Harla Journals

Harla Journal of Sustainable Development in Business and Economics

Journal home page: https://journals.ddu.edu.et/index.php/HJSDBE

Harla journal of Sustainable Development in Business and Economics

The Effect of Revers Logistics Practices on Operational Performance: A case study of Some Selected Manufacturing Companies in Dire Dawa City Administration

Ayalew Beyene Kassie[1*], Eyoel Edossa Lelissa[2], Tesfaye Kelbessa Bekere [3], Mikiyas Birahanu Teshome[4]

[1,2,3,4]Department of Logistics and Supply Chain Management, College of Business and Economics, Dire Dawa University, P.O. Box: 1362, Dire Dawa, Ethiopia, Phone: +251928440798, *E-mail: ayalewbeyene21@gmail.com

Abstract

Reverse logistics is the management of the end life of product globally advantages like improvement of competitiveness, regaining values, positive environmental impact and better image for an organization. The purpose of this study was to examine the effects of reverse logistics practices in manufacturing companies (mineral water and Coca cola) companies found in Dire Dawa. To address this study both descriptive and explanatory research design were employed. The current total numbers of employees in both companies are 2613 (Coca Cola bottling company (388) and (Mineral water company (2225) and the researchers took 200 employees as a sample. To achieve the objective of the study, both primary and secondary data source were used. Correlational analysis and multiple linear regressions will also carry out to test the relationship between each variable. Data obtained through questionnaire was analyzed by using descriptive statics: mean and standard deviation supported by Statistical Package for Social Sciences (SPSSversion22) and to come up with statistics that show the relationship between the independent variables and dependent variable inferential statistics was used. The major findings indicated that, most of revers logistics practices have significance effect on operational performance. Whereas product repackaging practices has insignificance effect on operational performance. In addition to this most of revers logistics practices are moderately practiced with in the case companies. This study therefore, recommends that reverse logistics practice is very important in developing efficient and effective management of waste products. Therefore, measures to facilitate collection of used packaging and expired products should be instituted within the country. This can be done by having collection points where customers could drop off used containers and expired products

Keywords: *Product recycling, product re-manufacturing, product reuse, product repackaging, operational performance, reverse logistics*

**Corresponding author: Ayalew B.*; ayalewbeyene21@gmail.com

DOI:

Received October, 2022; Accepted in revised form November, 2022; Accepted December, 2022

1. Introduction

Reverse logistics (RL) starts with the products moving back in the supply chain (De Brito, M. P. & Dekker, R., 2004). Typical reverse logistics activities would be the processes a company uses to collect used, damaged, unwanted (stock balancing returns), or outdated products, as well as packaging and shipping materials from the end-user. Once a product has been returned to a company, the firm has many recapturing value or proper disposal options from which to choose. Some of these reverse logistics activities are: reuse, resell, recondition, refurbish, remanufacture, repair, and recycle, cannibalization, return to supplier, sell via outlet, salvage, reclaim materials, incineration, and landfill (Rogers, DS and Tibben-Lembke, RS, 1999).

In a world where quality holds paramount important, the attitude towards forward logistics has evolved to include enhancement of customer service quality. Meanwhile growing concern for environmental problems and pressure from the global competitive marketplace toward further improvement of customer service have been presenting industries a new challenge of development and management of effective reverse logistics process (Horowitz, N., 2010).

In Sub-Saharan African countries, infrastructures were, if present, poorly managed and maintenance was lacking. Consequently, inefficient transport and communication formed a major obstacle in achieving efficiently organized flows of goods and services. If farmers and manufacturers were to take advantage of reforms in agriculture and other productive systems, dependable transport and communication systems were indispensable. Such systems were of major importance for the facilitation of internal and external trade. Investments in infrastructure would improve distribution logistics, increase productivity and lower production costs (World Bank, 2010).

