

The Effect of Supply Chain Management Practices on Operational Performance in the Case of the Ambo Mineral Water Share Company

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ABSTRACT

The primary purpose of this study was to examine the effect of SCM practices on Ambo Mineral Water Share Company operational performance. Strategic supplier partnerships, customer relationship management, level of information sharing, quality of information sharing and internal lean practices were the five independent variables included in the study, along with the dependent variable (operational performance). The metrics for measuring the company's operational performance were the delivery dependability, product quality, supply chain cost and operational flexibility. By this intention the study employed both quantitative and qualitative approaches that are considered necessary for this kind of research, which deals with underlying issues that usually can be understood in a both manner, and the proposed conceptual framework of the study was tested using descriptive and explanatory research design. Probability sampling of stratified and simple random sampling techniques was used in selecting samples from the target population. Using a total of 175 survey questionnaires, the primary data was collected from employees and eight management bodies for interviews of the case company. The data was collected by using 5-point Likert Scale type questionnaire and interview, and interviews then the collected data were analysed using SPSS Version 26. As the significant findings of the study it has been observed that there was a significant correlation between SCM practices and the overall operational performance of the company since the SCM practices explained 64.3% of the variability of the company operational performance. From the analysis, it can be concluded that all Supply Chain Management Practice Practices have positive and significant effects on Operational Performance. Therefore, the study recommends that the case company strive to improve the effectiveness and comprehensiveness of its SCM practices to enhance its operational performance in particular; and overall performance in general.

Keywords: Supply Chain Management Practices, Operational Performance

Introduction

In today's stiff competitive environment, there has been increased interest in supply chain management as a strategic tool to enhance return on investment and increase profitability. Supply chain management becomes important tool for companies to offer value to customers at the lowest possible costs. Growing complexities in the business environment, resource scarcity, changing customer expectations, increased customer knowledge levels and advances in information and communication technologies have all meant that manufacturing companies must improve their supply chain processes (Chang, Ellinger, Kim & Franke, 2016).

According to (Babu, 2012), to address the challenges in today's business environment, manufacturing firms need flexible and responsive supply chain management practices to respond to customer demands. Fierce competition in today's global markets, the introduction of products with short life cycles, and the heightened expectations of customers have forced business enterprises to invest in, and focus attention on their supply chains. This, together with continuing advances in communications and transportation technologies, such as mobile communication and overnight delivery, has motivated the continuous evolution of the manage supply chains continuous evolution and management techniques (Jin, 2015). Operational performance means the capacity of organisation to decrease administration

costs, arrange time, lead-time, and enhancing the viability of utilising crude material and conveyance limit (Heizer, 2013). Supply chains have come to be comprehended as moderately stable gatherings of firms occupied with the succession of creation and dissemination exercises required to serve the end customer (Stevenson & Spring, 2007).

This study aims to investigate the relationships among SCM practices and operational performance. SCM practices are defined as the set of activities undertaken by an organisation to promote effective and efficient supply chain management and achieve their operational performance. The practices of SCM are proposed to be a multi-dimensional concept, including the downstream which is the customer and upstream which is supplier sides of the supply chain partners. Operational measures for the constructs are developed and tested empirically, using data collected from respondents in a survey questionnaire. Multiple linear regression models are used to test the hypothesised relationships. The current research is expected to address the effect of supply chain management on operational performance.

Statement of the Problem

Companies rely on their supply chain to prosper within this competitive world. The supply chain is one of the major areas that have been identified as having great potential to improve efficiencies and reduce costs. This supply chain management is the most popular concept but highly misunderstood by many firms, this leading to poor implementation and performance in the operation of the firm. These inefficiencies have significantly impacted performance leading to higher prices and more customer complaints. Moreover strategic use of supply chain management to gain flexibility, cost reduction, and dependability and quality advantages over the competition has been underscored by several researchers. There are small numbers of manufacturing companies that integrate supply chain management practice into their organisational system. In addition, some challenges in the industry resulted in reducing the quality and demand for products manufactured domestically. Even if there is supply chain by default, it is not well managed and implemented for getting the benefits resulting from effective supply chain management. Beverage industries may encounter similar challenge, as they are part of the manufacturing industries and play significant role in country economic growth.

