

Uncertain Supply Chain Management

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The role of company competitiveness as mediation variable the impact of supply chain practices on operational performance

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CHRONICLE

Article history:

Received May 2, 2020
Received in revised format
September 18, 2020
Accepted October 29 2020
Available online
November 1 2020

Keywords:

Supply chain practices
Company competitiveness
Operational performance
Food and beverage industry
Indonesia

ABSTRACT

This study aimed to explain the role of supply chain practices on operational performance, and supply chain practices on company competitiveness and to analyze the impact of company competitiveness on operational performance. In addition, we also investigate the impact of supply chain practices on operational performance through role of company competitiveness as mediation variable. The study was conducted in South Sulawesi Province, Indonesia. Primary data were collected by questionnaire instrument from 108 food and beverage companies. Method of analysis was both descriptive statistical analysis, and Structural Equation Modelling (SEM). The study also used Sobel test to determine significance level of mediation role in the model. The results show that supply chain practices could give a positive impact on operational performance. Supply chain practices also gave a positive impact and significant on company competitiveness. Then, company competitiveness had a positive impact and significant on operational performance. Additionally, supply chain practices also had a positive impact on operational performance indirectly through the role of company competitiveness as mediation variable. Hence, supply chain practice was the most important variable to increase both company competitiveness and operational performance. Each company is recommended to implement this variable as competitive weapon in order to get a better operational performance and competitiveness as well.

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1. Introduction

As one of best practices in operational management area, management of supply chain has become a very important strategy and concept for many companies in maintaining its position and competitiveness in the global market (Heizer & Render, 2005; Munizu et al., 2017). Pujawan (2010) said that supply chain management may increase both efficiency and value of organization along the supply chain system by providing goods, money, and information to meet the customer need and creating customer satisfaction. Therefore, supply chain management activities start from customer demand and finished by customers which were satisfied (Chopra & Meindl, 2011; Saha et al., 2015; Pono et al., 2018). Based on management literature, concept of supply chain has been introduced by Oliver and Weber since 1982. Supply chain refers to a physical networks, namely a number of companies which are supplying a set of raw materials, producing goods, and distributing them to end customers, while supply chain management refers to strategies, approaches, methods and tools in managing supply chains to maximizing the value obtained by all company members in the overall supply chain system (Chopra & Meindl, 2011). As a system, supply chain management integrated all activities in the organization which starts from the procurement of raw materials and services, then transformate them into semi-finished product, end-products, and finally deliver them to end-customers (Heizer & Render, 2015). Every company can achieve competitive advantage through optimize resource for achieving best supply chain management and sustainable company competitiveness (Simchi-Levi et al., 2000; Pujawan, 2010). Technically, supply chain management needs full commitment either by managers or employees

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doi: 10.5267/j.uscm.2020.11.002

within company. Then, it can be adopted by all industries in developed and emerging countries in order getting best performance. However, in practice there are some differences in orientation between one country and another, for example in terms of cost reduction and customer orientation policies (Kot et al., 2018).

Supply chain management involves all members, from suppliers to customers, directly or indirectly by jointly fulfilling customer orders. Through an efficient supply chain, companies can minimize all cost components incurred in the company operations. It can have an impact on improving product quality, and speed of product delivery to customers (Chopra & Meindl, 2011). While competitive advantage is related to organization ability to create value through its resources that is different, unique, and relatively cannot be imitated by competitors. The company competitiveness can be improved through improvements to the elements which include cost/price, quality, flexibility, and speed of product delivery (Lakhal, 2009). Companies that have better competitiveness compared to competitors in the market have superior performance, especially in the aspects of sales growth, market share growth, return on investment (ROI) as well as productivity (Li et al., 2006). Testing of relationship among variables of supply chain practices, competitiveness, and company performance has been reported in the management literature, and particularly in the field of operational management. Based on a literature review, several differences were found between one study and another. This is caused by many factors, including the level of knowledge of respondents, the number of variables indicator, different research objects, and the area of study. Effective supply chain practices can improve companies competitiveness and also can produce better organizational performance (Li et al., 2006; Hsu et al., 2009; Kianto et al., 2013; Armayah et al., 2019; Munizu et al., 2019), while Singh et al. (2010) found a negative relationship between supply chain management and retail industry performance. Hence, based on some empirical findings which is described above, this study will reveal the impact of supply chain practices on operational performance, the impact of supply chain practices on company competitiveness, and the impact of company competitiveness on operational performance. Moreover, this study also investigates the direct impact of supply chain practices on operational performance through mediation role of company competitiveness in the context industry of food and beverage in South Sulawesi, Indonesia.