Currently the number of products returned or out of use is increasing significantly, so management of these products from the point of collection to the origin present a high degree of additional uncertainty on the customer service time, on the origin and the quality of the materials returned. Therefore, Reverse Logistics is critical, and its importance increases the need of information for the proper management of material flow returned (Wadhwa, S. & Madaan, J., 2007)

From a SC management perspective, the coordination and integration between forward and reverse flows can be achieved by designing proper order replenishment policies. However, existing order policies do not explicitly consider the flow of products re-manufactured. Not

considering information about the backward flow in the replenishment rule may bring inefficiencies in order and inventory management (Adenso-Dı`az, B. and Lozano, S., 2012).

The majority of the studies deal with one aspect of a real reverse logistics situation but they do not give the overall business environment, which makes insights rather one-dimensional. Thus, there is a need for conducting the study, by mapping the business context and environmental situation together with more broad information on critical factors, trade-offs and implications. Besides this, the lack of theory for reverse logistics or even for supply chain management adds to companies' inability of knowing what matters in reverse logistics. Therefore, the development of theory should be on top of the research agenda to support reverse logistics decisions (Dowlatshahi, S., 2000).

There is also been a study that have focused on reverse logistics in Ethiopia, (Matiows E., 2014) studied the implication on reverse logistics practices of bottled water manufacturing in Ethiopia. His study observed a significant influence of the implementation of reverse logistics for bottled water manufacturing companies for environmental sustainability when law forces them.

The other problem identified as a gap is polluting the environment at various project areas. Because of lack of a proper disposal system in the organization, some of its waste materials are creating a huge negative effect to the environment. Specially, replaced service components like oil filter, fuel filters and burned oil drained from hundreds of light and heavy construction equipment have always been found polluting lands/farms, and destroying the environment in many areas the company engaged. These problems are, hence, calling for a solution.

In addition to this study; lack of empirical evidence on reverse logistics concept and performance link targeting manufacturing firms in Ethiopia, and the current literature largely focusing outside Ethiopia. Literature review available indicated that studies had focused more on developed world like European Union, United states and advanced Asian and not taking in to account developing counties such as Africa and parts of South America (Kaufmann & Carter, 2006).

Therefore researchers try to investigate the research on the area of effects of reverse logistics practice on operational performance adoption in emerging economies, and to fill the theoretical, practical gap by specifically considering product remanufacturing practice (PRMP), product reuse practice, (PRUP), product recycling practice (PRCP), and product

repackaging practice (PRPP) to fill the theoretical, practical as well as methodological gaps in case of mineral water and coca cola bottling companies Dire Dawa city administration.

2. Review of Literature

2.1. Theoretical review

The study was guided by Resource-Based View Theory (RBV), Institutional Theory and system theory. According to (Maina, C.M. &Maina, T.M., 2015) resources in an organization include assets, competences, information, and knowledge that facilitate efficiency and effectiveness. Today's firm cannot be viewed to be competitively superior more than others in the same field only on the basis of accumulated assets, but on how effectively and efficiently they allocate, manage and exploit both idiosyncratic and physical resources. While resources are the source of a firm's capabilities, capabilities are the main source of its competitive advantage (Schmidt, 2013).Therefore, reverse logistics can be seen as a capability that allows manufacturers to use existing resources in alternative yet cost-effectively and ecologically friendly way by extending the product's normal life beyond its traditional usage (Lai, K.H., Wu, S. J., and Wong, C.W.Y., 2013).

According to (Atambo, W. & Omachar, A. E, 2016), Institutional theory refers to the process through which organizations change gradually through incorporating new ideas and philosophies so as to respond to changes taking place in the wider business environment. According to (Lozano, M., and Vallés, J., 2013), system theory views organizational structure as the established pattern of relationships among the parts of the organization, of particular importance are the patterns in relationships and duties. These include themes of; integration (the way activities are coordinated), differentiation (the way tasks are divided), authority (the structure of the hierarchical relationships), and administrative (the formalized policies, procedures, and controls that guide the organization).

2.2. Empirical literature Review

This study reviewed literature and similar studies with regard to reverse logistics practices and operational performance of an organization.

(Muthemba, M. J.,, 2016), found that there was a relationship between reverse logistics and operational performance among manufacturing firms in Kenya. He sought to review practice of reverse logistics based on category of returns accepted under damages, empties, re-work, and disposal and re-cycling. The study found out that firms carrying out remanufacturing

affirmed that 50 percent of the returned products are successfully re-captured and re-circulated back to the market.

