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# Factors Affecting Logistics Performance Metrics in Logistics Industry: Case of Kuehne+Nagel Logistics Company

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## Abstract

The purpose of this study was to determine the role of logistics metrics on logistics performance measurement in the Kenyan logistics industry; a case study of Kuehne Nagel logistic company. The specific objectives were to determine the role of logistics cost, logistics quality, logistics productivity, and logistics cycle-time on logistics performance measurement in Kuehne Nagel logistic company. The study was anchored on the SCOR model, resource-based view, theory of constraints and transactions theory. The study adopted a descriptive research design. The study target population was 72 managers comprising of top, middle and supervisory level managers. A census of all the managers was done. The study used questionnaires to collect data. A multivariate regression model was used to link the independent variables with the dependent variable. The study findings indicated that logistics cost and logistics metrics performance are negatively and significantly associated. the results further indicated that logistics quality, logistics productivity and logistics cycle-time had positive and significant association with logistics metrics performance the regression results showed that there is a negatively significant relationship between logistics cost and logistics metrics performance. Further, results indicate that there is positively significant relationship between logistics quality, logistics productivity, logistics cycle-time and logistics metrics performance. Based on the findings, the study concluded that there is negative and significant relationship between logistics cost and logistics metrics performance. Further, the study concluded that there is a positive and significant relationship between quality, productivity, cycle-time and logistics metrics performance. From the findings, the study recommended that logistic companies should find ways of reducing their logistics cost, since it affects their performance; should adopt measures towards improving the quality of their services; should invest in improving their productivity; and lastly logistic firms should adopt efficient time management systems. This will ensure maximum utilization of time as a resource.

**Keywords:** *Logistics Performance Metrics, Logistics Industry, Kuehne+Nagel Logistics Company*

## 1.0 Introduction

Planning is the process of assigning individual's tasks to resources at a certain point in time. Originally planning was a manual task, performed by human planner. Over the last decades' information system have increasingly taken over the roles in industries such as road logistics in practice however the human planner has still s considerable role. In order to make the transition from planning input to planning output planning system manual or computerized must employ the proper objectives to un optional planning (Krauth, Moonen, Popova, & Schut, 2005).

Logistics management has abroad , far reaching effects on our society to improve our living standards logistics is significant to economy in two perspectives first; logistics is one of the major for company which means the logistics activities would be affected by or would affect other economic activities; secondly logistics provides the activities of the movement and flow in economic transaction with the objective of facilitating the sales of substantial cargo and sales of some services(Krauth *et al.*, 2005).

Logistics metrics are quantitative measurement that tracks certain processes within the logistics framework the best design for logistics system or components of a logistics system truly depends upon the metrics used for measuring the performance. A system that measures up very high in one metric may not measure very well in some other criteria. The objective however is to design a system that meets or exceeds the expectations in most the selected metrics. Logistics metrics vary best upon the boundary of the system (the various functional areas included such as production distribution inbound transportation storage vendor selection (Caplice, & Sheffi, 2014). The functional requirement of the system and the different areas and ability to define and measure them in quantitative. Hence the first step in designing the metrics is to define the system that needs to be measured and its components. The second step is to determine the functional requirements or expectations of the system. The third step is to identify the metrics that can quantitatively measure the functional requirement. It is also important to understand the relationship between metrics (Caplice, & Sheffi, 2014).

Since 1890, when the business was founded in Bremen, Germany, by August Kuehne and Friedrich Nagel, Kuehne Nagel has grown into one of the world's leading logistics providers. Today, the Kuehne Nagel Group has more than 1,200 offices in over 100 countries, with over 67,000 employees. Their key business activities and market position are built on the company's truly world class capabilities

It provides sea freight and air freight forwarding, contract logistics and over land businesses with a focus on providing IT based logistics solution its freight forwarding services include the necessary arrangement for the transportation of goods by road and rail. Its contract logistic unit offers warehousing and distribution services.

## 1.2 Research Problem

To manage logistics costs, some companies try technological solutions; others seek the help of an experienced partners. Some managers consider it a safe option to hand off logistics operations to a solution provider who knows the game well. On the other hand, logistics cost matters not only at the company level but at national level the focus is more on the logistics performance parameters such as cost, safety, efficiency, and carbon footprint (JHuscoft & Hazen, 2013). At a company level firms have inevitable focused on logistics cost because of its impact on the bottom line. But some organization are looking beyond simple cost

measures and monitoring of other parameters that affects performance as well as cost. This confirms that supply chain is becoming more intentional and sophisticated with globalization of business (Lee, 2011).