2. Literature Review

2.1 Supply Chain Practices

Supply chain management conceptually consists of a set of approaches that integrate a number of activities that begin from suppliers to manufactures, storage, and customer. It is included a set of activities in producing and distributing goods in the right amount, right location, and right time. As a result, many companies can achieve minimum operating cost, including satisfaction for customers (Simchi-Levi et al., 2000). It involves coordination of the entire activities of supply chain that begin from supplying of materials to industries and ends on getting best customer satisfaction (Heizer & Render, 2015).

A number of studies have examined the effect of supply chain practices toward operational performance. For example, Li et al. (2006) concluded that effective supply chain practices can generate better operational performance at every organization. Then, the study of Hsu et al. (2009) and Hong et al. (2018) asserted that the grade of performance is determined by supply chain management practices. Because supply chain management can reduce the rate of production cycle-time and increase company productivity (Munizu et al., 2017; Choi et al., 2017). Related to above review, then the hypothesis-1 can be developed as below:

H₁: Supply chain practices can generate better operational performance.

2.2 Company competitiveness

Nowadays, the highly competitive market has challenged to every company for use their resources wisely for survive continuously in the global market. Companies can maximize the competitive advantage of their organizations through low-cost strategies, differentiation, and focus (Porter, 1985). Company competitiveness is a set of values generated by the company's resources, and enabling each organization to be relatively superior compared to its competitors in the global market (Barney, 1991). The competitive advantage can be observed from several important elements includes price element, quality, delivery dependability, time to market, and product innovation (Li et al., 2006; Mzoughi et al., 2008). As result of the review of literature, it can be seen that there are several studies that have been conducted in testing the relationship between supply chain practices and company competitiveness. Li et al. (2006) found that effective supply chain practices can improve company competitiveness. In addition, it was found that integrated supply chains can lead to increased company competitiveness (Li et al., 2006; Munizu et al., 2017). A number of previous studies stated that supply chain practices is one of the important factors to increase the company competitiveness. Related to above review, then the hypothesis-1 can be developed as below:

H₂ : Supply chain practices can generate better company competitiveness.

2.3 Operational performance

Conceptually, the performance of company is related to the achievements of a company over a certain period, as outcome or achievements generated through the company's operational activities (Choi et al., 2017). According to Kaplan and Norton (1996) measurement of overall organizational performance is the most important thing that must be carried out by many companies to assess whether some activities conducted as long as one period can reach the firm target. In addition, organizational performance includes financial and non-financial/ operational measurement. Operational performance is usually focused on three main things that related to efficiency, quality and time.

Based on above literature review, several studies found that firm competitiveness has a significantly relationship toward operational measurement (Li et al., 2006; Mzoughi et al., 2008; Singh et al., 2010; Choi et al., 2017). Hence, the hypothesis of this study can be developed as below:

H₃ : Company competitiveness can generate better operational performance.

H₄ : Supply chain practices can indirectly increase operational performance through company competitiveness as mediation variable.

