



Cover Page



EFFECT OF LOGISTICS MANAGEMENT PRACTICES ON OPERATIONAL PERFORMANCE OF COFFEE COOPERATIVES UNION OF ETHIOPIA THROUGH COMPETITIVE ADVANTAGE AND INNOVATION

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Abstract

This study specifically sought to determine the effects of procurement, transportation management, inventory management, and warehousing management on coffee cooperatives union operational performance through Competitive Advantage and Innovation. The study used both descriptive and explanatory research design, and the population of this study was the employees of coffee cooperatives union. The study adopted stratified and purposive sampling. The study used a sample size of 383 respondents. Further, the study used a self-administered questionnaire as the main instrument for collecting primary data from respondents. The data collected was first edited, formatted, and organized for coding into the Statistical Package for Social Science (SPSS) version 24 and AMOS. The statistical parameters generated from the software are presented in tables for easier interpretation. Data was analyzed using EFA and CFA. Also, SEM analysis was used to estimate the relationship between the dependent variable and independent variables through mediation of Competitive Advantage and Innovation. At the end of the study, it was established that procurement, transportation management, inventory management, and warehousing management influenced only to a small extent of the total variability in the operational performance of coffee cooperatives union. But through mediation of Competitive Advantage and Innovation the variability is more. Thus, full mediation of Competitive Advantage and Innovation found in between Logistics Management Practices and Operational Performance. Thus, coffee cooperatives union will be recommended to having a strong buyer-supplier relationship and integration of procurement planning with budget in order to improve operational performance.

Keywords: Procurement, Transportation Management, Inventory Management, Warehousing Management, Operational Performance.

1.1 Introduction

In the late 1940s, logistics expanded in both breadth and influence. The military alone used the term logistics in the 19th century rather than the business sector. Beyond the military, today's corporate sector acknowledges logistics as the competitive advantage for businesses and a rise in consumer value (Frazelle, 2021). "Logistics is a component of supply chain techniques that manage the efficient and effective forward and reverse flow and storage of goods, services, and related information between supplier and manufacturer to meet customers' requirements," according to Wikipedia (Council of Logistics Management, 2020).

Competitive pressure, cost management, information technology, globalization, and profit maximization were some of the factors that helped shape logistics science into what it is today (Lambert, Stock & Ellram, 2019).

Logistics ensure positioning of the right product with the right quality at the right time in the right place at the right price to the ultimate customer (Farahani, Rezapour & Kardar, 2019). Without logistics, no material moves, no operation can be done, no production can be done, no products are delivered, and no customers are served. Thus, logistics is heart for business success and customer services (Waters, 2020). Logistics is the process of strategically managing the procurement, movement and storage of materials, parts and finished inventory through the organization in such a way that current and future profitability are maximized through the cost-effective fulfillment of order (Christopher, 2019).

A logistics management plan plays a significant role in the field of asset handling and organizational cash flows in a competitive and dynamic economy. To put it another way, a logistics management plan makes it possible to cut costs and provide higher levels of customer service, which also improves an organization's operational success (Ristovska, Kozuhorov, & Petkovski, 2017). The impact of logistics management has ranged from increased cost-reduction and reactive issues to issues with the competitiveness of the organization (Spillin, McGinnis & Liu, 2020). There is therefore a growing consensus that businesses must manage logistics difficulties in addition to cost-effectiveness and trade issues (Tuttle & Heap, 2020).



Cover Page



Every year, each nation spends a sizable sum on logistics-related tasks. For example, in 2020, industries in EU nations paid 19.1% on transportation, 13.8% on storage, 18.1% on inventory carrying, and 11.1 % on administration, resulting in a total logistics expense of 62 % of the company's sales (Ghiani, Laporte & Musmanno, 2021).

