



Effect of Supply Chain Management Practices on the Firm Performance: A Study on Ethiopian Textile Manufacturing Industries

Worku Gadisa^{1*}, Zerihun Ayenew², & Tesfaye Eba³

¹ Research Scholar, Department of Management, Wollega University, Ethiopia

² Department of Management, Jimma University, Jimma, Ethiopia,

³ Department of Management, Ambo University, Ethiopia

Abstract

Article Information

The study results on the impact of supply chain management strategies on business performance are presented in this article. Using an explanatory research design, a causal analysis of the relationship between the independent factors and the dependent variable was carried out as part of the study. The study's specific areas of interest were supply chain relationships, responsiveness, supply chain integration (as an independent variable), and firm performance. In order to ascertain the impact of supply chain management strategies on business performance, a linear multiple regression model was employed. The study's conclusions showed that the firm performance of the textile manufacturing sector is influenced by supply chain relationships, responsiveness, and integration-related factors, in that order. Furthermore, the most pressing problem in enhancing organisational performance nowadays is reactivity. It is therefore advised that managers and staff at the business respond to the customer's request right away.

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*Corresponding Author:

Worku Gadisa

E-mail:

workugadisa2006@gmail.com

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INTRODUCTION

A supply chain is a network of businesses, individuals, tasks, information, and materials that facilitates the movement of goods from a supplier to a customer. Supply chain operations convert raw materials, components, and natural resources into completed commodities that are supplied to the end user (Karimi & Rafiee, 2014). Additionally, controlling the flow of products, services,

funds, and information both within and between business entities—including suppliers, producers, and customers—is what defines supply chain management, or SCM (Feng and Shanthikumar, 2018). Furthermore, to deliver goods, services, and information that are important to the target market and other stakeholders, supply chain management integrates critical business activities from the

customer via the original suppliers (Foerstl et al., 2015). In addition to these realities, businesses are having difficulty launching items on the market promptly, in the appropriate quantities, and in the appropriate locations because of the complexity of the supply chain. Consequently, companies began to realise how important it is to boost efficiency to keep a competitive advantage (Zhou & Li, 2020).

The ultimate objective of supply chain management (SCM) is to more efficiently satisfy customer demand by supplying the right product in the right amount at the right location, at the right time, and in the right condition (Agus, 2015). As a result, supply chain management has grown in significance in a market that is highly competitive. If companies wish to compete at the supply chain level, they must put in place an appropriate supply chain management plan. Coordination and integration of the strategy throughout the supply chain are necessary to enhance the performance of participants in the chain. SCM is a set of methods and practices for effectively integrating suppliers, manufacturers, distributors, and customers in order to improve the long-term performance of individual companies as well as the supply chain as a whole, according to Huang et al. (2014).

In The study by Carbonara and Pellegrino (2018) discovered that supply chain management techniques have a favourable and significant impact on organisational performance in addition to the previously listed activities. On the other hand, having an effective supply chain management system is the most crucial and beneficial strategy to boost performance and maintain market

competitiveness. Because supply chain management across companies is very competitive, doing this helps businesses stay competitive in the market (Nawaz, 2020). Additionally, it is determined that supply chain management strategies give businesses a competitive edge that boosts their performance in the marketplace and finances. According to a 2017 analysis by Welbourne, textile exports account for over 27% of India's foreign exchange earnings and provide for nearly 14% of the nation's total industrial output. According to a different study by Alkasim et al. (2018), India's textile manufacturing sector is the most advanced and skilled in both home and foreign markets. With an approximate contribution of 21.5% to global textile production, the textile manufacturing sector in India is the second largest industry in the world, after China. (Staritz, 2017). In particular, Oqubay's (2019) research in Ethiopia found that industrial parks face a number of difficulties, including low capital, low foreign exchange, low production capacity, inadequate management expertise, ineffective institutional service, lack of coordinated effort, subpar customs and logistics services, inadequate infrastructure and public services, and a scarcity and low quality of raw materials. Consequently, the purpose of this study was to ascertain how supply chain management strategies affected the performance of the company in the textile manufacturing sector in a few Ethiopian industrial parks.