3. Method

Quantitative approach is used to run this study. District of Gowa and Makassar city is selected as location of this study because they are well-known as center of manufacturing industry in South Sulawesi, Indonesia. The number of samples was 108 busines unit. The sample is determined by using Slovin formula at $\alpha = 10\%$. The sampling technique used a simple random sampling method, where the whole population members have the same opportunity to select as research samples (Hair et al., 2006). The respondents were owner/manager of food and beverage companies who voluntarily are willing to provide relevant information related to this study. Based on the conceptual model, the variables tested for their relationship in this study consists of exogenous variables, namely supply chain practices (X_1), and company competitiveness as endogenous-1 (Y_1), and operational performance as endogenous-2 (Y_2). Supply chain practices has four indicators, namely strategic supplier partnerships ($X_{1.1}$), customer relationships ($X_{1.2}$), information sharing level ($X_{1.3}$) and the postponement ($X_{1.4}$). These indicators were adopted and elaborated from Beamon (1998) and Li et al. (2006). Then, company competitiveness also has four indicators; namely price ($Y_{1.1}$), quality ($Y_{1.2}$), flexibility ($Y_{1.3}$) and speed of delivery ($Y_{1.4}$). These indicators were adopted and elaborated from Li et al. (2006) and Lakhali (2009). Then, operational performance have five indicators, namely production costs ($Y_{2.1}$), speed of order supply ($Y_{2.2}$), production cycle time ($Y_{2.3}$), ability to fulfill due date ($Y_{2.4}$), and productivity ($Y_{2.5}$). These indicators were adopted and elaborated from Heizer & Render (2015) and Choi et al. (2017).

We measure respondent's perception by using a Five Point's Likert Scale. This scale has five score (1-5) and it describes perception of respondent start strongly disagree until strongly agree toward the whole statements in the questionnaire (Ghozali, 2011; Sugiyono, 2014). The questionnaire tested before the data collecting phase is aimed to make sure the reliability and validity of instrument. A valid instrument is indicated by score of correlation coefficient ≥ 0.30 and at significance level $\alpha = 0.05$ for each indicator of variable. While a reliable instrument is indicated by score of Alpha Cronbach ≥ 0.60 (Hair et al., 2006; Sugiyono, 2014). In brief, the results are presented as follow.

Table 1
Result of Validity and Reliability Analysis

Variable/ Indicator	Correlation Coefficient (r)	Cronbach Alpha (α)	Remark
Supply Chain Practice (X)	-	0.882	Valid & Reliable
Strategic supplier partnerships	0.460		
Customer relationships	0.577		
Information sharing level	0.684		
Postponement	0.585		
Company Competitiveness (Y_1)	-	0.740	Valid & Reliable
Price	0.665		
Quality	0.548		
Flexibility	0.712		
Speed of delivery	0.482		
Operational Performance (Y_2)	-	0.778	Valid & Reliable
Production costs	0.665		
Speed of order supply	0.590		
Production cycle time	0.448		
Ability to fulfill due date	0.722		
Productivity	0.664		

Furthermore, this study uses three methods of analysis include descriptive statistics, structural equation modeling (SEM), and Sobel test. Descriptive statistical analysis describes the characteristics of respondents and research variables by using percentage (%) and mean value. Then, SEM used in this study was to test the hypothesis. Moreover, testing the mediation

effect is performed by using Sobel Test. It determines the effect of mediation role of company competitiveness variables on the relationship between supply chain practices and operational performance. On the other word, sobel test can show the strength of exogenous variable effect indirectly (X_1) to endogenous variable-2 (Y_2) through mediation role of endogenous-1 variable (Y_1). Indirect effects are obtained by multiplying the path coefficient (standardized) of each path in the model (Kline, 2011).

3. Results and Discussion

3.1 Statistical Descriptive Analysis

Profiles of research respondents were described by gender, age, education, and length of business. The description of profile can be presented in Fig. 1 below. As shown, there were 108 respondents in this research, consisting of 78 men (72.22%) and 30 women (27.78%). By age, most respondents aged between 31-50 years (66.67%). In addition, as many as 64 (59.26%) respondents have Diploma and Bachelor level and the remaining are respondents who have high school education (37.04%) and postgraduate (3.70%). Also, the result of descriptive analysis showed that 58 (53.70%) respondents had performed the business between 11 to 20 years.

