African Journal of Emerging Issues
Peer reviewed | Double blind | Interdisciplinary

African Journal of Emerging Issues (AJOEI)
Online ISSN: 2663 - 9335
Available at: https://ajoeijournals.org

PROCUREMENT AND SUPPLY CHAIN

REVERSE LOGISTICS PRODUCT DISPOSITION PRACTICE AND THE PERFORMANCE OF LARGE MANUFACTURING FIRMS IN KENYA

[1*]Felix Ndungu Kamanga, [2]Prof. Patrick Karanja Ngugi (PhD) & [3]Dr. Anthony Osoro (PhD)

[1]Department of Procurement and Logistics, Jomo Kenyatta University of Agriculture and Technology

Corresponding author's email: kamangafelix60@gmail.com

[2]Department of Procurement and Logistics, Jomo Kenyatta University of Agriculture and Technology

[3]Department of Procurement and Logistics, Jomo Kenyatta University of Agriculture and Technology

Date of Publication: June 2022

ABSTRACT

Background: In a world of scarce resources and disposal capacities, recovery of used products and materials is key to supporting a growing population at an increasing level of consumption. Globally there are pressures on organizations to act responsibly in terms of protection of the environment and create value for all stakeholders. Even though reverse logistics has gained a lot of relevance in most organizations very little research has been conducted on the subject. As a result, there is a great opportunity for researchers and academicians to advance the study of reverse logistics in order to fill this gap.

Methodology: This study sought to examine the influence of reverse logistics product disposition practice on the performance of large manufacturing firms in Kenya. The study used descriptive design and target population was large manufacturing firms which are registered with Kenya Association of Manufacturers. Data was analyzed using descriptive and inferential statistics.

Results: Pearson correlation coefficient for the output indicated that product disposition practice was able to explain 43.6% variations in the firm performance.

Conclusions and Recommendations: The study concluded that there was a significant positive relationship between product disposition practice and firm performance. The study recommended that product disposition practice be implemented by manufacturing firms as a way of boosting firm performance. The paper's findings may motivate local manufacturing firms to implement disposition practices when supported by innovative, suitable tools for the proper management of the information and material flow in the chain.

Keywords: *Supply Chain Management, Reverse Logistics, Product Disposition, Manufacturing Firms.*

INTRODUCTION

This paper aimed at developing a framework for selection of best reverse logistics disposition alternative. The need for recovery of returned manufactured goods has been receiving more attention than ever before due to growing environmental concerns. Given shorter product lifecycles, the complexities of selling products over multiple channels, and dealing with consumers who are very informed hence increasingly demanding a lot from manufacturers. Reverse logistics has become more and more important to the manufacturing firms, owing to various reasons including unavoidable product recalls, legislative policy regarding environmental and sustainable issues, etc. Reverse Logistics (RL) is the process of planning, implementing, and controlling the efficient, cost-effective flow of raw materials, in-process inventory, finished goods and related information from the point of consumption to the point of origin for the purpose of recapturing value or proper disposal (Govindan et al., 2015).

Manufacturers and distributors must be poised in flexibility and adaptability to successfully compete in the continuously rapidly changing environment. Organizations may partner with a vendor that can remanufacture or refurbish products and parts, and convert damaged inventory into sellable goods to recapture value that would otherwise be lost. There is more value in products that have been repaired or refurbished as compared to those that are sold as scrap or salvage. There is also a market for harvesting product components and selling them as spares. There is a rising global interest in reverse logistics. Companies have the opportunity to increase their profit margins and minimize losses through efficiently handling returns. Returns provide a revenue generating opportunity to recapture value. Logistics is the management of the flow of goods, information or materials from one point of origin to point of consumption, and in some cases even to the point of disposal (Stock & Ellram 2016).

The current research focused on one specific reverse logistics-related strategic practice, that is, disposition. Disposition encompasses the activities that place product back into inventory or temporary storage through the process of: repackaging, repair, refurbishing or remanufacturing (Badenhorst, 2013). When the decision is made to retrieve product within the supply chain, a number of options are available as to disposition. This study embarked on three disposition strategies which are the most used: Refurbishing; remanufacturing; and repackaging of returned products. The criteria for selection of best RL disposition option is guided by: economic benefits, environmental benefits, corporate social responsibility, stakeholder's needs and reverse logistics resources (Ravi et al., 2005).