MATERIALS AND METHODS

The study population had two strata: Bole Lemi Industrial Parks and Adama Industrial Parks in Ethiopia. Particularly, the study

focused on the textile manufacturing companies that are operating within the parks. The study used an explanatory research design, starting with a quantitative survey study and then following up with a quantitative study to best understand the research problem, as the objective was to investigate the cause-and-effect relationship between supply chain management practices and firm performance.

The study used supply chain information management, supply chain integration, and supply chain responsiveness as independent variables and firm performance as dependent variables. Moreover, the study used both primary and secondary sources of data. Specifically, the primary source of data was collected from officers of the company, company managers, and customs and transit using structured questionnaires. The study used a multiple linear regression model to analyse the causal relationship between supply chain management practices and firm performance, aided by SPSS software version 25 as a data analysis tool.

Reliability test

The reliability test ensured that the scale used on the questionnaire was assessing the variables it was supposed to measure and that the score returned from it was stable or consistent (Cronbach, 1955). According to Devictor (2008), Cronbach's alpha is a reliability coefficient that provides objective estimations of data generalisation. The guideline states that if the coefficient of reliability is 0.7 or higher, Cronbach's alpha is acceptable. Using Cronbach's alpha, the internal consistency of the items that make up the dimensions of the independent and dependent variables was examined. As a result, as recommended by Gunasekaran et al. (2008), the average correlation between items in the scales of the corresponding dimensions that reflect the independent and dependent variables has been used to assess the reliability of the study instrument. Table 1 displays the resulting Cronbach's alpha values for each of the dimensions.

Table 1

Reliability test

Independents and dependent variables	No item for each of them	Cronbach's Alpha results from all variables
Total	4 (3 Independent Variables and one dependent Variable)	0.931

Test of Assumptions of Multiple Linear Regression

Normality of Distribution

The normal distribution is a very commonly used continuous probability distribution function. Normal distributions are also

important in statistics and social sciences for real-valued random variables whose distributions are not known. In this study, the researcher used a histogram and dot plot to check the normality distribution, see Figure 1.

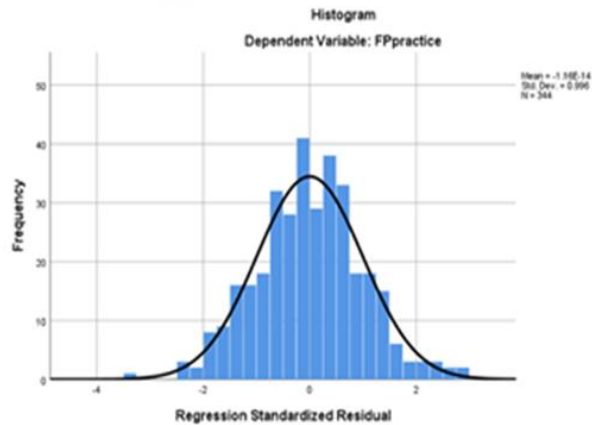


Figure 1 *Regression Standardized residual*

The purpose of this test is to determine whether the independent and dependent variables have a linear relationship. It can be concluded that the variables are normally distributed if the NPP line roughly resembles a straight line (Chelapati, 1972). This suggests a linear link between the variables by showing that a straight line could shape the relationship between the independent and dependent variables. The concept of linearity presupposes a linear link between variables. If residuals exhibit heteroscedasticity—a tendency to spread far apart or pack together at particular values—this test determines whether the residuals are equally distributed. To verify the normalcy assumption, the researcher employed a scatter plot and a normal probability plot (NPP). The graphs demonstrate the normal distribution of the data utilised in this study. The researcher can now perform numerous linear regression analyses thanks to this outcome.

Linearity Test and Homoscedasticity

The purpose of this test is to determine whether the independent and dependent variables have a linear relationship. It can be inferred that the variables are normally distributed if the NPP line roughly resembles a straight line (Chelapati, 2011). This suggests a linear link between the variables by showing that a straight line could shape the relationship between the independent and dependent variables. The underlying premise of linearity is the linear correlation between variables. If residuals exhibit heteroscedasticity—a tendency to spread far apart or pack together at particular values—this test determines whether the residuals are equally distributed. To verify the normalcy assumption, the investigator employed a scatter plot and a normal probability plot (NPP); refer to Figures 2 and 3. The data for this study was linear and homoscedastic, as the pictures demonstrate.