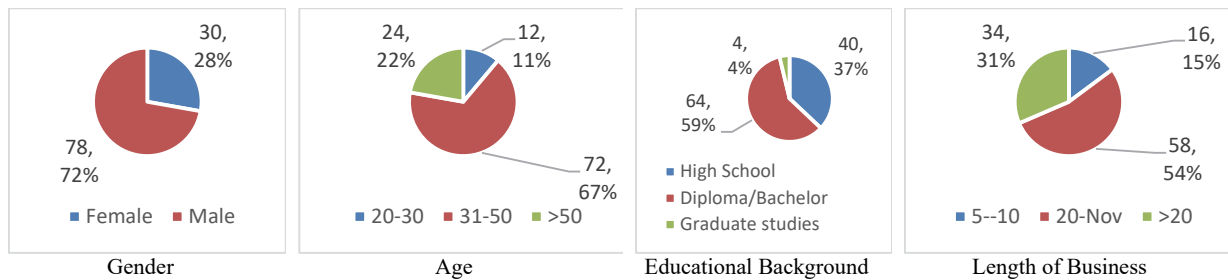


Fig. 1. Research Respondent Profile

3.2 Confirmatory Factor Analysis (CFA)

This analysis describes the research variables in terms of contribution each indicator toward factor or variable. Statistically, it can be explained that indicator variable which has the highest loading factor compared to other indicators in the factor is an important indicator in forming variable or factor. As previously described that variable of supply chain practices was measured by four indicators i.e. strategic supplier partnership, customer relationship, information sharing level, and the postponement. Then, the results of analysis can shown clearly as below.

Table 2
CFA - Supply Chain Practices

Variable - Indicators	Estimate (Standardized)	Critical Ratio (C.R)	Prob.	Remark
Supply chain practices $\rightarrow X_{1.1}$	0.810	Fix	Fix	Positive & Significant
Supply chain practices $\rightarrow X_{1.2}$	0.564	4.912	0.000	Positive & Significant
Supply chain practices $\rightarrow X_{1.3}$	0.648	5.711	0.000	Positive & Significant
Supply chain practices $\rightarrow X_{1.4}$	0.518	4.242	0.004	Positive & Significant

As a result of this analysis, it can be concluded that strategic supplier partnership, customer relationship, information sharing level and the postponement are valid and significant indicators of supply chain practices. it is indicated by probability value for all indicators more than α standard (prob. < 0.05). In addition, results in Table 2 showed that strategic supplier partnership ($X_{1.1}$) is the most important indicator of supply chain practices variable with loading factor value of 0.810. This indicator has a greater value than other indicators in the variable. A relationship of strategic partnership is a pattern of relationships built by a company to its supplier partners in long-term. The implications of this relationship have an impact on improving product quality, product development and innovation, continuous improvement and problem-solving by involving all supplier partners in the system. Then, as previously described the variable of company competitiveness was measured by using four indicators i.e. cost or price, quality, flexibility, and speed of delivery. Briefly, results of analysis can be shown clearly as follows.

Table 3
CFA - Company Competitiveness

Variable - Indicators	Estimate (Standardized)	Critical Ratio (C.R)	Prob.	Remark
Company competitiveness $\rightarrow Y_{1.1}$	0.544	4.430	0.001	Positive & Significant
Company competitiveness $\rightarrow Y_{1.2}$	0.728	Fix	Fix	Positive & Significant
Company competitiveness $\rightarrow Y_{1.3}$	0.660	5.820	0.000	Positive & Significant
Company competitiveness $\rightarrow Y_{1.4}$	0.556	4.726	0.000	Positive & Significant

These results prove that indicators of variable including price, quality, flexibility, and speed of delivery are valid and significant in creating the variable of company competitiveness. Because of probability value for all indicator more than α

standard (prob. < 0.05). Based on the table, quality ($Y_{1,2}$) is the most important indicator of company competitiveness variable with loading factor value of 0.728. This indicator has a greater value than other indicators in the variable of company competitiveness. Therefore, product quality is an important element in improving company competitiveness. Furthermore, operational performance variable was measured by using five indicators i.e. production costs, speed of order supplying, cycle time production, ability to fulfill due date, and productivity. Briefly, results of analysis can shown clearly as follows.