Economics is seen as the major driver to all the recovery options, where the firm may gain both direct as well as indirect economic benefits through recapturing value from returned products leading to profitable business opportunities (Ravi et al., 2005). Environmental concerns are the significant force shaping the economy as well as one of the most important issues faced by businesses (Murphy & Poist, 2003). Many companies have focused on reverse logistics operations because of environmental reasons (Rogers & Tibben-Lembke, 1999). Disposition decisions are greatly affected by the environmental policy of an organization. Sometimes, a firm recycles the products rather than disposal even if it is costlier. Corporate social responsibility provides guidelines to outline firm approach, strategies and associations with stakeholders while addressing ethical values, legal fulfillments and economic progress (Sarkis et al., 2010). Corporate social responsibility may greatly influence the reverse logistics disposition decision depending on the policy of an organization. According to Sarkis et al. (2010), reverse logistics can make significant

contribution to the sustainability and hence corporate social responsibility efforts of an organization.

Stakeholder's needs: Because of pressures from consumers, manufacturers are asking their suppliers to adopt the environment-friendly practices (Lamming & Hampson, 1996). Similarly, stakeholders in the distribution system are pressurizing their suppliers to be more environmentally responsible (Hall, 2001) because of their growing awareness and concerns. Reverse logistics resources: Availability and effective utilization of resources is essential for fully exploring the true value potential of reverse logistics. Dowlatshahi (2005) stated that the overall success of reverse supply chain system depends on the effective use of available resources. Disposition decisions depend on the availability of resources in an organization.

STATEMENT OF THE PROBLEM

The contribution of the manufacturing sector to the economy and jobs has been declining over the past five years, as the sector's share of the Gross Domestic Product (GDP) shrank by more than three percentage points from almost 11 per cent in 2013 to 8.4 per cent in 2017, according to the 2018 Economic Survey. In 2016, manufacturing contributed 9.1 per cent to GDP, a drop from the previous year's 9.4 per cent and 10 per cent in 2014. Kenya Vision 2030 identified the manufacturing sector as one of the key drivers for realizing a sustained annual GDP growth of 10 per cent (KAM 2015). The manufacturing sector has high, yet untapped potential to contribute to employment and GDP growth. Low performance of manufacturing firms is caused by problems such as; scarce resources, waste accumulation, high material cost, disposal and lack of sustainability (Barnett & Morse, 2013). Reverse logistics through disposition refers to the activities that place product back into inventory or temporary storage through the process of: repackaging, repair, refurbishing or remanufacturing (Badenhorst, 2013). Hence disposition when well managed can improve availability of resources at a lower cost. Moreover, legal disposal issues are a major concern for many organizations.

OBJECTIVES

i. To establish the impact of disposition through refurbishing strategy in reverse logistics and the performance of large manufacturing firms in Kenya.
ii. To determine the impact of disposition through remanufacturing strategy and the performance of large manufacturing firms in Kenya.
iii. To evaluate the impact of disposition through repackaging strategy and the performance of large manufacturing firms in Kenya.

LITERATURE REVIEW

Disposition refers to the activities that place product back into inventory or temporary storage through refurbishing, remanufacturing, and repackaging (Krykawskyy & Fihun, 2015). The company resorts to the refurbishment process when the simple repair of defective parts is not efficient enough. The successful refurbishing aims at improving the product's performance, extending their service life and bringing them up to an acceptable quality level. Very often, it is cheaper for expensive products to be refurbished instead of replacing the whole product by new one. Moreover, the returns are disassembled to separate items and modules which are subject to an accurate screening, inspection and testing process to replace or fix the outdated or damaged parts (Abdelshafie, 2014). The average of the remaining service life of a refurbished part is shorter than the service life of new ones (Bakker et al., 2014).

Remanufactured product processes aim to make the product's quality standard, life expectancy and performance like that of new products (Bakker, et al., 2014). In order to do that, the company has to take deeper interventions. All components of returned products are fully disassembled and inspected. The outdated, worn-out or damaged materials are changed with new parts, and the exchanged parts are fixed and evaluated. The company should identify which remanufactured items meet the quality standard. Further, the customer can purchase high quality products at low prices and full warranty (Abdelshafie, 2014).

An organization may result to repackaging a product as a result of damages on the outlook of the product. Repackaging involves complete or partial change of the entire look of the products before being presented to the consumer. Repackaging can occur as a result of complaints from consumers as a result of inability to use the products due to the way it has been packed or difficulty in using the products (Williams, 2016). Organizations may find it necessary to repackage their products to make them more suitable and appealing to their customers. It also consists of offloading products initially packed in large volumes to smaller easy to handle and distribute packaging. Repackaging is a necessary step in reverse logistics as it helps organization assess their consumer needs and repackage their products into more convenient and effective packages (Gencer & Akkucuk, 2015). Organizations are able to address the specific needs of their customers in terms of sizes, shapes and materials used in the repackaging process.

