Supply chain management practices and firms' operational performance

An empirical study of Vietnam garment industry

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Abstract:

Purpose: This study aims at providing an empirical evidence about the relationship between practices of supply chain management (SCM) and operational performance.

Design/methodology/approach: Based on a comprehensive literature review and the practical experience in the field of the Vietnam garment industry, a set of management practices have been identified and selected to develop a conceptual model as well as to establish their relationship to companies' operational performance. Structural equation modelling (SEM) was used to evaluate the validity of the model. The measurement instrument of practices was developed in 4 steps: (1) identification and development of initial instrument, (2) personal interviews and Q-sort, (3) large-scale data collection and (4) large-scale analysis in order to ensure unidimensionality, reliability and validity. Data were collected in Vietnamese garment enterprises.

Findings: The study showed that the four practices: customer focus, supplier management, process control and improvement, top management support are positively related to operational performance. In addition, this study also showed that these SCM practices could explain 52.6% variance of operational performance.

Research limitations/implications: There were some limitations that can guide academics to new lines of further research: (i) to extend the scope of the survey to include different countries and new situations, so results can be generalized and (ii) to explore additional factors that can further explain operational performance, such as operational environment, capital, technology, human resource, etc.

Practical implications: Research results gave some suggestions for business associations and government in order to issue the specific and practical policies creating good conditions for enterprises to get higher performance.

Originality/value: The proposed research model analyzing the relationship among SCM practices and operational performance and its validation using the Vietnam garment industry provided valuable insights both from theoretical and practical perspectives. The results of this study, moreover, help to understand the weaknesses of this industry. SEM, which was used in this study to test the measurement instrument and structural model, is one of modern and complex data analysis methods and can provide higher accuracy in the quantitative research.

Keywords: Supply chain management, Supply chain management practices, Operational performance, Garment industry, Vietnam.

Article Classification: Research paper

1. Introduction

The garment sector plays an important role in Vietnam socio-economic development in terms of creating huge employment, especially jobs for females, contributing as a major source of foreign exchange accumulation for the nation and creating a tremendous integration opportunity for Vietnam in the global economy.

However, after two decades of integration and development, among five main segments including raw material, garment accessories production, cutting and sewing, exporting and distributing, Vietnam garment industry still mainly focuses on cutting and sewing stages -the lowest value-added segment in the value chain.

Most of Vietnamese garment companies, containing service and manufacturing enterprises, are facing competitive disadvantages due to their inherent issues such as high operating costs, high lead-time, high rates of damaged materials, late delivery, and decreasing operational efficiency. To increase the competitive advantage, firms should consider operational performance as a way to leverage competiveness (Samson and Terziovski, 1999).

There are many worldwide researchers conducting studies to develop efficient methods to improve operational performance. As competition move from organizations to supply chains, the term of Supply Chain Management has become popular. The implementation of SCM practices is considered as a base for improvement of operational performance (Li et al., 2005).

There were many researchers investigating the relationship between SCM practices and operational performance (Christopher, 2013). However, these studies still exists some limitations that reduce their value in the literature. Those are:

- ✓ The inconsistency in results of previous studies.
- ✓ The mutual interaction among practices has not been taken into account.
- ✓ Data analysis approach.
- ✓ Specially, in Vietnam, with referenced documents, the related research is restricted.

This study aim at filling the above voids by proposing a new framework based on Structural Equation Modeling (SEM) and applying it in the Vietnam garment industry. It is also expected that the practical findings achieved from this research could contribute to the development of Vietnam garment industry in particular and to its global economic performance.

The structure of this paper includes: the following section presents further discussion of the research gaps in the literature, then research model and hypotheses are suggested. Section 3 describes development of the measurement instrument. In section four, results are presented and discussed. Implications and directions for further research are mentioned at the end of this paper.

2. Literature review and hypotheses

SCM aims at improving the sourcing for raw materials, the production and the distribution of products/services to customers (Fredendall and Hill, 2000; Hugos, 2011). The successful implementation of SCM practices provides opportunities to improve operational performance along the supply chain (Harrison and New, 2002).

In the literature, the adoption of SCM practices has been widely conducted. Yet, there is a large degree of overlap in the use of SCM practices and quality management practices. In other words, the taxonomy between them is unclear.

According to Talib et al. (2011), they can be classified based on "primary integration." While quality management practices mainly concentrate on the internal integration, e.g. executives and employees, SCM practices take into account internal processes of an organization and linking these with the external operations of members in the entire supply chain. Hence, combination with the extensive literature review, a set of relevant SCM practices have been identified (see Table 1). The classification adopted in this study (Flynn et al., 1995) assumes two main categories:

- **Core practices:** defined as technique- and methodology-oriented practices for supply chain, such as process control and improvement.
- **Support practices:** such as supplier management, customers focus and top management support, which are people- and culture-oriented practices and create an environment that supports effective use of the core SCM practices.