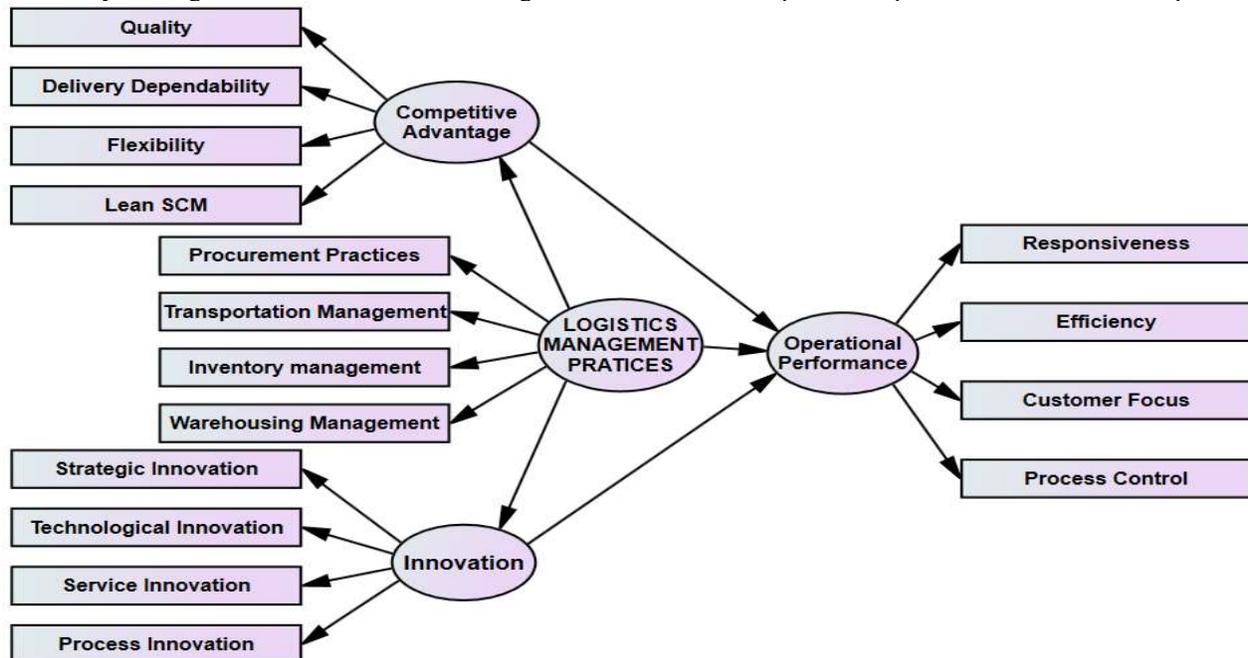
Sub-Saharan African countries were poor in logistics performance compared to other world countries. Particularly poor performances were resulted from lack of investment on infrastructure and lack of road maintenance. As a result, transportation constrained well flow of goods in market (Ittman& King, 2017).

Ethiopia's lack of exceptionality in Africa explains why it performs poorly in logistics. The overall Logistics Performance Index (LPI) score provided by the World Bank gauges' logistics performance. Out of 167 participating nations, Ethiopia is rated 131 (World Bank, 2018). This demonstrates that the nation's logistics system is truly weak and delivering subpar national performance. Production is coordinated with new customer orders, purchases are made in response to user department demand, and scheduling and shipping are done in response to orders (Kiare, 2019). As it provides its ways from the beginning of a supply chain to customers, transportation plays the job of transferring goods from one location to another. Because items are rarely produced and used in the same region, transportation is important for supply chain participant integration (Chopra & Meindel, 2007). Given that logistics activities have the highest cost of all, it is obvious that emphasis should be paid to transportation (Ghiani et al.,2021). The production department is vulnerable to the predominance of overproduction, underproduction, and a lack of spare parts due to poor inventory management (Munyao, Omulo, Mwithigas & Chepkulei, 2019)).

According to (Debela, 2020), the Ethiopian logistics system is characterized by inadequate logistics management systems and a lack of coordination of the transport of goods, low levels of infrastructure development and inadequate fleets of freight vehicles in terms of size and age, as well as damage and quality deterioration of goods during handling, transportation, and storage. His research, however, did not indicate how transportation affected operational effectiveness and did not take into account any other logistics-related tasks outside transportation. Therefore, this study was started to take into account other logistical tasks including purchasing, managing transportation, managing inventories, and managing warehousing, and to evaluate their impact on operational performance. Additionally, the primary goal of this study is to determine how logistics management practices affect coffee cooperatives union operational performance.