Evidence showed that cultural, social, economic and environmental aspects of each country 13 did influence the link between logistics management and performance (Miguel &Briton, 2011; Kaufmann & Carter, 2006). Keebler & Plank, (2009) agreed that the findings of US firm could not represent the universe of companies nor could findings be generalized to other countries. Furthermore, first world such as Europe, America and part of Asia had more developed infrastructure and business structures that easily supported the implementation of logistics as opposed to developing countries. The effort to achieve generalization of the causal relationship between logistics management and performance of manufacturing firms called for empirical confirmation in diverse environments, especially developing economies such as Kenya (Kangoye, 2016).

After this initial step, analysis of logistics performance has become an important issue in the area of management science research, but despite this attention from researchers, there is little convergence both in terms of methods and in terms of results for its validity. As Robb et al. (2008) mention, since logistics deal with physical, informational and cash flow management, it is generally recognized as a major determinant of business performance, but practices particularly in terms of performance analysis, are still at the stage of being studied by professionals and academics (Rui & Luis, 2014).

### 1.3 Objective of the Study

i. To determine the role of logistics cost on logistics performance measurement in Kuehne Nagel logistic company.
ii. To identify the role of logistics quality on logistics performance measurement in Kuehne Nagel logistic company.
iii. To evaluate the role of logistics productivity on logistics performance measurement in Kuehne Nagel logistic company.
iv. To assess the role of logistics cycle-time on logistics performance measurement in Kuehne Nagel logistic company.

## 2.0 Theoretical Framework

### SCOR Model

The supply chain operations reference model (SCOR) is a management tool used to address, improve, and communicate supply chain management decisions within a company and with suppliers and customers of a company (Huan, Sheoran & Wang, 2004). The model describes the business processes required to satisfy a customer's demands. It also helps to explain the processes along the entire supply chain and provides a basis for how to improve those processes.

The SCOR model was developed by the supply chain council with the assistance of 70 of the world's leading manufacturing companies. It has been described as the most promising model for supply chain strategic decision making (Poluha, 2008). The model integrates business concepts of process re-engineering, benchmarking, and measurement into its framework. This framework focuses on five areas of the supply chain: plan, source, make, deliver, and return. These areas repeat again and again along the supply supplier to the customer's customer (Irfan, 2008).

***Plan***

Demand and supply planning and management are included in this first step. Elements include balancing resources with requirements and determining communication along the entire chain. The plan also includes determining business rules to improve and measure supply chain efficiency. These business rules span inventory, transportation, assets, and regulatory compliance, among others. The plan also aligns the supply chain plan with the financial plan of the company (Lueg, 2008).

***Source***

This step describes sourcing infrastructure and material acquisition. It describes how to manage inventory, the supplier network, supplier agreements, and supplier performance (Taylor & Francis, 2009). It discusses how to handle supplier payments and when to receive, verify, and transfer product.

***Make***

Manufacturing and production are the emphasis of this step. Is the manufacturing process make-to-order, make-to-stock, or engineer-to-order?(Glecker, 2008). The make step includes, production activities, packaging, staging product, and releasing. It also includes managing the production network, equipment and facilities, and transportation.

***Deliver***

Delivery includes order management, warehousing, and transportation. It also includes receiving orders from customers and invoicing them once product has been received. This step involves management of finished inventories, assets, transportation, product life cycles, and importing and exporting requirements (Glecker, 2008).

***Return***

Companies must be prepared to handle the return of containers, packaging, or defective product. The return involves the management of business rules, return inventory, assets, transportation, and regulatory requirements (Taylor& Francis, 2009).

The SCOR process can go into many levels of process detail to help a company analyze its supply chain. It gives companies an idea of how advanced its supply chain is. The process helps companies understand how the 5 steps repeat over and over again between suppliers, the company, and customers. Each step is a link in the supply chain that is critical in getting a product successfully along each level. The SCOR model has proven to benefit companies that use it to identify supply chain problems. The model enables full leverage of capital investment, creation of a supply chain road map, alignment of business functions, and an average of two to six times return on investment.