Table 1: Description of SCM practices.

SCM practices	Description
Process control and improvement	Use of fool-proof for process design, statistical techniques, automation, preventive equipment. Clarity of work or process instructions. Identification of problem easily. *(Forker, 1997; Kaynak, 2003; Saraph et al., 1989)*
Top management support	Offer of innovation and continuous improvement policies. Provision of necessary resources for processes. Promotion of partners' involvement in firm's activities. Participation of top management in supply chain improvement process. Review of supply chain issues in top management meetings. Responsibility for operational performance. *(Flynn et al., 1995; Kaynak, 2003; Saraph et al., 1989)*
Customer focus	Determination of customers' needs and wants. Use of information from customers in designing products and services. Understanding of products or services by employees. Commitment in satisfying customers. Relationship between company's goals and customers' expectations. *(Lakhal et al., 2006)*
Supplier management	Reliance on a few suppliers. Selection of suppliers based on quality. Development of long-term relationship with suppliers. Clear of the specifications provided to suppliers. Assessment of suppliers' capabilities and performance. *(Li et al., 2005)*

The relation of these practices to operational performance has received attentions in previous studies. However, the results have not been fully consistent. For instance, in the relationship between process management and performance, the direct effect of process management on performance has been identified in several studies (Feng et al., 2006; Fening et al., 2008; Kaynak, 2003; Kaynak and Hartley, 2008; Prajogo and Brown, 2004; Sila and Ebrahimpour, 2005; Terziovski, 2006; Zu, 2009). However, according to Tarí et al. (2007), they have an indirect relationship (Tarí et al., 2007). Conversely, Flynn et al. (1995) argued that process management has a negative direct relationship with performance, or even they are not associated (Powell, 1995; Samson and Terziovski, 1999).

According to Kaynak (2003), furthermore, if a research model does not explore the relationships among practices, it cannot be considered comprehensive. In other words, studies need to identify the direct and indirect impact of SCM practices on operational performance at multiple levels. However, by using of multiple regression approach (Adam et al., 1997; De Cerio, 2003; Fening et al., 2008; Flynn et al., 1994; Samson and Terziovski, 1999; Zehir and Sadikoglu, 2010) or correlation (Powell, 1995; Tabachnick and Fidell, 2012), this issue cannot be fully addressed.

Therefore, to explore the relationship among selected SCM practices and the operational performance as well as to have a comprehensive research model, a structural model is proposed (Figure 1).

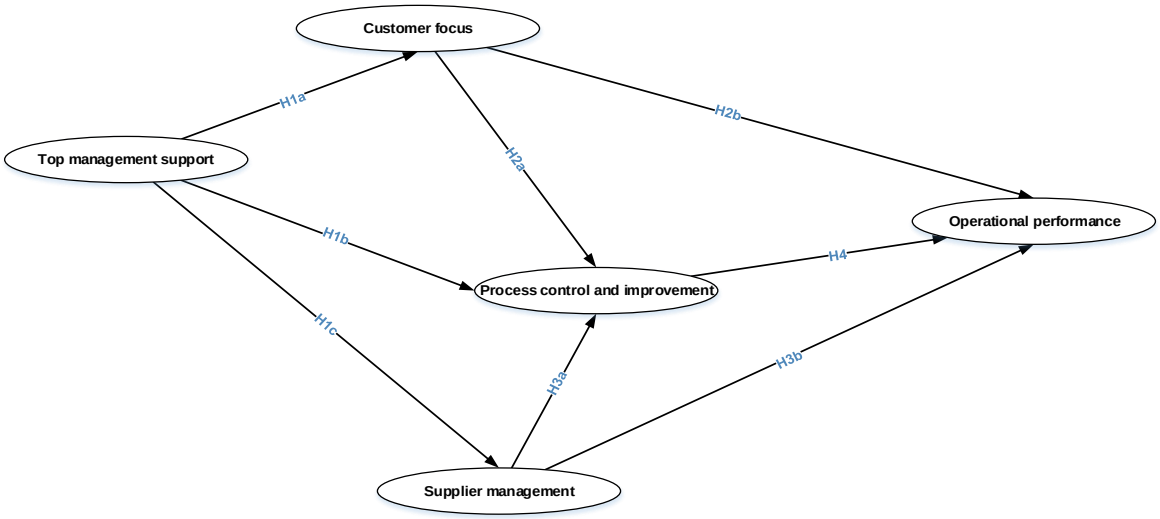

Figure 1: Research model

These relationship will be investigated by using SEM, which is an adequate approach to test the direct and indirect effect (Bollen, 1989). In the following sections, hypotheses suggested in the research model will be developed.

2.1. Top management support

The support of top management is the main motivation that drives companies towards an effective and successful implementation of SCM (Abraham et al., 1999; Ahire and Dreyfus, 2000; Ahire and O'Shaughnessy, 1998).