1.2 Conceptual Framework

The study is designed to find out the effect of logistics activities on the operational performance of coffee cooperatives union.



Source: Researchers Own Framework (2022)



Cover Page



1.3. RESEARCH METHODOLOGY

1.3.1 Research Design

The researchers used an explanatory research design, so the study looked for explanations of the nature of certain relationships between variables studied. In this study, an explanatory type of research design would be applied since it attempts to describe the effect of independent variables (procurement, transportation management, inventory management, and warehousing management) on the dependent variable (operational performance).

1.3.2 Target Population

This study's target populations were all coffee cooperatives union found in the West Guji Zone, Oromia Regional State, Ethiopia.

1.3.3 Sampling Method

The sample was selected from the target population by using probabilities sampling. From probability sampling, simple random sampling is used.

1.3.4 Sample Size

The study used formula of Yamane 1967 for determination of the sample size. Result of which considering selected employees is to be most appropriate.

$$n = \frac{N}{1 + N(e)^2}$$

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$$9,593 / 1 + 9,593 (0.05)^2 = 383$$

Table 1. Proportion Allocation

	Coffee Cooperatives	Number	Proportion
1	Buda Magada	980	39
2	Dibisa Ogo	561	22
3	Dogo Bulchan	462	18
4	Etuma	525	21
5	Bulichan Nagele	261	10
6	Kalicha Gudina	527	21
7	Kilenso Mokonsa	2635	105
8	Gumi Nageso	334	13
9	Kilenso Rasa	2448	98
10	Sakicha	385	15
11	Waqi Woya	79	3
12	Misoma Rogicha	176	7
13	Burka Ebela	220	9
	Total	9,593	383

1.3.5 Method of Data Collection

The researcher used questionnaire to collect data. Close and open-ended questionnaire prepared and distributed to coffee cooperatives union, because close ended questionnaire is easy to code and analysis. In preparing the questionnaire, a five-point Likert scale provided in order to get the responses from respondents on the effect of logistics management practices on operational performance.

1.3.6 Method of Data Analysis

In order to analyze the data, the two sets of Statistics: Descriptive and Inferential statistics were used. Descriptive statistics includes frequency; percentage, mean and standard deviation. This used to present demographic information of employees and the effect of logistics management practices on operational performance. CFA, EFA would be utilized to examine the relationship that exists between the independent and dependent variables and also between the independent variables to each other. It also used to test the most influential independent variable to operational performance through KMO. Statistical Packages for Social Sciences (SPSS) version 24 and AMOS vs 26 were used to present data in tables in order to show the summary of questionnaire. Hence, summarizes and describes quantitative information in the form of EFA, KMO, TVE, CFA, SEM, whereas inferential statistics (multiple linear regression) utilized taken from the statistical tools.



Cover Page



1.3.7 Model Specification

Multiple linear regression used to determine the effect of independent variables (procurement, transportation, inventory management and warehouse management) on dependent variable (operational performance) and coefficient of correlation by using the Statistical Package for Social Sciences (SPSS) version 24 package. The following regression model is formulated with four independent variables and one dependent variable.

$$Y = \beta_0 + \beta_1P_1 + \beta_2Tm_2 + \beta_3Im_3 + \beta_4Wm_4 + \epsilon$$

Where: b1, b2, b3, b4.....Slope

Y = operational performance

β_0 = is standardize regression coefficient

P1=Procurement

TM2=Transportation Management

IM3=Inventory Management

WM4=Warehouse Management

ϵ = Error term

1.3.8 Data Adequacy

The reliability of the instruments checked by applying KMO testing statistics on the questionnaire distributed for sample selected.

Table 2: KAISER-MEYER-OLKIN AND BARTLETT'S TEST

	Variable	KMO	Chi-Square	df	Sig.	Eigen values	Total Variance Explained (%)	Outcome
1	Procurement	.847	312.710	4	.000	2.748	56.489	Considered
2	Transportation management	.898	566.781	4	.000	2.103	36.772	Considered
3	Inventory management	.887	523.839	4	.000	2.327	42.740	Considered
4	Warehousing management	.841	518.199	4	.000	2.306	47.658	Considered
5	Operational performance	.876	685.841	4	.000	2.842	58.747	Considered
6	Innovation	.865	636.211	4	.000	2.608	45.194	Considered
7	Competitive Advantage	.700	373.784	4	.000	1.812	65.643	Considered

Extraction Method: Principal Component Analysis

Source: SPSS output (2022)

The KMO and Bartlett test evaluate all available data together. A KMO value over 0.7 and a significance level for the Bartlett's test below 0.05 suggest there is substantial correlation in the data. Variable collinearity indicates how strongly a single variable is correlated with other variables.