**Resource-Based View**

This theory was introduced by Wernerfelt (1984) and later enhanced by Barney (1991). The theory holds that the resources available in a particular organization, both tangible and intangible are the ultimate sources of competitive advantage (Tukamuhabwa, Eyaa & Derek, 2011). According to the theory, these resources should be well aligned such that they complement each other in attaining the desired outcomes. The organization should also yearn to diversify and increase the amount of resources owned to benefit the most.

The theory makes the assumption that each firm has resources that are unique to that firm and if well utilized, will lead to an additional advantage in competition. However, this is not usually the case as the resources are heterogeneous as companies are prone to have their

resources being imitated by the rivals. Hence operational advantage will only be obtained when the available resources are unique and have low possibility of being copied (Karia & Wong, 2011).

With the advancement in logistics, business operations are well integrated (Seuring et al., 2010). The resources created through integration in logistics are of higher value than individual firm's resources. The theory's proposition is that companies involved in resource integration are granted with more benefits. The impact that these logistics strategies will have on the operational performance will however be limited to the available resources in the firm. The theory therefore supports the importance of resources such as finances and time in the success of logistic metrics performance.

**Theory of Constraints**

The theory of constraints was proposed by Goldratt, and has been used in various management disciplines (Cyplik, Hadaś & Domański, 2009). The theory postulates that there exists at least one constraint in any particular organization that hinders it from attaining its set targets and goals. The theory thus acts to not only initiate but also implement breakthrough improvement.

The theory's proposition is that the organizations have difficulties in transporting their products between the involved parties. Hence, integrating the transport and logistics in the supply chain will ensure the partners are integrated. The theory is therefore useful in measuring the influence of logistics cost and quality on performance of logistics metrics.

**Transactions Theory**

The transactions theory was originally proposed by Williamson (1985). The theory aims at enhancing vertical integration and trust in firms. The theory holds that during implementation of operations, there are various costs which are incurred. These cost if not well managed may lead to losses being obtained rather than the expected profits (Gunasekaran & Kobu, 2007). Operational efficiency will only be obtained when cost is reduced mainly through assets specificity and minimization of uncertainty (Williamson, 1985).

The theory's importance is that it shows the benefit that may be accrued from incorporating logistics and transportation strategies in organizations. Hence transport and logistics will improve the performance of logistics metrics not only increasing the efficiency but also minimizing the costs in operations.

## 2.2 Empirical Review

### 2.2.1 Logistics Quality

Quality has several meanings depending on the customers need and wants. In the ideal situations, what is delivered conforms to the specification and exceeds the customers' expectations (Leem, 2007). These quality factors can be lumped into two broad categories-design quality and execution quality. Design quality reflects the functions, features and aesthetics of a product. Increasing design quality generally raises product cost because better materials, more materials and more labour are required in the product. Execution or conformance quality reflects how well a product meets its specification (Hudson, 2011). Understanding that quality means conforming to requirements and that the customer is the source of these requirements and that the customer is the source of these requirements is the first step on the road to improving the performance of any business function. It is always dangerous to accommodate any quality issue, be it small only a small problem. This is

because after operating with quality problems for a period of time, the current performance level becomes acceptable unless someone decides better results are possible (Ariel, 2012). It is patently wrong thinking that any problem is not worth the thinking only leads to the development of thousands of little problems that slowly bleed a company to death.

All productivity problems are ultimately caused by poor quality (Hudson, 2011). Managers who want to improve quality should not think only in terms of speeding up the processes and making people work harder. Those are valid consideration, but managers will get better result if they start working on increasing the quality of raw materials, improving the reliability of equipment, improving the skills of people, and reducing the barriers to doing the job right the first time. When process quality increases, so does product quality and productivity.

Liu and Luo (2008) examined the effect of logistics capabilities on the manufacturing firm‘s performance in China. They classified logistics capabilities as customer-focused capabilities and information-focused capabilities. The study indicated that customer-focused capabilities and information-focused capabilities respectively significantly affected firm performance directly and indirectly. In their study, Raju (2008), examined the relationship existing among logistics capabilities, logistics performance and firm financial performance in India. The results were positive that, both logistics capability and performance had a direct influence on the finance performance.

### 2.2.2 Logistics Productivity

In spite of all the attention given to productivity, the true meaning of the word has been generally overlooked. Most people assume productivity means units per labour hour, and most people are wrong (Lyons, Ritter, Thomas, Militello & Vincent, 2006).). Taking a narrow-minded viewpoint on productivity or quality ignores other issues which may be far more important. Factors such as short order lead time, on-time deliveries, being able to handle a complex product mix and high quality can be much more important in the market place. Working on the wrong priorities will waste resources and miss opportunities; any effort to improve productivity must be directed at increasing the total logistics performance (Hudson, 2011).