In most companies, customer satisfaction is the key driver of all activities. Therefore, customers' needs must be properly addressed not only by top managers but by all employees also (Lakhal et al., 2006). Top management support is essential to ensure that necessary resources are provided to carry out market studies to determine customers' needs and wants as well as making all efforts to meet them (Kaynak, 2003).

Additionally, in the SCM perspective, customer involvement in firm's activities plays an important role in the success of the whole supply chain (Robinson and Malhotra, 2005). Top management can promote customer involvement from the earlier stages of development until the commercialization stage (Flynn et al., 1995). Top management, further to define companies' mission and goals, creates the working environment in which all employees are encouraged to focus on addressing customer requirements (Ahire and Ravichandran, 2001). Thus, we suggest the following hypothesis:

H1a: Top management support is positively related to customer focus.

Top management sets up policies which encourage innovations and continuous improvement in an organization. For instance, the support for initiatives in the use of standard component, modular design of component parts makes design activities simpler. The effectiveness of design is improved as a result

(Kaynak, 2003; Kaynak and Hartley, 2008; Ou et al., 2010). In manufacturing activities, moreover, top management invests machines, equipment, etc., to increase level of automation as well as enhance implementation of preventive equipment maintenance and fool-proof of process design. This minimizes probability of employee errors and reduces variance in processes (Flynn et al., 1995; Forker, 1997; Kaynak, 2003; Lakhal et al., 2006; Saraph et al., 1989; Sila and Ebrahimpour, 2005). Thus, the following hypothesis is suggested:

H1b: Top management support is positively related to process control and improvement.

As traditional approaches, supplier management is seen as a mere administrative activity that mainly focuses on supplier selection. In this activity, price is the main criterion to evaluate suppliers. This can result in poor quality materials or even delayed orders. In new perspective, supplier management refers to not only selection of quality suppliers, but development of long-term relationship with suppliers and assessment of suppliers' performance also (Li et al., 2005). These activities only implement successfully if they receive support from top management (Kaynak, 2003; Kaynak and Hartley, 2008; Sila and Ebrahimpour, 2005; Singh, 2008; Zu et al., 2008). Top management actively participates in this process and selection will be based on review of more demanding criteria, e.g. quality, reliability of delivery activities and service. It ensures that firm has a reliable and high quality suppliers (Flynn et al., 1995; Trent and Monczka, 1999). Moreover, effective supplier management is considered a strategic area by top managers promoting higher levels of integration and collaboration (e.g. design, production, marketing, sales and customer service) with key suppliers. Thereby, communication, relationship, and cooperation among parties in the supply chain are improved (Ellram, 1995). Thus, we propose the following hypothesis:

H1c: Top management support is positively related to supplier management.

2.2. Customer focus

Customer focus is considered a key element for successful enterprises. All activities such as the development of new product/services, production, marketing, distribution and after-sales services should be concentrated on customer requirements. Each department and every employee should share customer-focused vision alike (Ahire and O'Shaughnessy, 1998; Ahire and Ravichandran, 2001; Flynn et al., 1995; Forza and Filippini, 1998; Lakhal et al., 2006; Nair, 2006; Sila and Ebrahimpour, 2005)

The implementation of customer focus practice helps companies to better understand customer expectations and market opportunities (Lakhal et al., 2006). Based on that, firms can be active in planning for purchasing, production, delivery, etc. For instance, firms can balance supply and demand, reducing variance in processes (Lee et al., 1997). In production activities, by understanding customer's demand, company could coordinate effectively machines, equipment and human resources to minimize process variances, reduce downtime and lead-time. Furthermore, employees knowing attributes of products/services can minimize errors and suggest improvements. Consequently, the effectiveness of processes and operational performance are improved. Finally, in the delivery stage, better shipment plans could be devised in order to reduce rate of late deliveries. Moreover, since customer's needs and wants are well identified, company can focus on value added activities and be able to eliminate or, at least reduce, defect rates, scrap, rework, returns, etc. (Dow et al., 1999; Fening et al., 2008; Lakhal et al., 2006; Rahman and Bullock, 2005; Samson and Terziovski, 1999; Zehir and Sadikoglu, 2010). Hence, we suggest the following hypothesis:

H2a: Customer focus is positively related to process control and improvement.

H2b: Customer focus is positively related to operational performance.

2.3 Supplier management

As referred earlier, cooperation between a company and key suppliers is a basic and critical SCM practice. Buyers collaborate with suppliers to ensure that input materials meet standards and quality requirements in order to produce quality products (Chen and Paulraj, 2004; Kaynak, 2003; Kaynak and Hartley, 2008; Li et al., 2005; Ou et al., 2010; Robinson and Malhotra, 2005; Vickery et al., 2003). High quality inputs, provided at the right time with the required quantity, helps firm to avoid downtime incidents, to reduce variance in processes and the rate of damaged materials (Flynn et al., 1995; Forza and Filippini, 1998). Moreover, effective supplier management can cut off inventory, waste and safety inventory level (Easton and Jarrell, 1998; Yeung, 2008).