Disposition decisions depend upon proposition of the product sold to the customer such as quality, selling price and logistics cost, as well as demand of the product in the market. If the product has sufficiently high value and the quality of returned product is good enough for recapturing value, then product can be remanufactured because of higher re-sale value (Arrieta, 2016). Vlachos (2014) examined the reverse logistics using the Resource-Based View (RBV) and argued that companies should allocate their resources to developing reverse logistics programs in order to avoid the potential negative impact on the bottom line. Conversely, if adequate resources (tangible/intangible or property-based/ knowledge-based) are targeted to reverse logistics programs, companies may gain a tremendous positive financial impact as well as important relational implications.

In a study, Kwak and Kim (2013) found that the part replacements from suppliers must be preferred over refurbishment of equipment's being more profitable. So the firm may adopt the disposition strategy of parts replacement rather than refurbishment. The choice to destroy the product must be preferred in case of resource scarcity because other disposition alternatives like recycling or remanufacturing may need higher investment for recapturing value. Although there may be legal restrictions on destroying some products in many countries, Agrawal et al. (2016) reported that if time is not relevant, then recycling is preferred, and reprocessing is preferred if time is primarily relevant. The findings of the study by Omorenda and Kwasira (2012) led to the conclusion that disposition has many other benefits such as saving storage space besides freeing capital, it enabled efficient use of materials and reduced overall costs.

Jindal and Sangwan (2016) developed a model for the returned products considering the time of the return, the quality of the product and the clogging effect at the remanufacturing facility. Agrawal et al. (2015) developed a flexible decision model for the selection of best alternative of disposition strategy. Christopher (2016) analyzed the strategic factors to provide a summary of these factors for the betterment of a firm's reverse logistics functions. Different firms in different industries have been using potential disposition alternatives such as: reuse, recycle, remanufacture

and repair or disposal practice. However, no model or methodology or approach was found for selecting the best disposition alternative in reverse logistics system. There is more value in products that have been repaired or refurbished as compared to those that are sold as scrap or salvage. There is also a market for harvesting product components and selling them as spares (Kotler, 2015).

METHODOLOGY

The study adopted Descriptive research design. The target population for this study was the 240 large scale manufacturing firms in Nairobi County which are registered members of KAM. A sample size of 150 manufacturing firms was selected using purposive sampling method. Data was collected from primary sources through survey method by use of questionnaires. Data was analyzed using descriptive and inferential statistics.

FINDINGS AND DISCUSSION

Response Rate

Out of the 150 questionnaires distributed, 129 were correctly filled and returned which represents a response rate of 89 percent. According to Kamel and Lloyd (2015) response rate of above 50 percent in business management research should be considered good. Therefore, the 89 percent response rate reported for this study formed an acceptable basis for drawing conclusions. Table 1 shows the response rate.

Table 1: Response Rate

Response rate	Sample size	Percentage %
Returned questionnaires	129	89
Un-returned questionnaires	21	14
Total	**150**	**100**

Descriptive statistics

The variable consisted of twelve items. Each scale was rated on a five point Likert type scale ranging from 1 for "Strongly Disagree," to 5 denoting "Strongly Agree". Average mean scale ratings ranged from 3.829 to 4.907. This indicated that the respondents believed that Disposition Practices exhibit moderate to high levels of implementation as part of reverse logistics. The highest mean rating was 4.907 for the statement "Remanufacturing aims to make the product's quality standard." (Std.D= 0.363, n=129). The statement with the lowest mean rating of 3.829 was "Refurbishing offers reduction in unit cost of product" (Std.D= 0.588, n=129). Repackaging strategy was mostly driven from complains received from customers (Std.D= 0.489, n=129). The composite average of Disposition Practices was 4.373 (Std.D =0.538) which was a high rating indicating that on average, Disposition Practices is highly implemented as part of reverse logistics. Table 2 shows the results.