Productivity is defined as output divided by input. Simple enough, but the big question is what output do you want? A better question is what outputs do your customers what?(Rahman, 2013). After all, if you want to improve productivity, the first thing to do is make sure you are going after the right outputs, what the customers what.

Firm performance was regressed against logistics capabilities and the results indicated that the predictive variable had positive and significant effect on firm performance. One of the main objectives of any organization was to achieve customer satisfaction. In their study, Zhang, Zhang, and Lim, (2005), examined the impact of logistics flexibility on manufacturing firm‘s customer satisfaction. This was done through a survey of 273 manufacturing firms in USA and the results indicated that logistics flexibility had significant, positive and direct impact on the customer satisfaction.

### 2.2.3 Logistics Cost

Perhaps the most important research concerning logistics that is going on is in the area of designing efficient cost, effective distribution systems. Therefore, a thorough understanding and a good performance evaluation of total logistics cost are essential. A profile consisting of various distribution cost elements should be developed so that appropriate trade-offs can be

applied as a basis of planning and reassessment of logistics cost systems, and thus, the overall cost effectiveness can be achieved.

According to Thomas and Griffin (2013), the single largest cost component of logistics is transportation cost, often comprising more than half of the total logistics cost. To reduce the delivery cost, this total should be treated as a metrics of high priority. However, there is an argument that in distribution service, the operational accent lies on stopping and not on driving, which means a large part of the performance, is determined by stopping operations such as the number of stops per trip and the stop-times per stop (Donsellar, 2006).

Logistics cost may exceed 25 per cent of the cost of doing business at the manufacturing level. For this reason, better management of the logistics functions offers the potential for large savings, which can contribute to improvement corporate profitability, logistics performance measurements cost selection is a critical step in the design and evaluation of any system. It can be monitored by using standard cost, budget, productivity and more complex the system, the more challenging it becomes to measure effectively (Mangan & Butcher 2008).

A study on logistics performance and the influence it had to firm performance, done in USA by Fugate *at el.* (2010) on 150 firms revealed that increase in logistics efficiency, effectiveness, and differentiation decreased expenses, inventory, cash requirements and increased inventory availability, timely delivery, on-time and damage-free deliveries, line item fill rates and sales (Fugate *et al.,* 2010), which improved net margin and asset turnover, which improved return on assets and overall firm performance.

### 2.2.4 Logistics Cycle-Time

Cycle-time evaluation is very essential in logistics performance, customers' needs to understand the lead times intervals (Bobbit, 2004). This time factor is usually order cycle-time, particularly from the perspectives of the seller looking at customer service (Chan, 2008). Time utility is the value added by having an item when it is needed, this is closely related to place utility, which means having the items or services available where it is needed without both time and place utility, which logistics directly supports, a customer could not be satisfied.

This confirmed that, firms could achieve customer satisfaction by developing logistics flexibility which enabled quick replenishment of incoming materials and rapid delivery of finished products to customers (Zhang, et al, 2005). Sa´nchez, and Pe´rez, (2005), did an Empirical survey of a representative sample of 126 Spanish automotive suppliers during the months of September and October 2003 to analyze the relationship between logistics flexibility dimensions and firm performance dimensions, and between logistics flexibility dimensions and environmental uncertainty 65 dimensions. A multivariate analysis studied the determinants of logistics flexibility. This research found a positive relation between a superior performance in flexibility capabilities and firm performance, although flexibility dimensions were not equally important for firm performance. On the other hand, the results showed that companies enhanced more the basic flexibility capabilities (at the shop floor level) than aggregate flexibility capabilities (at the customer-supplier level). However, aggregate flexibility capabilities were more positively related to firm performance than basic flexibility capabilities. Thus, companies could miss opportunities to improve competitiveness by underestimating customer-supplier flexibility capabilities.