From a supply chain perspective, suppliers are involved in firm's activities (Robinson and Malhotra, 2005). They can suggest the most appropriated components or parts for designing new products (Hoegl and Wagner, 2005), and help purchasers buying inputs that can be used most efficiently in manufacturing processes (Flynn et al., 1995; Forza and Filippini, 1998; Shin et al., 2000; Tan, 2001; Trent and Monczka, 1999). In addition, Vonderembse and Tracey (1999) showed that a good relationship with suppliers is useful for reducing order-time and rate of late orders. Hence, we suggest the following hypotheses:

H3a. Supplier management is positively related to process control and improvement.

H3b. Supplier management is positively related to operational performance.

2.4 Process control and improvement

Process control and improvement refers the use of statistical techniques, increasing automatic level of processes and fool-proof in designing process (Flynn et al., 1995; Forker, 1997; Kaynak, 2003; Saraph et al., 1989). These activities are helpful in decreasing process variance (Flynn et al., 1995) and minimizing chances of employee errors (Forker, 1997; Kaynak, 2003; Saraph et al., 1989). As a consequence, rate of damaged materials and late delivery, lead-time, unnecessary costs are reduced (Ahire and Dreyfus, 2000, Anderson et al., 1995), output increases and uniformity of products is higher (Anderson et al., 1994; Forza and Flippini, 1998). Furthermore, the use of preventive equipment maintenance make manufacturing process smoothly by improving reliability of equipment and restricting disruption in production (Ho et al., 1999). The relation of process control and improvement to operational performance is founded in the studies of Ahire and Dreyfus (2000); Forza and Filippini (1998). Hence, the following hypothesis is proposed:

H4: Process control and improvement is positively related to operational performance.

2.5 Operational performance

Operational performance refers to the ability of a company in reducing management costs, order-time, lead-time, improving effectiveness of using raw material and distribution capacity (Heizer et al., 2008). Operational performance has an important meaning to firms, it helps to improve effectiveness of production activities and to create high quality products (Kaynak, 2003), leading to increased revenue and profit for companies.

3. Research methodology

In this section the validation methodology of the conceptual model is described: (1) Identification and development of initial instrument, (2) personal interviews and Q-sort, (3) large-scale data collection and (4) large-scale analysis.

3.1 Identify and develop the initial instrument

The effective measurement instrument should cover all content domain of constructs (Parasuraman, 1991), measurement items of each construct should converge with other items statistically (Garver and Mentzer, 1999). In other words, two constructs which are similar in theory, are also the same in practical and vice versa. Constructs should have high level of reliable, short and easy to use (Li et al., 2005).

Based on a comprehensive literature review and definition of SCM practices in table 1, the scales of constructs were developed (table 2). A seven-point Likert scale was employed with a score of 1, indicating "strongly disagree", and 7, representing "strongly agree", to extract the different attitudes of respondents.

3.2 Personal interview and Q-sort

A structural interview of academicians with experience in the SCM area was conducted. These discussions were recorded, analyzed before to perform some improvements in the model. Q-sort method, then, was applied with the participation of some managers to assess initial construct validity, reliability and unidimensionality.

In the process of Q-sort method, some managers, who are working in the garment industry, were invited to review the scales of constructs in order improve their overall quality. Based on the feedback from experts, items were adjusted, and then, the official questionnaire was established.

3.3 Large-scale data collection

Target population in this study is Vietnam-based garment industry companies. The target respondents include presidents, vice presidents, directors, managers and coordinators who have information and experience in SCM. In the list of General Statistics Office in 2008, there are 3.174 garment enterprises. Contact information of companies was searched from website of *nhungtrangvang.com.vn*, which provides address, email, phone, etc. of companies in Vietnam. A total of 2.147 out of 3.147 garment enterprises were selected. The link of the official questionnaire was sent to these 2147 firms via email addresses. In order to increase the response rate, an electrical postcard was sent after the initial mailing to remind non-respondents. Depending on their requirements, a copy of questionnaire was mailed by post-office or the link of survey was sent to their email. One month later, the survey link, once again, was emailed. To encourage the cooperation of respondents, the survey results would be sent to them. A total of 246 questionnaires were received, resulting in the response rate of 11.5%. This is a significant rate with the method of email survey (Tse et al., 1995).

An estimate of non-response bias with T-test procedures was conducted in order to test the difference in items between early and late respondents (Armstrong and Overton, 1977). Results showed that no significant differences on the average scores of all observed items were found (internal confidence of 99%). It means that non-response bias exists between early and late respondents.

These 246 questionnaires were checked before analyzing in order to reduce errors in data entry process and detect missing values. After filtering data, there were 179 valid questionnaires, which were used for the next steps.