(Li B. and, Wang Z., 2018) , studied the effect of introducing upgraded remanufacturing strategy on original equipment manufacturer (OEM's) decision. In this study, remanufacturing is indicated to have great economic and environmental potential. Currently, resale is the main way of realizing the value of remanufactured products.

(Chin, T. and Sulaiman, Z., 2015), carried out a study on, green supply chain management, environmental collaboration and sustainability performance. In their study, they identified that the main objectives of green distribution are to encourage using environment friendly packaging raw materials and systems, standardizing packaging process in coordination with suppliers, using recycled materials along with producing recyclable packages, and reducing energy consumption in warehouses. The results of (Chin, T. and Sulaiman, Z., 2015), approved the significant and positive impact of green distribution as one of Green Supply Chain Practices (GSCP) on environmental performance of industrial firms in Malaysia.

(Khan, S., 2015), studied the impact of the green supply chain management on environmental based marketing performance. The study investigated the elements of the Green Supply Chain Management (GSCM) "Internal Environmental Management, Green Purchasing, Green Information Systems, Cooperation with Customers, Eco-Design and Packaging, and Investment Recovery" and its impact on the environmental-based marketing performance. Their analysis showed that there is significant impact of the eco-design and packaging on the environmental based marketing performance.

(Guta, B., 2016), in their study relationship between reverse logistics practices and organizational performance, sought to establish the extent of adoption of elements of recycling reverse logistics practices. The correlation analysis, which was found to be significant, showed that the recycling reverse logistics practice has a strong correlation with organizational performance. Further, this reverse logistics practice have significant strong positive correlation with financial performance and market performance. The study recommends that management of East Africa Bottling Share Company (EABSC) should look at reverse logistics practice as a strategic method that can be used to achieve organizational performance.

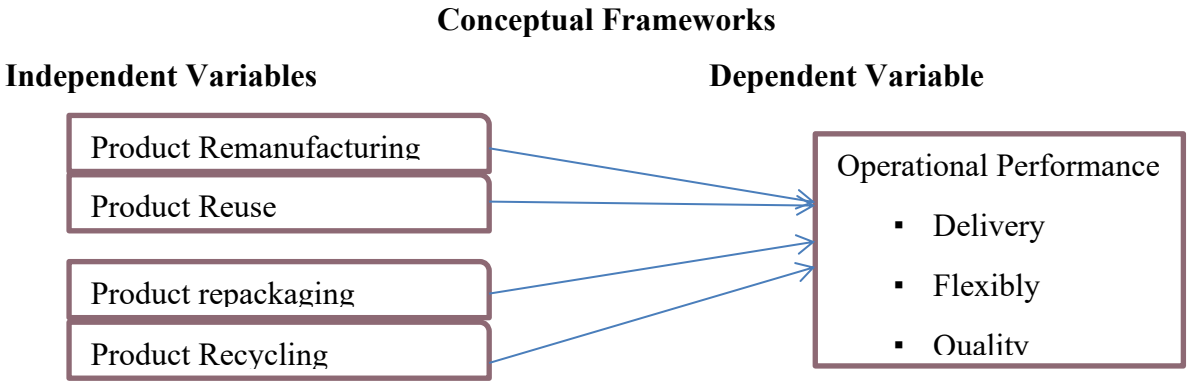

Fig. 1. Conceptual Frameworks

3. Materials and Methods

3.1. Research design

The study applied both descriptive and explanatory research design. Because it helps to describe and analyze the existing conditions and problems of the company to the perceptive of supply chain integration Further the research design adopted explanatory research design (Saunders M. &Thornhill A. , 2009) explanatory research is conducted in order to identify the extent and nature of cause effect relationships. This indicates that causal studies focal point on an analysis of a situation or a specific problem to explain the patterns of relationships between variables. Structured questionnaires were used to collect primary data and questionnaires were developed with research items on the research variables. The researcher used a Likert scale of five in the questionnaire.