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## 3.0 Research Methodology

This study adopted the descriptive research design This study adopted a census survey and, therefore sampled all the 72 top managers The study used purposive random sampling technique to select the 72 managers and analysis was done in SPSS version 22.A multivariate regression model was used to link the independent variables to the dependent variable as follows;

$Y = \beta 0 + \beta 1X_1 + \beta 2X_2 + \beta 3X_3 + \beta 4X_4 + \epsilon$

Where,

Y– Logistics Metrics Performance (LMP)

$X_1$ – Logistics Cost (LC)

$X_2$ – Logistics Quality (LQ)

$X_3$ –Logistics Productivity (LP)

$X_4$ – Logistics Cycle-Time (LTC)

Є= Error term

In the model, $\beta_0$ = the constant term while the coefficient $\beta_i = 1\ldots.4$ was used to measure the sensitivity of the dependent variable (Y) to unit change in the predictor variables $X_1$, $X_2$, $X_3$ and $X_4$. Є is the error term which captured the unexplained variations in the model.

## 4.0 Results and Discussion

### 4.1 Descriptive Statistics

#### 4.1.1 Logistics Cost

The respondents were asked to describe their agreement or disagreement on each of the following statements about logistics cost. Results are presented in Table 1.

**Table 1: Logistics Cost**

| Statement | strongly disagree | Disagree | Neutral | Agree | strongly agree | Mean | Std. Dev |
|---|---|---|---|---|---|---|---|
| Manufacturing cost influence the performance of logistic metrics in our company. | 1.60% | 1.60% | 9.40% | 54.70% | 32.80% | 4.16 | 0.78 |
| Value addition has a significant impact on logistics performance in our company | 0.00% | 3.10% | 6.20% | 46.90% | 43.80% | 4.31 | 0.73 |
| The performance of logistics metrics highly depends on the selling price | 1.60% | 1.60% | 4.70% | 42.20% | 50.00% | 4.38 | 0.79 |
| **Average** | | | | | | **4.28** | **0.77** |

Results in Table 1 indicate that majority (87%) of the respondents agreed with the statement that manufacturing cost influence the performance of logistic metrics in our company, 90% agreed that value addition has a significant impact on logistics performance in our company while 92% agreed that the performance of logistics metrics highly depends on the selling price. On a five-point scale, the average mean of the responses was 4.28 which means that majority of the respondents were agreeing with most of the statements; however the answers were varied as shown by a standard deviation of 0.77.

### 4.1.2 Logistics Quality

The respondents were asked to describe their agreement or disagreement on each of the following statements about logistics Quality. Results are presented in table 2.

**Table 2: Logistics Quality**

| Statement | strongly disagree | Disagree | neutral | Agree | strongly agree | Mean | Std. Dev |
|---|---|---|---|---|---|---|---|
| The organization has high quality features which influence logistic performance. | 1.40% | 4.20% | 6.90% | 47.20% | 40.30% | 4.21 | 0.86 |
| The company offers high quality logistics services. | 0.00% | 1.40% | 8.30% | 48.60% | 41.70% | 4.31 | 0.69 |
| Our logistic services and systems are reliable. | 0.00% | 1.40% | 6.90% | 47.20% | 44.40% | 4.35 | 0.68 |
| **Average** | | | | | | 4.29 | 0.74 |

Results in table 2 indicate that majority (87%) of the respondents agreed with the statement that the organization has high quality features which influence logistic performance, 89% agreed that the company offers high quality logistics services while 91% agreed that our logistic services and systems are reliable. On a five-point scale, the average mean of the responses was 4.29 which means that majority of the respondents were agreeing with most of the statements; however, the answers were varied as shown by a standard deviation of 0.74.

### 4.1.3 Logistics Productivity

The respondents were asked to describe their agreement or disagreement on each of the following statements about logistics Productivity. Results are presented in table 3.

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**Table 3: Logistics Productivity**

| Statement | strongly disagree | disagree | Neutral | agree | strongly agree | Mean | Std. Dev |
|---|---|---|---|---|---|---|---|
| The level of direct labour affects productivity within the company | 2.80% | 1.40% | 9.70% | 40.30% | 45.80% | 4.25 | 0.90 |
| The amount of inputs determines the level of productivity in the company | 1.40% | 4.20% | 4.20% | 50.00% | 40.30% | 4.24 | 0.83 |
| The organization management is concerned with the output level | 0.00% | 1.40% | 6.90% | 50.00% | 41.70% | 4.32 | 0.67 |
| **Average** | | | | | | 4.27 | 0.80 |

Results in table 3 indicate that majority (86%) of the respondents agreed with the statement that the level of direct labour affects productivity within the company, 90% agreed that the amount of inputs determines the level of productivity in the company while 92% agreed that the organization management is concerned with the output level. On a five point scale, the average mean of the responses was 4.27 which means that majority of the respondents were agreeing with most of the statements; however the answers were varied as shown by a standard deviation of 0.80.