Literature Review and Hypothesis

Factors identified with this topic of study have been recognised. Strategic supplier partnership practice, customer relationship management, level and quality of information sharing and internal lean practice factors are the independent variables, while operational performance is the dependent variables. From an administrative perspective, this review will give understanding why a legitimate thought ought to be connected in choosing the variables that should be received in accomplishing responsiveness (Rajagopal, 2015). The study proposes five dimensions: are strategic supplier partnership, customer relationship management, level of information sharing, quality of information sharing and internal lean practice. Based up on literature support, the expected relationships among SCM practices and operational performance are discussed, and hypotheses relating these variables are developed.

Strategic Supplier Partnership

According to (Li, 2006) strategic supplier partnership entails “the long-term relationship between the organisation and its suppliers”. It focuses on direct, long-term association and it is interested in mutual planning and problem-solving efforts (Arawati & Zafaran, 2008). Therefore, it is designed to enhance individual participating firm’s operational efforts and capabilities to achieve their goals (Li, 2006). An effective supplier partnership is a critical to leading edge supply chains (Arawati & Zafaran, 2008). In corroboration, (Fawcett, Watson & Magnan, 2014), argue that strategically aligned companies can work for hand in glove and eliminate wasteful time and effort. At the same time, it can also be argued that strategic supplier partnerships enable organisations to work more effectively with suppliers willing to share responsibility for the success of the products.

H01: Strategic supplier partnership practice has no significant effect on the operational performance of AMWSC.

Customer Relationship Management

Customer Relationship Management (CRM) encompasses the entire range of practices employed to manage customer complaints, build long-term relationships with customers, and improve customer

satisfaction. This implies that a customer relationship is an essential element of the organisation supply chain practices. Strong relationships with supply chain members, including customers, are needed to successfully implement the SCM program (Maestrini, Luzzini, Maccarrone & Caniato, 2017). A better relationship between two parties will benefit both sides regarding profitability also in the short-term and long-term in the long term. Both (Wijetunge, 2017) concur that customer relationships allow organisations to differentiate their product from competitors and sustain customer loyalty. Similarly, (Maestrini, 2017) opine that the relationship between suppliers and buyers can provide a galaxy of benefits within the company and environmentally products.

Ho2: Customer relationship management practice has no significant effect on the operational performance of AMWSC.

Level of Information Sharing

The Level of information sharing is defined as “the extent to which critical and proprietary information is communicated to one’s supply chain partner” (Li, 2006). Information sharing has two dimensions: quantity and quality. Both aspects are essential supply chain management practices, as well as in past supply chain management studies. According to (Monczka, Petersen, Handfield & Ragatz, 1998) level of information sharing refers to the extent to which critical and proprietary information is communicated to one’s supply chain partner.

Ho3: The level of information sharing practice has no significant effect on operational performance of AMWSC.

Quality of Information Sharing

The Quality of information sharing, in a sense includes such aspects accuracy, timeliness, adequacy, and credibility of information exchanged between the partners of the supply chain (Moberg, 2002). (Simatupang & Sridharan, 2005), defines information sharing as the access to private data between business partners, thus enabling them to monitor the progress of products and orders as they pass through various processes in the supply chain. Information sharing about key performance metrics and process data improves the supply chain visibility metrics, and process data improves the supply chain visibility, thus enabling effective decision making. Information shared in a supply

chain is useful if it is relevant, accurate, timely, and reliable (Simatupang & Sridharan, 2005).

Ho4: Quality of information sharing practice has no significant effect the on operational performance of AMWSC.