3.2. Target population

When it is not possible to study an entire population but the population is known, a smaller sample is taken using a random sampling technique. The current total populations of the case companies are 2613 (mineral water=2,225) and (Coca Cola =388). The researchers were took 200 respondents by using the formula proposed by (Malhotra, 2007). The formula is shown under bellow table:

Table 1. Sample size determination

Population Size	**Sample size**		
	Low	**Medium**	**High**
51-90	5	13	20
91-150	8	20	32
151-280	13	32	50
281-500	20	50	80
501-1200	32	80	125
1201-3200	50	125	**200**
3021-10,000	80	200	315
10,001-35000	125	315	500
35001-150000	200	500	800

Malhotra, Marketing Research. (2007)

Based on the above formula, the researcher will be select large sample size (200) consider as a sample respondents as per the Malhotra sample size determination method.

3.3. Data Collection Instruments

Primary data was collected by using questionnaires formed with close-ended questions. The questions were asked to indicate their level of agreement and disagreement using a five-point Likert scale (one = strongly disagree two = disagree, three = neutral four =agree and five = strongly agree) about the supply chain integration and operational performance.

3.4. Data analysis and presentation

The data was analyzed by use of both quantitative and qualitative method of data analysis. The quantitative measures were used to generate descriptive statistics to analyze for frequencies, means and percentages. The qualitative measures were analyzed through summarizing key findings, explanations, interpretations and making conclusions. The results were reported using descriptive statistics such as frequency tables, pie charts and graphs.

4. Results and Discussions

4.1. Results

In this study out of 200 questionnaires distributed to the respondents, 175 (87.5%) were correctly filled and returned. Thus, data presentation and analysis in this study was based on the responses of 175 respondents from the targeted factories. The data related to each of the reverse logistics practices was presented and analyzed separately as follows.

Table 2. Descriptive Statistics Revers Logistics practice and Operational Performance

Variables	Mean	Std. Deviation
Product remanufacturing practice	3.5223	0.81418
Product reuse practice	3.4411	0.76061
Product recycling practice	3.3703	0.73032
Product repackaging practice	3.0814	0.83658
OP	3.4404	0.65417

Source: Researchers Survey, (2021)

From the findings above table 2, the objective of this study sought to indicate the mean and standard deviation of reverse logistics practice and operational performance.

The above tables show that the overall mean response score among employees with regard to product remanufacturing practice used the companies was (mean=3.5223 with std. deviation= 0.81418), product reuse practice (mean=3.4411with std. deviation= 0.76061), product recycling practice (mean=3.3703with std. deviation= 0.73032), product repackaging practice (mean=3.0814 with std. deviation= 0.83658),and the overall operational performance mean

value of (mean=3.4404with std. deviation= 0.65417) respectively. This indicated that product remanufacturing ranked as the most adopted reverse logistics practice followed by product reuse in the factories. Therefore, it can be observed that reverse logistics practices have been adopted at significant levels in both mineral water and coca cola bottling companies in Dire Dawa city administration.

Table 3. Correlation matrix for Revers Logistics Practice and Operational Performance

Variables	PRMP	PRUP	PRCP	PRPP	OP	
PRMP	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	175				
PRUP	Pearson Correlation	.498**	1			
	Sig. (2-tailed)	.000				
	N	175	175			
PRCP	Pearson Correlation	.435**	.553**	1		
	Sig. (2-tailed)	.000	.000			
	N	175	175	175		
PRPP	Pearson Correlation	.674**	.269**	.358**	1	
	Sig. (2-tailed)	.000	.000	.000		
	N	175	175	175	175	
OP	Pearson Correlation	.827**	.739**	.570**	.465**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	175	175	175	175	175
****. Correlation is significant at the 0.01 level (2-tailed).**						

Source: Researchers Survey, (2021)

PRMP = product remanufacturing practice, PRUP= product reuse practice, PRCP = product recycling practice, PRPP = product repackaging practice and OP = operational performance.

As it is indicated in the above table2, there is significant correlation between revers logistics practice and operational performance.