Table 3: Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.73	6.68	3.74	.492	569
Std. Predicted Value	-2.266	2.321	.000	1.000	569
Standard Error	.048	.299	.107	.048	569
Adjusted Predicted Value	1.79	6.66	3.74	.493	569
Residual	-2.254	1.779	.000	.885	569
Std. Residual	-3.103	2.495	.000	.790	569
Stud. Residual	-3.212	2.799	.002	1.005	569
Deleted Residual	-2.428	2.147	.002	.810	569

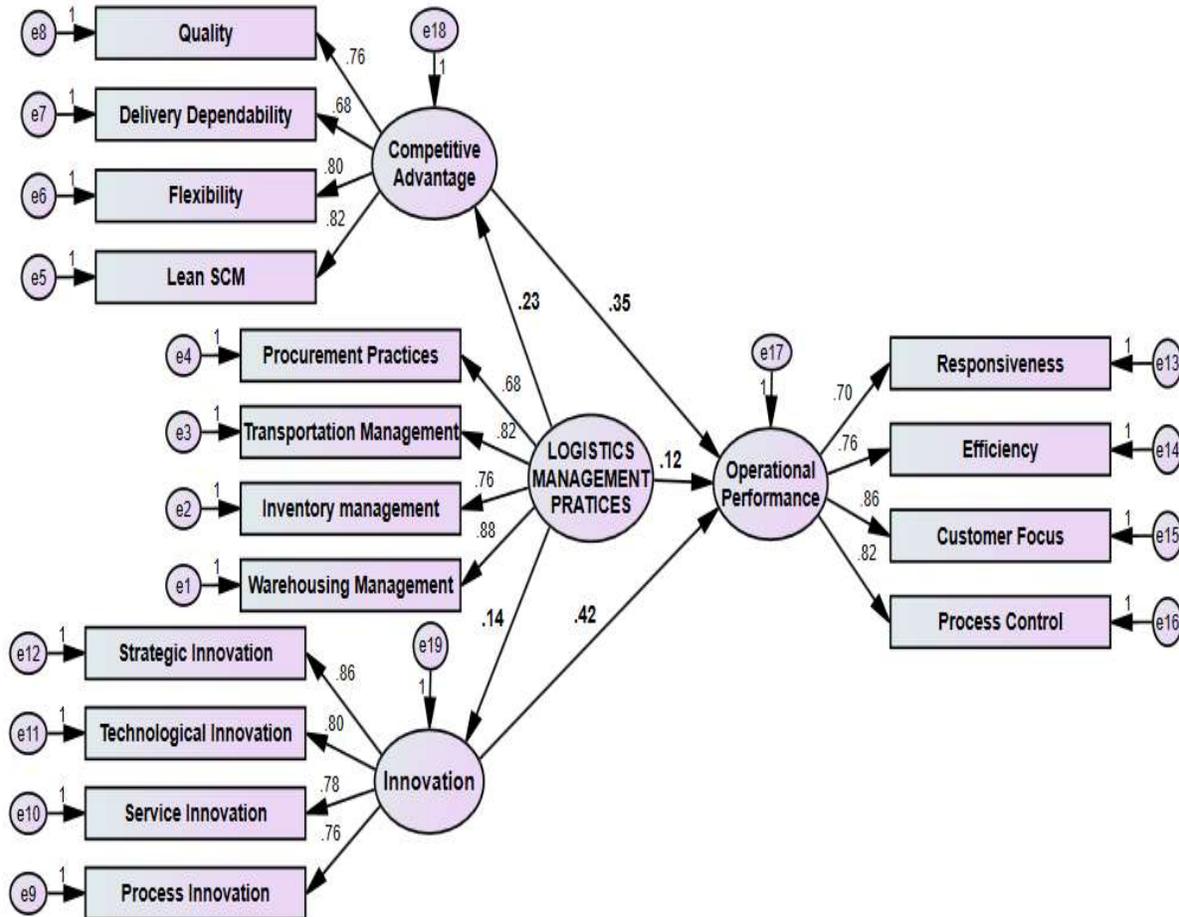
Stud. Deleted Residual	-3.302	2.618	.001	1.009	569
Mahalanobis Distance	.703	57.869	7.781	8.759	569
Cook's Distance	.000	.105	.004	.010	569
Centered Leverage Value	.001	.140	.019	.021	569