In addition, independent and dependent variables were obtained from the same respondent in each firm. This could lead to the presence of common method variance (CMV). Harman's single-factor test was calculated to test this existence (Podsakoff et al., 2003). Unrotated factor analysis was performed with all observed items. If only one factor emerges, in other words, if a general factor could explain most of covariance in all variables, it is rational to conclude that a significant CMV is existed. Results indicated that eight factors was appeared, however, when the number of items are too much, this way of testing is not really exact (Podsakoff et al., 2003). Therefore, in this case, items in each of the independent construct (SCM practices) were factor analyzed with items in the dependent construct's scale (operational performance). For each case, the results of factor analysis showed that two and more than two factors were emerged, meaning that there is no significant CMV.

Most of respondents are presidents, directors, vice directors, managers, etc. who had more than 5 years of working experience in the current company. Among them, 32.4% are retailers, 40.2% from manufacturing companies, 14.5% from distribution centers, fabric firms account 10.6% and the remaining are design-related companies. Approximately 26.8% of the firms had 10 or fewer employees, 35.8% of the firms employed between 10 and 49 workers, 19.6% of the firms had from 50 to 249 employees, and 17.8% of the firms had more than 250 employees.

3.4 Large-scale data analysis process

Firstly, Cronbach's Alpha coefficient was used for evaluating reliability of each construct (Antony et al., 2002). Cronbach's Alpha coefficient is a statistical test about the consistent degree to which observed items in a construct are correlated. Additionally, to improve Cronbach's Alpha coefficient, items which are low in item – total correlation coefficient will be deleted. Coefficient of item – total correlation expresses correlation among an item and the average score of other items in the same construct. Thus, the higher this coefficient is, the higher the correlation among items are and reliability of this construct is high at the result (Hair et al., 1995; Nunnally, 2010).

Then, exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were conducted to assess unidimensionality and validity of constructs, including: convergent validity, discriminant validity and criterion-related validity.

Additionally, the distribution of observed items is the normal distribution. Most of Kurtosis and Skewness range from (-1, +1), which is in acceptant range (Kline, 1998). Thereby, the method of ML (Maximum Likelihood) is appropriate to estimate parameters in the research model (Muthen and Kaplan, 1985).

If measurement items are unidimensional, reliable and valid, the analysis of structural equation model is carried out to test the hypotheses developed in the research model. In contrast, the process will turn back to literature review to redefine the constructs as well as the measurement instrument.

4. RESULTS

4.1 Test results of the measurement instrument

The measurement items were calculated Cronbach's Alpha and EFA with the support of SPSS (**S**tatistical **P**ackage for the **S**ocial **S**ciences) in advance. Extraction method used in EFA was Principal component – rotation method of Varimax. The breakpoint is at Eigenvalue ≥ 1 for all constructs in theory model. The results, in the table 2, indicated that two items were deleted because they do not get the target value. The remaining items have the coefficient of item-total correlation range from 0.578 to 0.784 (greater than 0.35), the minimum of Cronbach's Alpha is 0.791 (greater than 0.7), factor loadings range from 0.722 to 0.871 (greater than 0.4), Eigenvalue is greater than 1, the average variance extracted is greater than 50.

Then, CFA was carried out by AMOS software. After removing 3 items which do not get the target values, the measurement model including four constructs of SCM was tested with the following results: $\chi 2/df = .927$ (less than 3.0), Root Mean Square Error of Approximation (RMSEA) = .000 (less than 0.08), Akaike's Information Criterion (CAIC) = 320.734 < CAIC for Saturated Model (841.484) and CAIC for Independent Model (1452.991), Parsimony Goodness-of-Fit Index (PGFI) = .686 (greater than 0.5), Parsimony Normed Fit Index (PNFI) = .769 (greater than 0.5), Comparative Fit Index (CFI) = 1.000 (greater than 0.9), indicating that the measurement model is appropriate with the collected data (Bollen, 1989; Byrne, 1998; Carmines and McIver, 1981; Hair et al., 1995; Jaccard and Wan, 1996; Joreskog and Sorbom, 1993).