In other words, the independent variable dimensions (product remanufacturing practice, product reuse practice, product recycling practice,) and operational performance have strong relationship with (r=0.827), (r= 0.739), (r=0.570) respectively and significance value less than 0.01. Whereas product repackaging practice and operational performance have moderate relationship with correlation coefficient of (r =0.465) and significance value less than 0.01. Therefore, this indicated that, product remanufacturing practice and operational performance have strong relationship followed by product reuse and product recycling practice. The study can be argued by (Guta, B., 2016) who analyzed reverse logistics practices and operational performance and that the recycling reverse logistics practice has a strong correlation with organizational performance.

Table 4. Multicollinearity test

Model	Collinearity Statistics.	
	Tolerance	VIF
PRMP	.436	2.295
PRUP	.597	1.675
PRCP	.644	1.552
PRPP	.527	1.898

Source: Researchers Survey, (2021)

As shown on the above table 4, based on the coefficients output (collinearity statistics), the obtained variance inflation factor (VIF) for all independent variables was found to be between 1 and 10, which means that there is no multicollinearity problems.

Table 5. Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
OP	.064	175	.079	.989	175	.219
RLP	.068	175	.046	.976	175	.004

Source: Researchers Survey, (2021)

From normality test table shown in the appendix normality, distribution of all independent variables and dependent variable was normally distributed at the value of significance level ($p < 0.05$) of using Kolmogorov-Smirnov statistics. P-P plot Charts is also used to determine whether the data is normally distributed in the appendix section.

Table 6. test of linearity

			Sum of Squares	df	Mean Square	F	Sig.
OP * RLP	Between Groups	(Combined)	57.955	47	1.233	9.487	.000
		Linearity	54.129	1	54.129	416.465	.000
		Deviation from Linearity	3.826	46	.083	.640	.958
	Within Groups		16.506	127	.130		
	Total		74.461	174			

Source: Researchers Survey, (2021)

As it shown in the above table 6, the values of sig. deviation from linearity of all variables were > 0.05. From this it can be concluded that there is a liner relationship between independent variables and dependent variable. As it can be seen from the ANOVA table the value of sig. Deviation from linearity of each variable were above 0.05 i.e., (Sig .958). Therefore, each independent variable was the liner relationship with the dependent variable (operational performance).

Table 7. Homoscedasticity Test

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.180	.068		2.629	.009
	PRMP	.032	.022	.162	1.419	.158
	PRUP	-.009	.020	-.043	-.439	.661
	PRCP	-.024	.020	-.110	-1.171	.243
	PRPP	.011	.020	.057	.548	.585

Source: Researchers Survey, (2021)

Testing for homoscedasticity was necessitated by the use of hierarchical multiple regressions as the principal inferential statistical approach. As it is shown in the above table the obtained value of sig. Value of all independent variables was > 0.05. This indicated that there were no Heteroscedasticity problems of all independent variables.

Table 8. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.913[a]	.834	.830	.26954

Predictors: (Constant), PRPP, PRUP, PRCP, PRMP
Source: Researchers Survey, (2021)

From the above table the "R" column represents the value of R, the multiple correlation coefficients. R can be considered one measure of the quality of the prediction of the dependent variable; operational performance. A value of 0.913[a], in this indicates a good level of prediction. The "R square" additionally referred to as the coefficient of determination, which is the share of the variance in the based variable that can be defined by the independent variables (product remanufacturing practice, product reuse practice product recycling practice, and product repackaging practice) and the value of 83.4% that the independent variables explain the variability of the dependent variable which is operational performance.

Table 9. ANOVA table

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	62.110	4	15.528	213.726	.000[b]
	Residual	12.351	170	.073		
	Total	74.461	174			

a. Dependent Variable: OP Source: Researchers Survey, (2021)

b. Predictors: (Constant), PRPP, PRUP, PRCP, PRMP

The ANOVA reports how well the regression equation fits the data or predict the dependent variable. In the above ANOVA, table the F value measures the probability of chance deputes from straight line and the F-ratio of this study is (F=15.528/.073= 213.726), which is

statistically significant at P<0.001 because the value in the column labeled (sig. less than <0.01) or the significance value is .000 which, is less than 0.001.