Internal Lean Practice

The elimination of waste stands as a fundamental idea within the lean system. The core thrust of lean practices is that these practices can work synergistically to create a streamlined, high-quality system that produces finished products at the pace of customer demand with little or no waste (Mwale, 2014). Furthermore, (Manrodt & Vitasek, 2008) described lean as a systematic strategy to increase customer value by finding and removing waste (of time, effort, and materials) through continuous improvement by following the product at the customer’s pull to pursue perfection. Thus, the effectiveness of SCM can be examined by have its ultimate cost on the customer satisfaction through responsiveness and lower prices resulting from lean internal operations. To provide more value, lean-adopting companies collaborate to discover and reduce waste wherever it appears (Manrodt & Vitasek, 2008).

Ho5: Internal lean practice has no significant effect on the operational performance of AMWSC.

Operational Performance

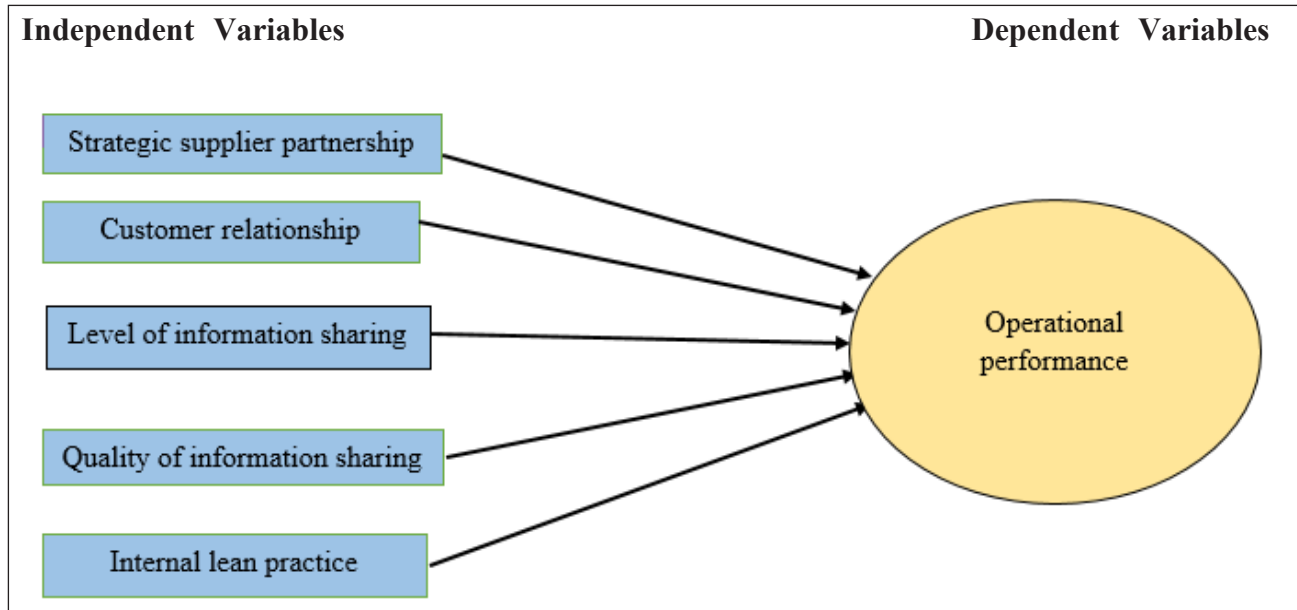
Operational performance refers to the ability of an organisation to reduce administrative costs, order time, lead time, and improve the effectiveness of using raw material and distribution capacity and has an essential meaning to firms, it helps to improve the effectiveness of production activities and to create high-quality products leading to increased revenue and profit for companies (Karimi & Rafiee, 2005). (Miguel & Brito, 2011), noted that performance improvements can appear in different aspects such as inventory reduction, lead time reduction, or quality improvement.