Table 2: Descriptive Statistics

Code	Disposition Practices	SD (%)	D (%)	N (%)	A (%)	SA (%)	Mean	Std. Deviation
DP1	Refurbishing offers reduction in unit cost of product	0	0	27	63	10	3.829	0.588
DP2	Refurbishing aims at improving the product's performance,	0	0	9	45	47	4.380	0.640
DP3	Refurbishing extends the service life of product	0	0	17	66	17	4.000	0.586
DP4	Refurbishing brings product quality to an acceptable level	0	0	24	30	46	4.217	0.810
DP5	Remanufacturing brings Reduced product/material acquisition cost	0	0	2	77	21	4.186	0.447
DP6	Remanufacturing aims to make the product's quality standard	0	0	2	5	93	4.907	0.363
DP7	Remanufacturing makes product performance like that of a new one	0	0	3	62	35	4.318	0.530
DP8	Remanufacturing allows the firm to capture value from the returned products	0	0	2	31	67	4.643	0.527
DP9	Repackaging changes the entire look of the products before being presented to the consumer	0	0	0	47	53	4.527	0.501
DP10	Repackaging can occur as a result of complaints from consumers	0	0	0	39	61	4.612	0.489
DP11	Repackaging makes the product more suitable and appealing to their customers	0	0	0	66	34	4.341	0.476
DP12	Repackaging helps firms assess their consumer needs and repackage their products into more convenient way.	0	0	0	49	51	4.512	0.502
	Composite						***4.373***	***0.538***

Table 3: Contribution of disposition Practice to firm performance

	Frequency	Percent
Yes	129	100

Table 4: Implementation of disposition Practice as part of reverse logistics

	Frequency	Percent
Good	53	41.1
Excellent	76	58.9
Total	129	100

Correlation between Disposition Practices and firm performance

The results for the effect of Disposition Practices and firm performance were assessed using Pearson correlation coefficient as shown in table. The output indicate that disposition practices had a strong positive relationship with firm performance ($r=.660$, $p<0.05$). Results are shown in Table 5.

Table 5: Correlation Results

		Firm performance	Disposition practices
Firm performance	Pearson Correlation	1	.660**
	Sig. (2-tailed)		.000
	N	129	129
Disposition practices	Pearson Correlation	.660**	1
	Sig. (2-tailed)	.000	
	N	129	129

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

Influence of Disposition Practices and firm performance

The objective of the study was to establish the influence of product disposition practice and the performance of large manufacturing firms in Kenya. The following null hypothesis was formulated

H_0: Product disposition practice in reverse logistics has no significant influence on the performance of large manufacturing firms in Kenya.

Table 6 shows that the R-squared is 0.436 meaning that the Disposition Practices was able to explain 43.6% variations in the firm performance while the rest are explained by the error term.

Table 6: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.660a	0.436	0.431	0.51611

a. Predictors: (Constant), Disposition Practices

The F-statistic is 98.108 with a p-value <0.05 which implies that the regression model is significant. Therefore, the t-statistics and p-values can reliably be used to test the significance of coefficients in the model.

Table 7: ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	26.134	1	26.134	98.108	.000b
	Residual	33.83	127	0.266		
	Total	59.963	128			

a. Dependent Variable: Firm Performance.

b. Predictors: (Constant), Disposition Practices

Table 8: Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.339	0.123		9.165	0.000
	Disposition Practices	0.428	0.053	0.66	12.188	0.000

a. Dependent Variable: Firm Performance.

The regression equation obtained from this output is:

Performance = 1.339 +0.428 Disposition Practices

The beta coefficient for Disposition Practices was 0.660. This indicates that a unit increase in Disposition Practices would result in 66.0 % increase in manufacturing firm performance. The t-statistic and corresponding p-value were 9.905 (0.000). Therefore, at P < 0.05 level of significance the null hypothesis is rejected implying that Disposition Practices has a significant influence on firm performance. On the basis of these statistics, the study concludes that there is significant positive relationship between Disposition Practices and firm performance.

CONCLUSION

Data analysis revealed that the R-squared was 0.436 meaning that the Disposition Practices are able to explain 43.6% variations in the firm performance while the rest are explained by the error term. The beta coefficient for Disposition Practices was 0.660. This indicates that a unit increase

in Disposition Practices would result in 66.0 % increase in manufacturing firm performance. The t-statistic and corresponding p-value were 9.905 (0.000). On the basis of these statistics, the study concludes that there is significant positive relationship between Disposition Practices and firm performance. The disposition decision will help the firm in improving the overall reverse logistic and firm performance. Globalization, fast depletion of resources, environmental concern and government regulation results in both pressure and drivers for the companies to implement reverse logistics. The study has a relationship close to that of Jack et al. (2010) which illustrated that RL capabilities result in cost savings and improved performance. Similarly, Richey et al. (2005) argued that returned resources could be used to develop innovative RL capabilities to enhance performance and gain competitive differentiation.