a. Dependent Variable: Operation Performance

Source: SPSS output (2022)

Mahalanobis' distance (MD) is a statistical measure of the extent to which cases are multivariate outliers, based on a chi-square distribution, assessed using $p < .001$. The critical chi-square values for 2 to 10 degrees of freedom at a critical alpha of 0.001 as shown in above table indicated a good fit. The Cook's distance shown in above table, considered high as it is greater than 0.7 and extreme. It is greater than 1. As the point has been flagged by the Cook's distance, this point is considered highly influential and has a combination of unusual explanatory variables and response values (the combination of X_i 's and y_i are unusual).

2.1. STRUCTURAL EQUATION MODEL (SEM)



Source: AMOS output (2022)

As a multivariate statistical analysis technique above figure in form of Structural equation modeling shown the structural relationships analyze. SEM combined the factor analysis and multiple regression analysis, and it is showed the structural relationship between measured variables and latent constructs were under acceptance.



Cover Page



2.1.1. REGRESSION WEIGHTS: (GROUP NUMBER 1 - DEFAULT MODEL)

Table 3: Regression Weight

			Estimate	S.E.	C.R.	P	Label
Operation Performance	<---	Logistic Management Practices	.723	.078	7.543	***	par_12
Competitive Advantage	<---	Logistic Management Practices	.319	.083	2.190	***	par_10
Competitive Advantage	<---	Innovation	.316	.108	1.328	***	par_11

Source: AMOS output (2022)

The above table results manifested that the p value is below 0.05, therefore, regression weights and the correlations are independent of the units in which all variables are measured; therefore, they are not affected by the choice of identification constraints.

2.2. INTERPRETATION OF MODEL FIT

This model fit sheet summarizes the result of SEM model fitness with their accepted values.

Table 4: Model Fit Indices

Acronym	Explication	Accepted fit	Result	Result
CMIN/DF	Chi-square divided by Degree of Freedom	≤ 3 = acceptable ≤ 5 = reasonable fit	fit 1.965	Model Fit
GFI	Goodness of Fit Index	1 = perfect ≥ 0.95 = excellent ≥ 0.9 = acceptable fit	fit 0.93	Model Fit
AGFI	Adjusted Goodness of Fit Index	≥ 0.90 = acceptable fit	0.92	Model Fit
CFI	Comparative Fit Index	1 = perfect ≥ 0.95 = excellent ≥ .90 = acceptable fit	fit 0.94	Model Fit
RMSEA	Root Mean Square Error of Approximation	≤ 0.05 = reasonable fit	0.076	Model Fit
RMR	Root Mean Squared Residual	≤ 0.05 = acceptable ≤ 0.07 = acceptable fit	fit 0.005	Model Fit
SRMR	Standardized Root Mean Squared Residual	≤ 0.05 = acceptable fit	0.03	Model Fit

Source: AMOS output (2022)

As we seen in above table, the model fit sheet summarizes the result of SEM model fitness with their accepted values. When researchers compare the SEM model fit indices with the standardized vales, it was observed that Chi-Square (CMIN), Goodness of Fit Index (GFI), Baseline Comparisons in Model Fit, Parsimony-Adjusted Measures, Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Squared Residual, Comparative Fit Index and Critical N all are under acceptance range and depicted the model fitness.