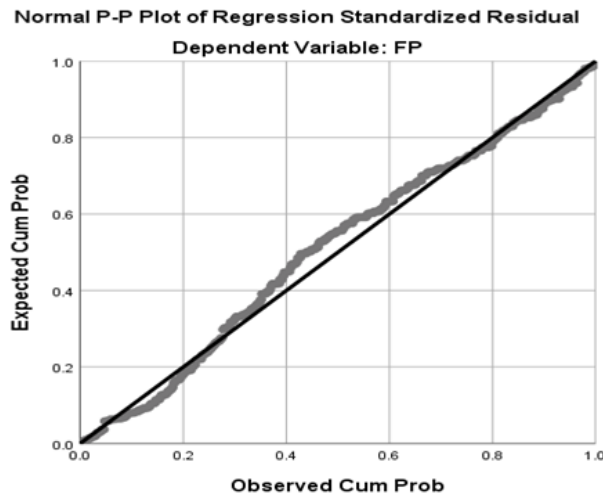


Figure 2 Normal P-Plot

Multicollinearity test

Predictor variables that are highly connected or interrelated are said to be multicollinear (Slinker, 1985). Furthermore, according to O'brien (2007), a variable whose VIF value is greater than 10 indicates the presence of a multicollinearity problem. This is the decision rule for the multicollinearity test for the model. There isn't a VIF value larger than 10, as Table 2 shows. The investigator came to the

conclusion that the explanatory factors' multicollinearity is not an issue. It demonstrates that all variables have variance inflation factors of less than 10. As a general rule, multicollinearity problems occur when the VIF result is larger than 10. Nevertheless, multicollinearity is not a problem in our investigation. Consequently, several regression analyses can be performed by the researcher.

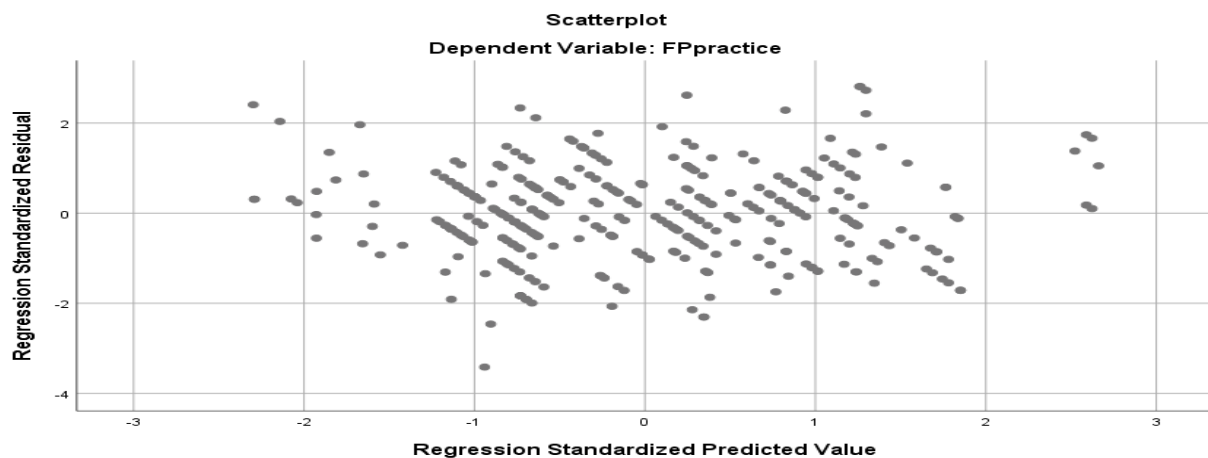


Figure 3 Scatterplot

Table 2

Multi collinearity test

Model	t	Sig.	Collinearity Statistics	
			Tolerance	VIF
1 (Constant)	3.658	0.000	0.215	4.662
Supply Chain Relationship	15.944	0.000	0.332	3.013
Supply chain integration	3.035	0.003	0.414	2.418
Supply chain responsiveness	4.150	0.000	0.215	4.662