Table 2: Test results of measurement instrument

Constructs	Observed items	Cronbach's Alpha and EFA with SPSS					CFA with AMOS		
		Factor loadings	Item – total correlation	Eigenvalue	Variance extracted	Cronbach's Alpha	Standardized Regression Weights	Composite reliability	Variance extracted
Process control and improvement	Use of statistical techniques.	.803	.647	2.721	68.014	.843	.708	.844	.575
	Use of automatic processes.	.847	.710				.798		
	Use of fool-proof for process design.	Deleted					Deleted		
	Use of the preventive equipment maintenance.	.803	.649				.727		
	Clarity of work or process instructions.	.845	.706				.796		
Top management support	Offer of innovation and continuous improvement policies.	.761	.640	3.429	57.142	.85	.739	.809	0.514
	Provision of necessary resources for processes.	.800	.686				.726		
	Promotion of partners' involvement in firm's activities.	.761	.639				.693		
	Participation of top management in supply chain improvement process.	.749	.625				.708		
	Review of supply chain issues in top management meetings.	.740	.615				Deleted		
	Responsibility for operational performance.	.722	.593				Deleted		
Customer focus	Determination of customers' needs and wants.	.802	.623	2.461	61.517	.791	.75	.751	.502
	Use of information from customers in designing products and services.	.771	.583				.681		
	Understanding of products or services by employees.	.798	.617				.692		
	Commitment in satisfying customers.	.766	.578				Deleted		
	Relationship between company's goals and customers' expectations.	Deleted					Deleted		
Supplier management	Reliance on a few suppliers.	.839	.740	3.502	70.039	.893	.802	.893	.608
	Selection of suppliers based on quality.	.822	.717				.774		
	Development of long-term relationship with suppliers.	.826	.723				.765		
	Clear of the specifications provided to suppliers.	.826	.723				.777		
	Assessment of suppliers' capabilities and performance.	.871	.784				.837		
Operational performance	Reduction of management costs.	.768	.626	3.08	61.594	.844	.656	.868	.517
	Reduction of lead-time.	.780	.643				.670		
	Reduction of order-time.	.793	.661				.764		
	Reduction of rate of damaged materials.	.827	.705				.779		
	Reduction of rate of late delivery.	.754	.612				.697		

For the dependent construct, $\chi 2 = 6.977$, p = .222 (>0.05); df = 5; $\chi 2/df = 1.395$ (<3.0); GFI = .985, TLI = .988, CFI = .994 (>0.9); RMSEA = .047 (<0.08), CAIC = 68.723 < CAIC for Saturated Model (92.811) and CAIC for Independent Model (369.104), indicating that the measurement model of the dependent construct is appropriate with the collected data.

Standardized Regression Weights of all items are greater than 0.6 (the minimum value is 0.656) and significant (p<0.05). The composite reliability of all items ranges from .751 to .893, greater than the acceptant level of 0.6 and the average variance extracted ranges from 50.2% to 60.8% (>50%) (Table 2). In addition, the correlation coefficient between pairs of constructs ranges from .471 to .632 in the significant level of p = .000 (Table 3). In other words, constructs have discriminant validity (Steenkamp and van Trijp, 1991). Likewise, each SCM practices has high and positively related to operational performance, indicating that constructs have criterion-related validity (Chen and Paulraj, 2004; Kaynak, 2003; Li et al., 2005). It is concluded that scales of constructs have unidimensionality, reliability and validity (Bollen, 1989; Byrne, 1998; Carmines and McIver, 1981; Hair et al., 1995; Jaccard and Wan, 1996; Joreskog and Sorbom, 1993).

Table 3: Test results of correlation among constructs

	1	2	3	4	5
1. Customer focus	1				
2. Supplier management	.512	1			
3. Top management support	.480	.471	1		
4. Process control and improvement	.563	.569	.549	1	
5. Operational performance	.632	.523	.476	.619	1

4.2 Test results of hypotheses

The theoretical model was tested by method of SEM with the support of AMOS 5.0 software (Byrne, 1998). Test results of the structural model showed that $\chi 2/df = 1.072$ (<3.0), RMSEA = .020 (<0.08), CAIC = 498.249 < CAIC for Saturated Model (1429.286) and CAIC for Independent Model (1994.011), Parsimony Goodness-of-Fit Index (PGFI) = .719 (greater than 0.5), Parsimony Normed Fit Index (PNFI) = .776 (greater than 0.5), Comparative Fit Index (CFI) = .992 (greater than 0.9), indicating that the structural model is an appropriate fit with the collected data.

Figure 2 describes the SEM results of relationships among SCM practices and operational performance. Parameters on the arrows are Standardized Regression Weights (β) and P-value. The test results indicated that all of paths in the model are supported by the collected data (β ranges from .193 to .520 at the significant level, p<0.025). In other words, all hypotheses suggested in this study are approved.