2.3 TOTAL EFFECTS (GROUP NUMBER 1 - DEFAULT MODEL)

Table 5: Total Effect

	Logistic Management Practices	Operation Performance	Competitive Advantage
Operation Performance with Innovation	.852	.000	.000
Competitive Advantage	.321	.198	.000

Source: AMOS output (2022)



Cover Page



Researcher mediator model based on Operation Performance mediation, decomposes the total effect, c , into the indirect effect, ab (product of the indirect paths a and b) and the direct effect, c' (with the effect of the mediator removed). The total effect can be describing as $c = c' + ab$, and hence the indirect effect as $ab = c - c'$. With complete mediation, the entire (or total) effect of Logistic Management Practices on a Competitive Advantage is transmitted through Operation Performance as a mediator variable. Thus, the Logistic Management Practices has no direct effect on the Competitive Advantage; rather, its entire effect is indirect. Thus, mediation role of Operation Performance was really happening in a given model, but the total effect is significant simply because the sample size is very large, or assumptions for the test of the total effect were met.

3.1 Conclusions

The primary goal of this study at coffee cooperatives union was to evaluate the impact of logistical activities on operational performance. The following conclusions were reached in light of the study's goals and results: Four logistics management practices were shown to have a substantial impact on operational performance with full mediation of innovation and competitive advantages. This study provides proof that operational performance at coffee cooperatives union is influenced by procurement, transport management, inventory management, and storage management. According to the study's findings, all four of the independent variables were determined to be statistically significant. Inventory management, transportation management, warehousing management, and procurement are arranged in order of importance level, from highest to lowest.

The study also indicated that the performance of manufacturing organizations is influenced by procurement procedures. An enhancement in the logistics practice's procurement management leads to a favorable, notable improvement in operational performance and makes it possible to handle procurement processes effectively, protecting businesses from budget deficits and plant closures. The study comes to the conclusion that procurement has an impact on the company's operational success.

Transportation management has an effect on the operational performance of profit-driven companies like coffee cooperatives union. Thanks to more effective transportation management techniques, customer orders are processed quickly and with a high degree of customer care. Operational effectiveness is also influenced by inventory management methods such material needs scheduling, accurate inventory documentation, policy guidelines for managing inventory, and automation of inventory management. A business loses efficiency and effectiveness if it views inventory management as a simple problem.

3.2 Recommendations

Research recommendations arise according to the research findings. Regarding improving operational performance, it is recommended to enhance efficient management of procurement practices, transportation management, inventor management, and warehousing management to improve operational performance as a result, as these variables are considered significant variables regarding improving operational performance. By improving logistics management practices, operational performance will be improved as a result.

The study established that procurement practices have a significant positive effect on the operational performance of coffee cooperatives union. The study recommended that coffee cooperatives union should strengthen the supplier relationship to the level of partnership. In order to be effective in the management of the procurement practice, it is recommended to improve procurement planning and provide training for employees of procurement staff regarding managing procurement procedures. This should be done by the top management of coffee cooperatives union.

The association between transportation management methods and operational performance was established by this study; $p < 0.05$ ($P = 0.000$). The report advised manufacturing firm coffee cooperatives union to increase transportation management procedures and have enough transportation units for a broad market reach. To enhance operational performance, senior management and the transportation management section should place a strong emphasis on procedures like vehicle scheduling, maintenance, inspection, and others.

According to the study, inventory management significantly improves coffee cooperatives union's operational performance. According to the study's recommendations for inventory management practices, senior management should have sufficient policy guidelines and the inventory management section of coffee cooperatives union should emphasize the need of accurate inventory documentation.



Cover Page



The study also suggests automating the majority of inventory management to improve responsiveness and efficiency. The report also advised coffee cooperatives union's top management to place an emphasis on proper inventory management strategies, including material need scheduling and others.

Additionally, the results of the study demonstrate that better warehousing management increases coffee cooperatives union's operational performance by 16.4%. In order to have enough warehouse space and a sufficient infrastructure for warehousing, the study advised coffee cooperatives union. Additionally, the report recommended that businesses automate the majority of warehouse tasks to increase operational performance by improving warehousing efficiency.

As they are elements impacting operational performance and may serve as obstacles to operational performance improvement, key variables affecting operational performance should generally receive attention.

3.3 Suggestion for Further Study

Further studies should be done on other aspects of logistics activities on operational performance rather than procurement, transportation management, inventory management, and warehousing management.

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