayi, J. M, and Namagembe, S., "Collaborative Relationships and SME Supply Chain Performance", World Journal of Entrepreneurship, Management and Sustainable Development", 6(3), 2010, 233-245

Gallego, L. V., Review of Existing Methods, Models and Tools for Supplier evaluation. Unpublished Master Thesis, Department of Management and Engineering, Linköpings Universitet, Sweden, 2011

Gunaryo, D., Sudarman, H.B., Wibowo, and P. Ambarita, Pengembangan Ekonomi Kreatif Indonesia 2025: Rencana Pengembangan Ekonomi Kreatif Indonesia 2009-2015, Ministry of Trade of The Republic of Indonesia, Jakarta, Indonesia, 2008

Hirakubo, N. and Kublin, M., "The relative Importance of Supplier Selection Criteria: The Case of Electronic Components Procurement in Japan", International

Journal of Purchasing and Materials Management, Spring, 34(2), 1998, 19-24.

Iriani, A and Priyanto, S.H., "Modeling of Employee Relationship in SME Batik: Case Study of Windasari Batik", Asian Journal of Management Sciences and Education, 2(4),2013, 22-35

John, T.C. and Riley, D.W., ''Using Inventory for Competitive Advantage through Supply Chain Management'', International Journal of Physical Distribution & Materials Management, 15 (5), 1985, 16-26.

Leenders, M. and Fearon, H., Purchasing & Supply Management, Irwin, Chicago, 2007

Lummus, R R. and Vokurka, J. "Defining Supply Chain Management: a Historical Perspective and Practical Guidelines", Industrial Management and Data Systems, 99(1), 1999, 11-17

Mishra, R.K.," Buyer-Supplier Relationship in SMEs", The IUP Journal of Supply Chain Management, VIII (3), 2011, 26-41

Mwikali, R. and Kavale S., "Factors Affecting the Selection of Optimal Suppliers in Procurement Management," International Journal of Humanities and Social Science, 2 (14), 2012, 189-193.

Nguyen, H., Supplier Performance Evaluation Documentation and Process in the Textile and Garment Manufacturing Industry Company Case: X, Unpublished Bachelor's Thesis, International Business, Haaga-Helia, 2013

Oparinde, S. S., "Batik as a Cultural Identity of the Yoruba: Hand Colouring Techniques and Applications, Possibility of Adaptations," Journal of Arts, Science & Commerce, 3 (2), 2012, 31-41.

Pagell, M. and Sheu, C., 'Buyer Behaviors and Supply Chain Performance: An International Exploration', Proceeding of Academy of Management Meeting, Washington D.C, 2001

Paiva, E.L., Phonlor, P., and D'avila L.C., "Buyer-Supplier relationship and Service Performance: an Operations Perspective Analysis", The Flagship Research Journal of International Conference of Production and Operations Management Society, 1(2), 2008, 77-88

Prahinski, C., and Benton, W. C., "Supplier Evaluations: Communication Strategies to Improve Supplier Performance," Journal of Operations Management, 22 (1), 2004, 39–62

Simchi-Levi, D., Kaminsky P., and Simchi-Levi, E., Designing and Managing The Supply Chain: Concepts, Strategies and Case Studies (3rd ed), McGraw-Hill/ Irwin, New York, 2008.

Srinivasan, M., Mukherjee, D. and Gaur, A. S. , "Buyer–supplier Partnership Quality and Supply Chain Performance: Moderating Role of Risks, and Environmental Uncertainty", European Management Journal, 29 (4), 2011, 260– 271

Villarreal Lizarraga, C.L., Dupont, L., Gourg, D., and Pingaud, H. 'Contributing to Management of Shared Projects in SMEs Manufacturing Clusters', Proceedings of the 18 th International Conference on Production Research, Salerno, Italy, 2005

Weber, C. A., Current, J. r., Benton, W. C., "Vendor Selection Criteria and Methods", European Journal of Operational Research, 50(1), 1991, 2-18

Weele, A. J. van.. Purchasing and Supply Chain Management: Analysis, Strategy, Planning, and Practice (5th ed), Cengage Learning EMEA, Andover, Hampshire, 2010