Dependent Variable: FPa

The correlation coefficient (R) between the dependent variable's observed and predicted values is displayed in Table 3. Its value is between 0 and 1. A tiny number suggests that the dependent variable and the independent factors have little to no linear relationship. As a result, the value of R in the table above is 0.922, or 92.2%, indicating a strong correlation between supply chain management strategies and company performance.

The variance of the variables utilised in the analysis is also displayed in Table 3. The coefficient of determination, or R-square, indicates the amount of variation in company performance (a dependent variable) caused by the supply chain's relationship, responsiveness, and integration (independent variables). An analysis of Table 3 reveals an

R-square value of 0.85, indicating that supply chain responsiveness, integration, and connections account for 85% of the variation in business performance. About 15% of this study is left unaccounted for. This indicates that there are variables that will continue to be investigated in the future by other researchers. The sample R squared, or adjusted R square in Table 3, tends to provide an optimistic assessment of how well the model matches the population. Typically, the model's fit to the sample is not as good as it is to the population. In an effort to more accurately represent the model's goodness of fit in the population, adjusted R squared makes corrections to R squared. Thus, the adjusted R square value in this instance is 0.849, or roughly 84.9%.

Table 3

Model Summary

Model Summary ^b				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.922 ^a	0.850	0.849	0.12007

a. Predictors: (Constant), Supply Chain responsiveness, Supply chain integration, Supply chain relationship

b. Dependent Variable: Firm performance

Statistical significance is defined as having a large F ratio and a probability of less than 0.05 in Table 4 of the analysis of variance (ANOVA). Consequently, Table 4's result indicates that the model's overall significance and fitness may be evaluated using the value

of $F > 0.000$, indicating that the model's output is statistically significant at a significance level below the percent. This could point to the model's substantial capacity for explanation.

Table 4

ANOVA Table

		ANOVA ^a				
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	27.838	3	9.279	643.631	0.000 ^b
	Residual	4.902	340	0.014		
	Total	32.740	343			

a. Dependent Variable: Firm performance

b. Predictors: (Constant), Supply Chain responsiveness, Supply chain integration and Supply chain relationship

Standardized Coefficients

Using the standardised coefficients, one may determine which independent variable is more significant. They are employed to compare how one independent variable affects a dependent variable. The supply chain relationship has the greatest standardised coefficient (0.722), followed by supply chain responsiveness (0.135) and supply chain integration (0.111), as shown by the regression coefficients in Table 5. Out of the three independent variables, company

performance was significantly impacted by the first two: supply chain responsiveness and relationship. The supply chain responsiveness, integration, and relationship predictor variables are statistically significant in predicting business performance, as the regression coefficient table shows. Due to the fact that each of their p-values—supply chain responsiveness (p-value = 0.000), supply chain integration (p-value = 0.003), and supply chain relationship (p-value = 0.000)—is below the 0.05 alpha threshold.

Table 5

Regression Coefficient

Coefficients ^a				
Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.
	B	Beta	Std. Error	

Table 5 continues...

1 (Constant)	.380	.104		3.658	.000
Supply chain relationship	.626	.039	.722	15.944	.000
Supply chain integration	.110	.036	.111	3.035	.003
Supply Chain responsiveness	.155	.037	.135	4.150	.000

a. Dependent Variable: Firm performance

Standardized Coefficients

Using the standardised coefficients, one may determine which independent variable is more significant. They are employed to compare how one independent variable affects a dependent variable. The supply chain relationship has the greatest standardised coefficient (0.722), followed by supply chain responsiveness (0.135) and supply chain integration (0.111), as shown by the regression coefficients in Table 5. Out of the three independent variables, company performance was significantly impacted by the first two: supply chain responsiveness and relationship. The supply chain responsiveness, integration, and relationship predictor variables are statistically significant in predicting business performance, as the regression coefficient table shows. Due to the fact that each of their p-values supply chain responsiveness (p-value = 0.000), supply chain integration (p-value = 0.003), and supply chain relationship (p-value = 0.000) is below the 0.05 alpha threshold.