Table 4
CFA - Operational Performance

Variable - Indicators	Estimate (Standardized)	Critical Ratio (CR)	Prob.	Remark
Operational performance $\rightarrow Y_{2,1}$	0.642	5.180	0.000	Positive & Significant
Operational performance $\rightarrow Y_{2,2}$	0.525	4.112	0.005	Positive & Significant
Operational performance $\rightarrow Y_{2,3}$	0.679	5.886	0.000	Positive & Significant
Operational performance $\rightarrow Y_{2,4}$	0.798	Fix	Fix	Positive & Significant
Operational performance $\rightarrow Y_{2,5}$	0.564	4.782	0.000	Positive & Significant

As result of this analysis, it can be known that production costs, speed of order supplying, cycle time production, ability to fulfill due date, and productivity are valid and significant indicators of operational performance variable. Because of probability value for all indicator more than α standard (prob. < 0.05). Based on the table, ability to fulfill increase due date ($Y_{2,4}$) is the most important indicator of operational performance variable with loading factor value of 0.798. This score is greater than other indicators in the variable of operational performance. So, the improvement of the company's ability to fulfill customer orders has an impact on decreasing customer complaints.

3.3 Structural Equation Modeling Analysis

To examine research hypotheses, this study uses structural equation modeling (SEM) analysis. In addition, this analysis also used to investigate complex models in the quantitative research that test the impact of exogenous variables on endogenous variables based on empirical data which collected by field survey. The result of empirical model explains the relationship among variable of supply chain practices, company competitiveness, and operational performance can shown clearly as below.

Table 5
The result of goodness of fit model

Criteria	Cut-off	Result	Description
Chi Square	Expected small	52.216	Marginal
AGFI	≥ 0.90	0.802	Marginal
GFI	≥ 0.90	0.844	Marginal
RMSEA	≤ 0.08	0.036	Fit
CFI	≥ 0.95	0.968	Fit
TLI	≥ 0.94	0.959	Fit

As results of the goodness of fit model as presented in the table, it can be concluded that from six criteria standards, there are three criteria i.e. Root Mean Square Error of Approximation (RMSEA), Tucker Lewis Index (TLI), and Comparative Fit Index (CFI) that have met the requirements, while three other criteria i.e. Chi Square, Adjusted Goodness of Fit Index (AGFI), and Goodness of Fit Index (GFI) have score no met cut off value of goodness of fit model. However, based on the principle of parsimony theory, this research model is acceptable and no further modification through the modification index way (Ferdinand, 2006; Kline, 2011). Hence, this final model result is presented by table below.

Table 6
Result of empirical model

Relationship	Estimate (Standardized)	Critical Ratio (CR)	Prob.	Remark
Direct Impact				
Supply Chain Practices \rightarrow Operational Performance	0.304	2.880*	0.016	Significant (H ₁ , accepted)
Supply Chain Practices \rightarrow Company Competitiveness	0.580	5.445*	0.000	Significant (H ₂ , accepted)
Company Competitiveness \rightarrow Operational Performance	0.612	6.116*	0.000	Significant (H ₃ , accepted)
Indirect Impact (company competitiveness as mediation variable)				
Supply Chain Practices \rightarrow Operational Performance		0.354*		Significant (H ₄ , accepted)

The data in the table above shows that all hypotheses tested in this research model are supported by empirical facts. The first hypothesis (H1) stated that supply chain practices have a significant impact on operational performance. This is supported by critical ratio (C.R) value that is greater than t-table value ($2.880 > 1,960$), and a probability value that is smaller

than standard α ($0.016 < 0.05$). In addition, direct impact of the variable of supply chain practice on operational performance can be seen from the value of path coefficient (standardized estimate) of 0.304. The results of this study prove that better implementation of supply chain practices can increase operational performance. The results of this research are in line and support previous research conducted by Li et al. (2016) who found that effective supply chain practices leads to better company performance. Effective supply chain practices can increase company performance positively in terms of aspects of financial, marketing, operation, and human resource measurement (Hsu et al., 2009; Kianto et al., 2013; Armayah et al., 2019; Arifin et al., 2019).