Conceptual Frameworks of the Study

Drawing from the discussion of various literatures literature, the researcher has tried to extract the conceptual framework of this study. The framework proposes that SCM practices affect operational performance. The diagrammatical expression of the conceptual framework of this study shown in Fig. 1 below indicated the five

dimensions of SCM practices, namely strategic supplier partnership, customer relationship, level of information sharing, quality of information sharing and internal lean practice. The five dimensions of SCM practices

are independent variables whereas the dimensions of operational performance are considered as dependent variables.



Source: Adapted from literature review.

Fig. 1: Conceptual Framework for the Study

Research Methodology

Research Design and Approach

An explanatory and descriptive research design was employed in this study realisation the intended objectives. A descriptive research design enables us to understand the nature of what we are looking at in the different effects of supply chain management practice in Ambo Mineral Water Share Company as they exist. A descriptive research design applied to describe and discuss the findings by using descriptive statistics, such as mean, standard deviation. Moreover, the explanatory research design used to address research objectives and that examined the cause and effect relationship among variables of supply chain management practice and operational performance. The researcher used qualitative research approach to describe the effect of supply chain management practice on operational performance. Both quantitative and qualitative data were utilised, with quantitative data taking precedence. Using a mixed approach assisted the study in neutralising biases associated with using a single approach and ways to balance the weaknesses inherent in a single method with the strengths of the other method.

Sampling Technique and Sample Size

Stratified and simple random sampling techniques were used to select the sample for the study. The stratified sampling technique was appropriate to select respondent from all component or those included under supply chain management department and those have contact with it. (Peersman, 2014), argues that stratified random sampling is used when representatives from each subgroup within the population need to be represented in the sample. Simple random sampling was utilised to select respondents from each department. The target population for the study is classified organisation into eight (8) strata of organisation involving in supply chain of AMWSC. The department of AMWSC that are classified under supply chain management of the company are stratified into distribution, fleet management, production, procurement, sales and marketing, store management, warehouse management, quality control and depot management. The sample was drawn from the target population of 325 permanent employees of the case company. The sample included members from production/operation department, members from quality control, members from marketing & sales service department, and members from logistics and supply chain management department

of the case organisation. Based on these the researcher used the following sample size determination formula to determine the sample size of the population. The formula was developed by Taro Yamane (1967). It is calculated as follows:

$$n = \frac{N}{1+N(e)^2}$$
 Where **n** is the sample size, **N** is the population size, and **e** is the level of precision or sampling error = (0.05)

$$n = \frac{325}{1+325(0.05)^2} = 179$$

After calculating the sample size by substituting the numbers into the Yamane formula, the numbers of sample is 179 and this sample size is proportional divided to each department.

Table 1: Proportion of Sample Size from Each Department

Sr. No.	Name of Department	Number of Employee	Sample Size Proportion
1.	Depot management	60	33
2.	Distribution	45	25
3.	Quality control	25	14
4.	Production	80	44
5.	Procurement	25	14
6.	Sales and marketing	40	22
7.	Store management	20	11
8.	Warehousing management	30	16
Total		325	179

Therefore, the sample size chosen for this study is considered by the researcher as representative of the

target population, because, most of managers who are responsible for the areas related to the topic of study and employees working in expected to have best knowledge in the areas related to the topic of study.

Data Analysis

In general, there are two types of data analysis techniques: qualitative and quantitative, whereby the choice of these methods greatly depends on the type of data the researcher has at hand. When most of the data collected is numerical, the analysis calls for quantitative tools, descriptive and inferential statistics were used to characterise the data. Therefore, in this study, the collected quantitative data were analysed using Statistical Package for Social Science (SPSS) version 26 to drive descriptive statistics, such as mean and standard deviation. Inferential statistics, specifically Pearson's correlation, were used to demonstrate the relationship, including the strength/degree and direction of associations between variables. Both the strength of the relationship between variables and the influence of the independent variable on the dependent variable, as well as the statistical significance, were assessed. Correlation analysis is one of explanatory design that is intended to identify the relationship between independent variables (supply chain management practice) and dependent variable, (Operational performance). Based on the assumption of linear relationship between the variables, the pearson correlation method is used to identify the relationship between the variables. All the independent variables had a positive correlation with the dependent variable of operational performance at 0.05% significance level.