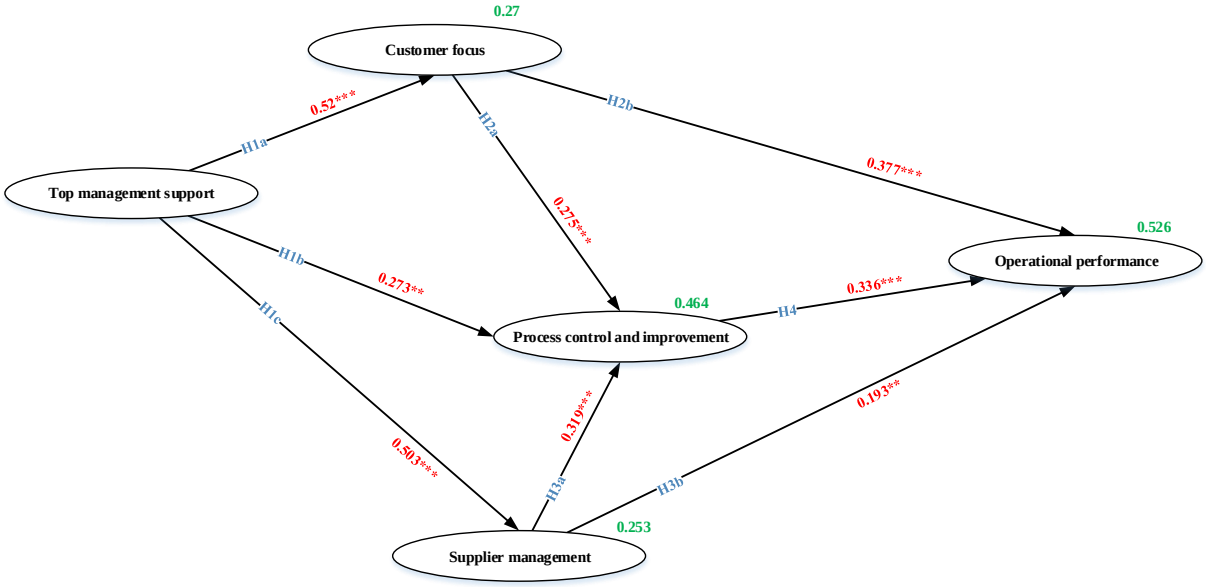

Figure 2: Test results of SEM

The R^2 for operational performance explained by the SCM practices is 0.526, indicating that the SCM practices can explain a large amount of variance in operational performance. Therefore, it can be said that SCM practices suggested in this study have important role in improving operational performance.

5. Discussion

The empirical results in this study provide an evidence to consider SCM practices as reliable predictors for operational performance. The interactions among SCM practices and the relation of these practices to operational performance were also proved. The next part will present further discussion about the role of each practice in the SCM implementation and the improvement of operational performance.

Firstly, the practice of customer focus is directly related to operational performance and indirectly through the relationship with process control and improvement. -

Customers are those who bring benefits for enterprises, so they are an important factor that any firms and supply chains want to find out and satisfy their requirements. When global trends have changed from offering what company can produce into selling what customers need and want, garment industry is no exception. Being an industry in which designs and materials frequently change seasonally, it requires enterprises to catch up customers' demand promptly. In the global value chain, the most essential factor to approach the design segment is to master customers' fashion interest.

The successful implementation of customer focus practice helps companies to better understand customer expectations and market opportunities. Thus, firms can balance supply and demand, coordinate effectively machines, equipment and human resources to minimize process variances and increase operational performance.

This correlation helps to understand the weakness of Vietnam garment industry. The export model of Vietnam mainly based on CMT (cut - make - trim) processing contract, in which, customers decide what kind of input materials are to be used, while the oversea distributors/ vendors choose all distribution channels. Hence, most of companies have no chance to communicate with their end-users and do not know what customers' expectations are. Consequently, Vietnamese garment enterprises only work at cutting & sewing stage - the lowest benefit and value-added segment.

Additionally, the relation of top management support to customer focus indicated that customer focus is a mediating factor in the relationship between top management support and operational performance.

Specifically, top management creates the organizational culture and provides necessary resources to determine customer demand that will result in increasing operational performance.Next, the practice of supplier management is directly related to operational performance as well as indirectly through the relationship with process control and improvement. In addition, supplier management is a mediating factor in the relation of top management support to operational performance. These are supported by studies of Easton and Jarrell (1998); Yeung (2008) and Vonderembse and Tracey (1999).

Nowadays, buying quality materials at a reasonable price becomes more and more difficult. To increase the effectiveness of purchasing, supplier management plays an extremely important role (Easton and Jarrell, 1998; Yeung, 2008). Different from the traditional view, many suppliers are chosen to have the cheapest price. Supplier management practice relies on a few suppliers and develops the long-term relationship with them. As a result, firm will have the stable supply, reduce the variance in price and processes as well as improve operational performance. The ineffective implementation of supplier management practice decreases the competitive advantage of garment enterprises in Vietnam. It is the fact that export orders are often delayed, due to the delayed import of materials. In addition, when there is a shortage of materials in market, some suppliers delayed shipments and took this opportunity to increase selling price. That's why, so far, only some leading firms have the ability to implement FOB contracts, a higher export method against CMT, that garment enterprises, themselves, can use materials which are procured somewhere without any directions from buyers, or be able to produce garments based on their own design, with no prior commitment of any kind from foreign buyers. The main cause is that Vietnamese garment enterprises have no reliable suppliers in quality materials and delivery time.