RECOMMENDATIONS

The study may help the managers in disposition decision making by using the proposed approach for the selection of best disposition alternative. Further study may be carried out based on survey data and more case studies to validate the findings. In future, research may also be carried out by looking at other disposition alternatives. Also, cost benefit analysis along with other factors discussed above may be carried out further to strengthen the outcome of the study. This study suggests that firms should invest more resources in disposition creative solutions; for instance, improving RL information systems and technology would lead to more sustainable environmental protection and economic performance outcomes.

REFERENCES

Abdelshafie, A. G. M. (2014). Trends and practices of e-waste management through revers logistics-a case study: *Samsung Electronics Company* (Master's thesis, Høgskolen Molde-Vitenskapelig høgskole i logistikk).

Agrawal, S., Singh, R. K., & Murtaza, Q. (2015). A literature review and perspectives in reverse logistics. *Resources, Conservation and Recycling*, *97*, 76-92.

Arrieta, V. (2015). Reverse logistics as alleviation to ecological issues: Theory and implementation.

Badenhorst, A. (2013). *A best practice framework in reverse logistics*, (Doctoral dissertation).

Bakker, C., Wang, F., Huisman, J., & den Hollander, M. (2014). Products that go round: exploring product life extension through design. *Journal of Cleaner Production*, *69*, 1016.

Barnett, H. J., & Morse, C. (2013). *Scarcity and growth: The economics of natural resource availability* (Vol. 3). Routledge.

Barney, Jay, Wright, M., & Ketchen, D. J. (2014). The resource-based view of the firm: *Journal of Management*, *27*, 625-641.

Christ, K. L., & Burritt, R. L. (2013). Environmental management accounting: the significance of contingent variables for adoption. *Journal of Cleaner Production*, *41*, 163-173.

Christopher, M. (2016). *Logistics & supply chain management*. Pearson UK.

Dowlatshahi, S. (2005), "A strategic framework for the design and implementation of remanufacturing operations in reverse logistics", *International Journal of Production Research*, Vol.43No.16, pp.3455-3480.

Gencer, Y. G., & Akkucuk, U. (2015). Reverse Logistics: Automobile Recalls and Other Conditions. *Handbook of Research on Waste Management Techniques for Sustainability, IGI Global, Hershey*, 125-154.

Govindan, K., Khodaverdi, R., & Vafadarnikjoo, A. (2015). Intuitionistic fuzzy based DEMATEL method for developing green practices and performances in a green supply chain. *Expert Systems with Applications*, *42*(20), 7207-7220.

Jindal, A., & Sangwan, K. S. (2016). A fuzzy-based decision support framework for product recovery process selection in reverse Logistics. *International Journal of Services and Operations Management*, *25*(4), 413-439.

Kotler, P. (2015). *Framework for marketing management*. Pearson Education India.

Krykawskyy, Y., & Fihun, N. (2015). The Place of Reverse Logistics in the Modern Society. *Logistics and Transport*, *25*

Kwak, M., & Kim, H. (2013). Market positioning of remanufactured products with optimal planning for part upgrades. *Journal of Mechanical Design*, *135*(1), 011007.

Lamming, R., & Hampson, J. (1996). The environment as a supply chain management issue. *British Journal of Management*, Vol. 7, pp. S45-S62.

Murphy, P. and Poist, R. (2003), *"Green perspectives and practices: a comparative logistics* study", *Supply Chain Management: An International Journal*, Vol.8No.2, pp.122-131.

Omorenda, H., & Kwasira, J. (2012). Evaluation of the Use of Reverse Logistics on Organizational Profitability. *International Journal of Science and Research*

Ravi, V., & Shankar, R. (2015). Survey of reverse logistics practices in manufacturing industries: An Indian context. *Benchmarking: An International Journal*, *22*(5), 874-899.

Rogers, D.S. and Tibben-Lembke, R. (1999), Going Backwards: Reverse Logistics Trends and Practices, *Reverse Logistics Executive Council, Reno, NV.*

Sarkis, et al. (2010); Barriers to the Implementation of Environmentally Oriented Reverse Logistics: Evidence from the Automotive Industry Sector. *British Journal of Management*, Vol. 21, No. 4, pp. 889–904.

Stock J.R & Mulki J.P, (2016) "Product Returns Processing: An Examination of Practices of Manufacturers, Wholesalers/Distributors, and Retailers", Journal of Business Logistics, Volume 30, No. 1, 2009, pp. 33-62.

Vlachos, I. (2014). *A Conceptual Framework of Reverse Logistics Impact on Firm Performance.*

Williams, T. (2016). *EMC for product designers*. Newnes.