Since the results, Using the p-value, the model is statistically significant then the p-value is less than 0.05 using the F statistic, the critical F test statistic (tabulated) at α=0.05 with degrees of freedom in the numerator, df = K=4 and degrees of freedom in the denominator, df = n-(k+1) =175-(4+1) =170 i.e. K stands for number of independent variables. Therefore, it was concluded that the regression model is significantly better prediction of operational performances or the regression model over all predicts operational performances significantly well. The idea was supported by (Green, K.. & Bhadauria, S. , 2012) addressing the relationship between logistics management practices and organizational performance in a large number of companies in the United States, concluded that logistic management practices have a positive impact on business performance.

Table 10. Coefficients of Independent Variable

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.295	.116		2.530	.012
	PRMP	.446	.038	.555	11.728	.000
	PRUP	.343	.035	.399	9.877	.000
	PRCP	.080	.035	.089	2.283	.024
	PRPP	.041	.034	.052	1.208	.229
a. Dependent Variable: OP						

Source: Researchers Survey, (2021)

PRMP = product remanufacturing practice, PRUP= product reuse practice, PRCP = product recycling practice, PRPP = product repackaging practice and OP = operational performance

From the above table coefficient of determination explains the extent to which changes in the dependent variable can be explained by change in the independent variables or the percentage of variation in the dependent variable operational performance that is explained by all the above listed four independent variables. From the above coefficient table except product repackaging practice, all other variables have positive and significant effect on operational performance.

Therefore, the value of β from the table represents the slope of the regression line. It is 0.446 for product remanufacturing practice and although this value is the slope of the regression associated with a unit change in the outcome associated with a unit change in the predictor. This implied that, if the predictor variable is increased by one unit (if product remanufacturing practice is increased by one unit), then operational performance increase by 44.6%. Therefore,

product remanufacturing practice has a positive and significant effect on operational performance at (β= 0.446 and (t=11.728, p=. 000). This finding is supported by A study done by Ilias P. Vlachos (2014) Reverse Food Logistics during the Product Life Cycle indicates that re manufactured products incur 40-60% less costs than new products and save 85% of the energy needed to start from scratch since re manufacturing expands the life cycle of the product.

The same is true that if the predictor variable is increased by one unit, (if product reuse practice and product recycling practice is increased by one unit), then operational performance increase by 34.3% and 8% respectively. This finding is supported by (Moses Kabergey,& Salome Richu., 2015) reveals that reverse logistics practice have overall prediction of 25.4 % on operational performance of sisal processing firms in Nakuru County. This implies that in overall, reverse logistics practice positively affects operational performance of sisal processing firms in Nakuru County. The rest variable, product repackaging practice has positive and insignificant effect on operational performance.

OP= .295 + .446 PRMP+. 343PRUP+.080PRCP+.041 PRPP+e (error term)

Table 11. Summary of hypotheses test

Proposed hypotheses	**Significant level P< 0.05**	**Decision based on the finding**
H1: Product remanufacturing practice has positive and significant effect on operational performance	.000	Accepted
H2: Product reuse practice has positive and significant effect on operational performance	.000	Accepted
H3: Product recycling practice has positive and significant effect on operational performance	.020	Accepted
H4: Product packaging practice has positive and insignificant effect on operational performance	.229	Rejected

Source: Researchers Survey, (2021)

4.2. Discussion

Responses obtained from respondents showed that reverse logistics plays an important role in the overall success of organizations. The finding of descriptive statistics analysis shows that, overall mean response score among employees with regard to product remanufacturing practice used in in the companies was (mean=3.5223 with std. deviation= 0.81418), product reuse practice (mean=3.4411with std. deviation= 0.76061), product recycling practice (mean=3.3703with std. deviation= 0.73032), product repackaging practice (mean=3.0814 with std. deviation= 0.83658),and the overall operational performance mean value of (mean=3.4404with std. deviation= 0.65417) respectively. This indicated that product

remanufacturing ranked as the most adopted reverse logistics practice followed by product reuse in the factories. Therefore, it can be observed that reverse logistics practices have been adopted at significant levels in both mineral water and coca cola bottling companies in Dire Dawa city administration.