The study also confirms the relation of top management support to supplier management. It means that supplier management is a mediating factor in the relationship between top management support and operational performance. We can explain briefly this as follows. Top management are those selecting qualified suppliers and providing the best condition for them to participate in daily activities. This helps to increase efficiency of supplier management that will result in improving operational performance.

The relationship between process control and improvement and operational performance is supported in this study. When an organization can control and improve its processes effectively, manufacturing processes operate smoothly. Process variance and chances of employee errors are also minimized. Consequently, operational performance is improved. In addition, process control and improvement is also proved to have relationship with support practices, top management support, customer focus and supplier management. It indicated that the role of process control and improvement is as a mediating factor in the relation of the support practices and operational performance. The support practices create an environment supporting effective adoption of process control and improvement that will result in increasing operational performance.

This study, once again, proved role of the support SCM practice – top management support. The implementation of this practice can create environment to support for other SCM practices including supplier management, customer focus, process control and improvement, and indirectly improve operational performance. Specifically, the relationship among top management support, supplier management among customer focus provides an evidence about the role of top management support in building the relationship of partners in supply chain, Supplier – Firm – Customer. Top management support plays a role as "an adhesive" connecting members together. In addition, top management support can also maximize the capacity of supply chain through quality policies and objectives which mobilize participation of all employees in order to (1) determination of customers' needs and wants (2) assessment and selection of suppliers (3) improvement of production processes. Therefore, their support could create a good environment helping companies to improve their operational performance.

6. Conclusions and implications

This study explores the relationship among SCM practices and operational performance in a transitional economy. SCM practices, including: process control and improvement, top management support, customer focus and supplier management, should be implemented as an integration system rather than independent practices, in which they interact with each other to improve operational performance (Flynn

et al., 1995; Kaynak, 2003). The results of this study help to understand the weaknesses of the Vietnam garment industry and are supported by previous studies in other countries (Flynn et al., 1995; Kaynak, 2003; Lakhal et al., 2006; Tarí et al., 2007; Zu, 2009; Zu et al., 2008)

According to the results, SCM practices suggested in this study could explain 52.6% variance of operational performance. This is an remarkable rate because not only SCM practices suggested in this study, operational performance is also impacted by others, such as operational environment, capital, technology, equipment, human resource, information, etc. Each of above practices has a certain impact, and not any is the unique one to effect on operational performance. As a consequence, enterprises which have investment resource for equipment investment, technological innovations will be able to remarkably improve operational performance by implementing these SMC practices. In other words, in the same conditions of finance, technology, equipment, environment, etc. those that can well address these SCM practices will have higher operational performance. For the purpose of improving operational performance at Vietnamese garment companies, some following proposals are suggested:

- It is necessary to focus on customers who should be considered as the "heart" of all activities. The efforts of companies should concentrate on how to satisfy their customers. To do so, companies need to determine what customers' needs and wants are by accessing networks of distribution center, wholesale, retail, etc., and use these information in designing products and services. It is important to assure employees, especially who contacts directly to customer, to understand the products or services of company clearly. Moreover, enterprises need to promote marketing activities and trade promotion, establish networks to collect the feedbacks from customers, understand what their expectations are and participate in the activities which create more benefits in the global apparel value chain.

- Choosing a few suppliers who have high quality and are certified. Companies should set up an effective information network to communicate with suppliers, make clear specifications provided to suppliers and enhance the relationship with supplier as strategic partners. It is useful to help in decreasing amount of inspection, review, or checking for incoming quality at company's plant. For foreign suppliers, instead of negotiating individually, enterprises should cooperate, based on Textile and Apparel Association to deal with suppliers about quality, price, etc.

- Firms need to strengthen in controlling and improving processes in order to improve operational performance by using statistical techniques, preventive equipment maintenance, and increasing automatic level of processes preventive equipment (Forker et al., 1997; Kaynak, 2003; Saraph et al., 1989).

- Last but not least, top managers act as a driver of implementing the other practices. Operational performance will be increased if top managers participate in supply chain improvement process, provide necessary resources for processes and promote partners' involvement in firm's activities (Forker, 1997; Kaynak, 2003). Top management has to be pioneers in implementation of innovation and continuous improvement policies along the supply chain. (Kaynak, 2003). It is equally important that these goals and policies need to be clear and provided fully to employees (Forker, 1997; Kaynak, 2003; Kaynak and Hartley, 2008).

The improvement of operational performance leads to the augment on revenue and profit for company. Employee income will increase and their living conditions also. Consequently, their loyalty to company enhances as well. Government budget is also increased via tax.

Finally, the proposed structural equation model analyzing the relationship among SCM practices and operational performance as well as its validation using the Vietnam garment industry provided valuable insights both from theoretical and practical perspectives. However, there are some limitations that can guide academics to new lines of future research: (i) to extend the scope of the survey to include different countries and new situations, so results can be generalized and (ii) to explore additional factors that can further explain operational performance, such as operational environment, capital, technology, human resource, etc.

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