The Pearson correlation results for the study are shown in Table 2:

Table 2: Correlation Analysis

		Ssp	Crp	Lisp	Qisp	Ilp	Op
Ssp	Pearson Correlation	1					
	Sig. (2-tailed)						
	N	175					
Crp	Pearson Correlation	.634**	1				
	Sig. (2-tailed)	.000					
	N	175	175				
Lisp	Pearson Correlation	.665**	.672**	1			
	Sig. (2-tailed)	.000	.000				
	N	175	175	175			
Qisp	Pearson Correlation	.480**	.530**	.501**	1		
	Sig. (2-tailed)	.000	.000	.000			
	N	175	175	175	175		

		Ssp	Crp	Lisp	Qisp	Ilp	Op
Ilp	Pearson Correlation	.509**	.512**	.590**	.433**	1	
	Sig. (2-tailed)	.000	.000	.000	.000		
	N	175	175	175	175	175	
Op	Pearson Correlation	.669**	.654**	.689**	.630**	.580**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	175	175	175	175	175	175

** . Correlation is significant at the 0.01 level (2-tailed).

Source: Own survey data, 2023.

Based on Table 2, the correlation analysis revealed a strong significance ($n = 175$; $r = 0.67$; $p < 0.05$) and positive relationship exist between strategic supplier partnership and operational performance. These findings are in align with quantitative studies by (Fantacy, Magnan & McCarter, 2016), on the benefits, barriers, and bridges to effective supply chain management which concluded that strategic supplier partnerships definitely enhanced performance among supply chain collaborative partners. The correlation analysis also revealed that customer relationships positively correlated with operational performance ($n = 175$; $r = 0.65$; $p < 0.05$). This invariably implies that any improvements in the customer relationships by AMWSC would lead to improved operational performance. The finding of a direct impact of customer relationships on organisational performance confirms (Sukati, Abdul Hamid & Baharun, 2017), a survey study on consumer goods manufacturing firms in Malaysia where it was established that customer relationship had a positive and significant effect on performance improvements.

The correlation matrix revealed a positive and significant relationship between level of information sharing and operational performance ($n = 175$; $r = 0.69$; $p < 0.05$). The results implied that a positive change in information sharing results in a positive and significant change in operational performance of AMWSC. The result of this study suggests that companies need to have excellent information sharing with their supply chain partners to achieve superior organisational performance. These findings are consistent with a study of (Tigu & Calaretu,

2013) which conceptualised that there is a positive relationship between information sharing and supply chain performance. In the same vein, (Ogutu & Samuel, 2018) expounded that information sharing can lead to lower cost through reduction of stock keeping units and shortages as well as leading to better supply chain performance. In other words, Information Quality and Operational Performance have a relationship or correlation ($r = 0.742$; $r = 0.63$; $p < 0.05$). Table 2 also indicates a significant positive correlation between Internal Lean Practices and Operational performance. This means that Internal Lean Practices and Operational Performance have a relationship or correlation ($r = 0.700$). The study supports (Karimi & Rafiee, 2014) in Iran which concluded that Lean practice had a direct and positive impact on the performance of companies and improved their operational performance.

Regression Analysis

In multiple regressions, the strength of the relationship between the independent variables and dependent variable is measured by a correlation coefficient, which is symbolised by an adjusted R square. It shows the percentage of the total variation of the dependent variable that the independent variable can explain and this is assessed using the coefficient of determination (R). Regression analysis was used to express the relationship between the independent and dependent variables. The ability of independent variables to explain the changes in dependent variables was measured by adjusted R-square, as shown by Table 3.

Table 3: Regression Model

Model Summary ^b					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.808 ^a	.653	.643	.26673	1.793
a. Predictors: (Constant), <i>Internal lean practice</i> , <i>Quality of information sharing practice</i> , <i>Strategic supplier partnership</i> , <i>Customer relationship practice</i> , <i>Level of information sharing practice</i> .					
b. Dependent Variable: <i>Operational performance</i>					

Source: Own survey data, 2023.