The correlation analysis indicated that the independent variable dimensions (product remanufacturing practice, product reuse practice, product recycling practice,) and operational performance have strong relationship with (r=0.827), (r= 0.739), (r=0.570) respectively and significance value less than 0.01. Whereas product repackaging practice and operational performance have moderate relationship with correlation coefficient of (r =0.465) and significance value less than 0.01. Therefore, this indicated that, product remanufacturing practice and operational performance have strong relationship followed by product reuse and product recycling practice. The study can be argued by (Guta, B., 2016) who analyzed reverse logistics practices and organizational performance and that the recycling reverse logistics practice has a strong correlation with organizational performance.

The regression analysis shows that except product repackaging practice, which has positive and insignificant effect on operational performance; all other variables have positive and significant effect on operational performance.

Therefore, the value of β from the finding represents the slope of the regression line. It is 0.446 for product remanufacturing practice. This implied that, if the predictor variable is increased by one unit (if product remanufacturing practice, product reuse practice, product recycling practice are increased by one unit respectively), then operational performance increase by 44.6%, 34.3% and 8% respectively Therefore, product remanufacturing practice has a positive and significant effect on operational performance respectively). This finding is supported by Moses Kabergey, & Salome Richu. (2015) reveals that reverse logistics practice have overall prediction of 25.4 % on operational performance of sisal processing firms in Nakuru County. This implies that in overall, reverse logistics practice positively affects operational performance of sisal processing firms in Nakuru County.

4.3. Discussion

The first hypothesis proposed that product remanufacturing practice has positive and significant effect on operational performance (β= 0. 446 and (t=11.728, p=. 000). This tells us there is significance relationship between Product remanufacturing practice and o operational performance. Therefore, the proposed hypothesis was accepted.

The second hypothesis proposed that product reuse has a positive and significant effect on operational performance at (β= .343) and (t= 9.877, p= .000). This implied that, if the predictor variable is increased by one unit (if product reuse is increased by one unit), then operational performance increase by 34.3%. The finding is similar with (Moses Kabergey,& Salome Richu., 2015) product reuse has statistically significant positive effect on operational performance of sisal processing firms in Nakuru County. Therefore, the proposed hypothesis was accepted.

The third hypothesis proposed that product recycling has a positive and significant effect on operational performance at (β= .080) and (t= 2.283, p= .024). This implied that, there is a positive and significant relationship between product recycling and operational performance. Therefore, the proposed hypothesis was accepted

The fourth hypothesis proposed that, there is no significant association between product packaging practice and operational performance at the indication level of (β= .041) and (t= 1.208, p= .229). Therefore, product packaging practice has positive and insignificance effect on operational performance.

5 Conclusion and Recommendation

This study examines the effects of reverse logistics practice on operational performance of mineral water factories and coca cola bottling company in Dire Dawa city administration. Data were generated through questionnaire administration to employees of both manufacturing companies. The study concludes that reverse logistics practice is very important in developing efficient and effective management of waste products from manufacturing firms. The study found reasons to conclude based on the results that reverse logistics is highly significant in achieving the organizational goals, company's future success, the functioning of a manufacturing company and strategically positioning the company especially in the face of current rising costs of manufacturing in our country Ethiopia.

From the findings of this study; the descriptive statistics shows product remanufacturing ranked as the most adopted reverse logistics practice followed by product reuse in both mineral water and coca cola bottling companies. The correlation result indicated that, there is a positive relationship between Reverse logistics practices; product remanufacturing practice, product reuse practice, product recycling practice, product repackaging practice and operational performance.

The study therefore recommends the need for a growing focus on various sections of reverse logistics practice in the management of waste products' of manufacturing company in order to

achieve organizational goal and enhances sustainable business performance. The study further recommends that, reverse logistics practice is very important in developing efficient and effective management of waste products. Therefore, measures to facilitate collection of used packaging and expired products should be instituted within the country. This can be done by having collection points where customers could drop off used containers and expired products.