Unstandardized coefficients

Unstandardized coefficients β represent the independent variable coefficients in the regression coefficient outputs. The unstandardized coefficient (B) displays the change in the dependent variable with a unit

change in the independent variable. Equation (1) represents the casual association between the independent factors and the dependent variable in this investigation.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e \tag{1}$$

All three of the criteria are shown to be statistically significant in predicting the success of the firm based on the values of the regression coefficients. Based on their P-values ($P < 0.05$), the supply chain relationship, supply chain integration, and supply chain responsiveness were found to be statistically significant variables. Equation (2) indicates that the coefficient of the β supply chain relationship was 0.626, in accordance with the study results displayed in Table 5.

$$Y = 0.380 + 0.626x_1 + 0.110x_2 + 0.15x_3 + 0.05 \tag{2}$$

This demonstrates that while all other factors stay the same, a one-unit improvement in the supply chain relationship will result in a 0.625-unit improvement in company performance. Furthermore, when all other factors stay the same, a unit improvement in supply chain integration would result in a 0.11 improvement in firm performance. Lastly, if all other factors stay the same, a unit increase in supply chain responsiveness would result in a 0.15 improvement in firm performance.

Hypothesis testing

Won et al. (2009) state that the alternative hypothesis should be rejected if the p value is greater than 0.05 and less than the significant level of 0.05. Table 6 summarises the findings of the hypothesis tests. Firm performance is positively and significantly impacted by the supply chain relationship, as evidenced by the β value ($\beta = 0.626$, at a 95% confidence level of $p < 0.00$). As a result, the alternative hypothesis—which contends that supply chain interactions significantly and favourably impact business performance—is accepted and the null hypothesis is rejected. Firm

performance is positively and significantly impacted by supply chain integration ($\beta = 0.11$, 95% confidence level: $p < 0.003$). As a result, the alternative hypothesis—which contends that supply chain integration significantly and favourably affects business performance—is supported and the null hypothesis is rejected. Firm performance is positively and significantly impacted by supply chain responsiveness ($\beta = 0.15$, 95% confidence level $p < 0.00$). As a result, the alternative hypothesis—which contends that supply chain responsiveness significantly and favourably affects company performance—is supported and the null hypothesis is rejected.

Table 6

Summary of testing hypothesis

Hypotheses Result	p-value	Relationship	Remark	
			Null hypothesis	Alternative hypothesis
Supply chain relationship has a positive and significant effect on the firm performance	0.000	Positive	Rejected	Accepted
Supply chain integration has a positive and significant effect on firm performance	0.003	Positive	Rejected	Accepted
supply Chain responsiveness has a positive and significant effect on firm performance	0.000	Positive	Rejected	Accepted

CONCLUSIONS

The study evaluated how supply chain management strategies affected the textile manufacturing industry's business performance. Firm performance served as the dependent variable in this study, while supply chain management techniques served as the independent variable. All three criteria are

therefore determined to be statistically significant in predicting company success based on the values of the regression coefficients. The factors connected to supply chain relationships are shown to have the greatest favourable effect on the performance of the organisation. Factors pertaining to supply chain responsiveness have the second-

highest influence on company performance. Thirdly, the third-highest influence on business performance is attributed to issues relating to supply chain integration.

In light of the aforementioned discovery, the investigator proposes the subsequent recommendations:

Improving supply chain linkages should receive more attention from firm managers and management bodies. Furthermore, the most pressing problem in enhancing organisational performance nowadays is reactivity. It is therefore advised that the managers and staff of the organisation respond to the customer's request right away. Lastly, industrial industries should not undervalue the importance of supply chain integration. It is therefore strongly advised that the enterprises that manufacture textiles concentrate on strengthening supply chain integration.

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DECLARATION

No competing interest in this paper.

DATA AVAILABILITY

Data supporting the findings of this study are available from the corresponding author on request.

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