As clearly described in Table 3 the adjusted R-square value for the regression model was 0.643. This indicates that the explanatory variables which are supply chain management practice in this study, explain about 64.3% of the variation in the operational performance. The study findings agree with (Choi, Min, Joo & Choi, 2016) studies among life insurance companies in South Korea which concluded that there was a good relationship between supply chain management and organisational performance.

Coefficients of Regression Analysis

The main objective of symbolised the coefficient of regression analysis to know which of the predictors has contributed significantly to our understanding of symbolised as Y. Thus, Table 4 reveals coefficients when we explore each predictors beta i.e., standardised regression coefficient and its level of significance.

Table 4: Coefficient Regression Analysis

Coefficients ^a						
Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.839	.275		-3.055	.003
	ssp	.302	.087	.228	3.470	.001
	crop	.185	.087	.144	2.140	.034
	wisp	.303	.098	.221	3.096	.002
	qisp	.303	.062	.273	4.877	.000
	ilp	.161	.066	.141	2.427	.016

a. Dependent Variable: op.

Source: Own survey data, 2023.

As a multiple regression analysis is used to determine the relationship between the five SCM practices as independent variables and the operational performance of the AMWSC, based on Table 4, the general multiple regression models arrived at were:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + e$$

$$Y = -0.839 + 0.302X_1 + 0.185X_2 + 0.303X_3 + 0.303X_4 + 0.161X_5 + e$$

The $\beta_0 = -0.839$, predicts that the operational performance of AMWSC when all the five independent variables (strategic supplier partnership X_1 , customer relationship management X_2 , level of information sharing X_3 , quality of information sharing X_4 and internal lean practice X_5) are zero. If all the five SCM practices had not been performed in the company (i.e., when $X_1, X_2, X_3, X_4, X_5 = 0$), the operational performance of AMWSC would be negative -0.839. By looking at the Unstandardised Beta Coefficient column of Table 4, for one unit increase in strategic supplier partnership, customer relationship management, level of information sharing, and quality of information sharing and internal lean practice the company's operational performance will increase 0.302 units, 0.185 units, 0.303 units, 0.303 and 0.161 units respectively, holding other independent variables

constant. In a nutshell, based on the regression equation following inference is drawn.

- In the above table, the regression coefficient for strategic supplier partnership (B_1) = .302, which implies that a one percent improvement in strategic supplier partnership practice leads to 30.2% enhancement in operational performance of AMWSC if other variables are kept constant. The significance value for SSP is $p = 0.001$ which is significant at a 5% significance level ($p < 0.05$). It implies that Strategic supplier partnership has a significant and positive effect on the operational performance of AMWSC.
- The regression coefficient for customer relationship management practice (B_2) = .185 which implies that a one percent improvement in customer relationship management practice leads to 18.5% enhancement in operational performance of AMWSC if other variables are kept constant. The sig value $p = 0.034$ is significant at a 5% significance level ($p < 0.05$). It implies that customer relationship practice has a significant and positive effect on the operational performance of AMWSC.
- For the level of information sharing practice, the regression coefficient is (B_3) = .303, which implies

that one percent change in level of information sharing practice leads to 30.3% enhancement operational performance of AMWSC if other variables are kept constant. The sig value is 0.002 which is significant because the significance level is less than 5%. It implies that the level of information sharing practice has significant and positive effect on operational performance of AMWSC.

- The regression coefficient for the quality of information-sharing practice is (B4) =.303 which implies that one percent change leads to 30.3% enhancement in Operational performance of AMWSC if other variables are kept constant. The sig value is 0.00 which is significant because the significance level is less than 5%. It implies that the quality of information sharing practice has significant effect on operational performance of AMWSC.
- The regression coefficient for internal lean practice (B5) =.161 which implies that a one percent change leads to 16.1% increase in operational performance of AMWSC if other variables are kept constant. The sig value $p=0.016$ which is significant at the 5% significance level. It implies that internal lean practice has a significant effect on the operational performance of AMWSC.