Acknowledgment

The authors sincerely acknowledge the support and cooperation of stakeholder during this study.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

References

Adenso-Dı`az, B. and Lozano, S. (2012). An analysis of the main factors affecting bullwhip in reverse supply chains. International Journal of ProductionEconomics, 135, pp. 917-928.

Chin, T. and Sulaiman, Z. (2015). Green supply chain management, environmental collaboration and sustainability performance. Procedia CIRP. 695-699.

De Brito, M. P. & Dekker, R. (2004). A framework for reverse logistics, In Reverse Logistics: Quantitative Models for Closed Loop Supply Chain . (D. e. al, Ed.) Heidelberg , Germany : Springer.

Dowlatshahi, S. (2000). Developing a theory of Reverse Logistics. Interfaces. 30(3), pp. 143-155.

Green, K.. & Bhadauria, S. . (2012). Green Supply Chain Management Practices: Impact on Performance .Supply Chain Management: . An International Journal, , 17(3)290-305.

Guta, B. (2016). Relationship between Reverse Logistics Practices and Organizational Performance: The Case of East Africa Bottling Share Company. Addis Ababa University, Ethiopia.

Hazen, B. and Hanna J. (2011). Diffusion of green supply chain management examining perceived quality of green reverse logistics. The International Journal of Logistics Management(22 (3)), 373-389.

Horowitz, N. (2010). How to find savings in reverse logistics.CSCMP's, Supply Chain Quarterly.[Online] Available from.

Kaufmann & Carter. (2006). International supply chain relationships and non-financial performance – A comparison of US and German practices. Journal of Operations Management(24), 653-675.

Khan, S. (2015). Analysis and Usage: Cloud Computing Technology in the Supply Chain Management. Life Science Journal(12(11), 3–5.

Lai, K.H., Wu, S. J., and Wong, C.W.Y. (2013). Did Reverse Logistics Practices Hit the Triple Bottom Line of Chinese Manufacturers? International Journal of Productio nEconomics 146, (1).

Langat, E. (2012). Reverse supply chain management practices in large scale manufacturing companies in Nairobi, Kenya. Unpublished MBA project UON,Kenya. Scandinavian Journal , 65-69.

Li B. and, Wang Z. (2018). The Effect of Introducing Upgraded Remanufacturing Strategy on Original Equipment Manufacturer (OEM's) Decision. Sustainability Article.).

Lozano, M., and Vallés, J. (2013). An Analysis of the Implementation of an Environmental Management System in a Local Public Administration. Journal of Environmental Management 82 (4): 495-511.

Maina, C.M. &Maina, T.M. (2015). Features of Resource Based View Theory: An Effective Strategy in Outsourcing. International Journal of Management and CommerceInnovations 3(2), 2348-7585.

Matiows E. (2014). Trends in bottled water use survey in Addis Ababa: Implication on reverse logistics of Bottled water manufacturing in Ethiopia.

Moses Kabergey,& Salome Richu. (2015). Effect of Reverse Logistics on Operational Performance of Sisal Processing Firms in Nakuru County,. Kenya.

Muthemba, M. J.,. (2016). The Relationship between Reverse Logistics and Operational Performance among Manufacturing Firms in Kenya. Unpublished MBA Project, UON,Kenya.

Ongombe, J. (2012). Reverse logistics and competitive advantage. An investigation of wate rbottling companies. Logistics and Transportation Review,, 850-871.

Rogers, DS and Tibben-Lembke, RS. (1999). Going Backwards: Reverse logistics trends and practices, Reverse Logistics Executive Council. Reverse Logistics Executive Council.

Saunders M. &Thornhill A. . (2009). Research methods for business students (5th Edi. ed.). England: Pearson education limited.

Schmidt, J. K. (2013). Resource Value and Customer Heterogeneity. Academy of Management Review

Wadhwa, S. & Madaan, J. (2007). Conceptual Framework for Knowledge Management in Reverse Enterprise System. Knowledge Management Practicec, 1-22.

World Bank. (2010). World Economic Forum. Global Competitiveness Report
port