The result of Table 6 also supports the second hypothesis (H2) which states that supply chain practices have a significant impact on the company competitiveness. This is supported by critical ratio (C.R) value which is greater than t-table value ($5.445 > 1.960$), and a probability value that is smaller than standard α ($0.000 < 0.05$). In addition, the direct impact of the variable of supply chain practice on company competitiveness can be seen from the value of the path coefficient (standardized estimate) of 0.580. This finding shows that effective supply chain practices can lead to better company competitiveness. The results of this study support findings of Li et al. (2006), Mzoughi et al. (2008), and Munizu et al. (2017) inferred that practices of supply chain increase company's ability to build strategic relationships with suppliers, customer relationship, information sharing level, and flexibility in fulfilling customer orders can affect company competitiveness. In other words, those practices can lead to effort in creating best company competitiveness.

Furthermore, the result of table also confirms the third hypothesis (H3) which states that company competitiveness have a significant impact on the operational performance. This is supported by the value of the critical ratio (C.R) which is greater than the value of t-table ($6.116 > 1.960$), and a probability value is smaller than standard α ($0.000 < 0.05$). In addition, the direct impact of variable of competitiveness on operational performance can be seen from the value of the path coefficient (standardized estimate) of 0.612. These results indicate that the better competitiveness can increase the operational performance. The findings of this research are in line with the results of previous studies which concluded that continuous improvement efforts towards elements of competitiveness including competitive pricing, quality, flexibility, and speed of product delivery to customers will improve operational performance (Mzoughi et al., 2008; Singh et al., 2010; Choi et al., 2017). The data in the table also proves that the fourth hypothesis (H4) stated that supply chain practices have a significant impact on the operational performance through the role of mediating variables of the company competitiveness supported by empirical facts. The results of the indirect impact on Sobel Test shows that probability value of Sobel test (0.001), Aroian test (0.001) and Goodman test (0.002) are smaller than value of standard α (5%). The coefficient value of indirect impact of supply chain practices on operational performance was 0.354. Based on the result, it could be inferred that the role of company competitiveness variables as mediation variables could be categorized as "partial mediation". As one of strategies in operation management, supply chain practices implementation can give a positive contribution in increasing both company competitiveness and organizational performance within companies. Best implementation in strategic partnerships with suppliers, customer relations practices, information sharing, postponement has become important element to generate a good supply chain system. This can be indicated by lower production costs, decrease production cycle times, and fast fulfillment of customer orders (Lin, Huang, & Lin, 2002; Prajogo et al., 2016; Munizu et al., 2017). Related to this findings, food and beverage companies can maintain its competitive position through implementation of supply chain management effectively in the global market (Swafford et al., 2006). Additionally, effective supply chain management can be achieved when all members in the supply chain system have the same commitment in implementing important elements of supply chain practices consistently and sustainably in the future.

4. Conclusion

As one of management best practices in operation and production area, supply chain practices is an important element that is used by many firms to reach their goals. This study has proved that the variable of supply chain practices enhances significantly operational performance as well as company competitiveness. The ability of each company to build strategic relationships with suppliers, customer relationship, higher levels of information sharing, and more flexible in changing customers demand can generate better operational performance and company competitiveness. Then, variable of company competitiveness has a direct impact and significant on operational performance. Thus, the ability of company in setting competitive product prices, producing quality products, meeting customer needs flexibly, and making on-time product delivery can increase operational performance, as observed through lower production costs, and increase productivity. This study has explained that supply chain practices not only directly enhances operational performance but also indirectly can increase operational performance of the firms through the mediation role of company competitiveness variable.

The findings of this study provided some practical implications for firm managers. The successfulness of supply chain practices must be supported by managers through some strategic policies and action plan well-implemented, because better supply chain practices can generate a high competitiveness and operational performance of the firm. A strong management commitment and good ability in running supply chain practices become the key factors for getting best firm performance, especially in the context of manufacturing industry.

Acknowledgement

The authors are grateful to the all team members that supported this project including material and financial aspects, which helped research project completed the work on scheduled. Moreover, we thank to the whole staffs of management department, especially in providing some materials that supported this study to conduct the research.

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