Analysis of Hypothesis

Ho1 Strategic supplier partnership practice has no significant effect on the operational performance of AMWSC.

The coefficient significance value of SSP is 0.001 at the 5% significant level, indicating that strategic supplier partnership practice has a significant effect on operational performance of AMWSC. As a result, the null hypothesis is rejected, and the alternative hypothesis is accepted. This research supports the finding of (ASMAMAW, 2019), that strategic supplier partnership affects firm performance significantly.

Ho2 Customer relationship management practice has no significant effect on the operational performance of AMWSC.

The coefficient significance value of CRP presence is 0.034 at the 5% significant level, indicating that Customer relationship management practice has a significant effect

on operational performance of AMWSC. As a result, the null hypothesis is rejected, and the alternative hypothesis is accepted. The finding of this research is consistent with the finding of (Duong Vu Xuan Quynh, 2018), that customer relationship affects firm performance at 0.05% significance level.

Ho3 Quality of information sharing practice has no significant effect on operational performance of AMWSC.

The coefficient sig value of QISP presence is 0.000 at the 5% significant level, indicating that Quality of information sharing practice has a significant effect on operational performance of AMWSC. As a result, the null hypothesis is rejected, and the alternative hypothesis is accepted. The finding of this research is consistent with the finding of (Duong Vu Xuan Quynh, 2018) that Quality of information sharing affects firm performance at a 0.01% significance level.

Ho4 Level of information sharing practice has no significant effect on the operational performance of AMWSC.

The coefficient sig value of 0.002 at the 5% significant level, indicating that LISP has a significant effect on operational performance of AMWSC. As a result, the null hypothesis is rejected, and alternative hypothesis is accepted. The finding of this research is consistent with the finding of (liberal, 2016) that the level of information sharing has statistically significant effect on firm performance.

Ho5: Internal lean practice has no significant effect on the operational performance of AMWSC.

The coefficient sig value of 0.016 at the 5% significant level indicates that ILP has a significant effect on the operational performance of AMWSC. The finding of this research is consistent with the finding of (Koh et al., 2007) and (Agus, 2011) that showed lean practices have direct positive and significant impact on organisational performance.

Conclusions

The study concludes that AMWSC has implemented the various SCM practices (Strategic supplier partnership practice, customer relationship management practice, level of information sharing practice, quality of information sharing practice and internal lean practice). These practices have helped AMWSC to improve its operational performance. This is supported by the results from the

conducted regression analysis that indicated a strong relationship between SCM practices and the operational performance of AMWSC. According to the analysis result, SCM practices suggested in this study could explain 64.3% of the variability of the operational performance of AMWSC. From the findings, it is clear that the quality of information sharing has the highest effect on operational performance of the company while an internal lean practice has the most minor effect on operational performance. The study has confirmed that SCM practices are very noteworthy in improving the operational performance of organisations such as AMWSC. As today's competition is not among companies rather, it is between their supply chains, companies are implementing SCM practices in the hope of enhancing product quality, reducing supply chain costs, improving delivery dependability and operational flexibility and then securing competitive advantage. Therefore, in today's globalised world, adopting SCM practices not only provides a competitive advantage over competitor but it is also essential to improve the operational performance of the organisation. This study examined the effect of five variables (Strategic Supplier Partnership, Customer Relationship, level of Information Sharing, quality of information Sharing and Internal lean practices) on operational performance. From the findings of the study, it can also be concluded that the operational performance does not result from the products and services an organisation is offering alone but instead, it is those inimitable characteristics of supply chain practices that will differentiate and give an organisation the required operational performance. The benefits accruing to the companies due to the adoption of supply chain practices have been found to include delivery dependability, operational flexibility, reduction in operational cost and improved quality.

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