### 4.1.4 Logistics Cycle-Time

The respondents were asked to describe their agreement or disagreement on each of the following statements about logistics cycle-time. Results are presented in table 4.

**Table 4: Logistics Cycle-Time**

| Statement | Strongly disagreed | Disagreed | neutral | agree | Strongly agree | Mean | Std. Dev |
|---|---|---|---|---|---|---|---|
| there is timely delivery of goods and services | 2.80% | 2.80% | 5.60% | 52.80% | 36.10% | 4.17 | 0.87 |
| Our systems allow for faster production rates | 0.00% | 1.40% | 8.30% | 45.80% | 44.40% | 4.33 | 0.69 |
| There is timely delivery of goods and services | 1.40% | 1.40% | 8.30% | 33.30% | 55.60% | 4.40 | 0.82 |
| **Average** | | | | | | 4.30 | 0.79 |

Results in table 4 indicate that majority (89%) of the respondents agreed with the statement that there is timely delivery of goods and services, 90% agreed that our systems allow for faster production rates while 89% agreed that there is timely delivery of goods and services. On a five-point scale, the average mean of the responses was 4.30 which means that majority of the respondents were agreeing with most of the statements; however, the answers were varied as shown by a standard deviation of 0.79.

### 4.1.5 Logistics Metrics Performance

The respondents were asked to describe their agreement or disagreement on each of the following statements about logistics metrics performance. Results are presented in table 5 below.

**Table 5: Logistics Metrics Performance**

| Statement | strongly disagree | disagree | neutral | agree | strongly agree | Mean | Std. Dev |
|---|---|---|---|---|---|---|---|
| Our company's logistic metrics are of high quality | 0.00% | 2.80% | 9.70% | 36.10% | 51.40% | 4.36 | 0.78 |
| Our company's logistic metrics are efficient. | 0.00% | 0.00% | 5.60% | 50.00% | 44.40% | 4.39 | 0.60 |
| There is frequency in our company's logistics metrics | 0.00% | 2.80% | 5.60% | 45.80% | 45.80% | 4.35 | 0.72 |
| **Average** | | | | | | 4.37 | 0.70 |

Results in table 5 indicate that majority (87%) of the respondents agreed with the statement that our company's logistic metrics are of high quality, 94% agreed that our company's logistic metrics are efficient while 91% agreed that there is frequency in our company's logistics metrics. On a five-point scale, the average mean of the responses was 4.37 which means that majority of the respondents were agreeing with most of the statements; however, the answers were varied as shown by a standard deviation of 0.70.

### 4.2 Correlation Analysis

Table 6 presents the results of the correlation analysis.

**Table 6: Correlation Matrix**

| | | Performance | Distribution Cost | Quality | Productivity | Cycle Time |
|---|---|---|---|---|---|---|
| Performance | Pearson Correlation | 1.000 | | | | |
| | Sig. (2-tailed) | | | | | |
| Distribution Cost | Pearson Correlation | -.443** | 1.000 | | | |
| | Sig. (2-tailed) | 0.000 | | | | |
| Quality | Pearson Correlation | .657** | -.488** | 1.000 | | |
| | Sig. (2-tailed) | 0.000 | 0.000 | | | |
| Productivity | Pearson Correlation | .639** | -.745** | .671** | 1.000 | |
| | Sig. (2-tailed) | 0.000 | 0.000 | 0.000 | | |
| Cycle Time | Pearson Correlation | .647** | -.670** | .462** | .549** | 1.000 |
| | Sig. (2-tailed) | 0.000 | 0.000 | 0.000 | 0.000 | |

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

The results revealed that distribution cost and logistics metrics performance are negatively and significantly associated (r=-0.443, p=0.000). The table further indicated that quality and logistics metrics performance are positively and significantly associated (r=0.657, p=0.000). It was further established that productivity and logistics metrics performance are positively and significantly associated (r=0.639, p=0.000). Finally, results showed that cycle-time and logistics metrics performance are positively and significantly associated (r=.647, p=0.000).

### 4.3 Regression Analysis

The results presented in table 7 present the fitness of the regression model.

**Table 7: Model Fitness**

| Indicator | Coefficient |
|---|---|
| R | 0.647 |
| R Square | 0.623 |

Results revealed that logistics cost, quality, productivity and cycle–time were found to be satisfactory variables in explaining logistics metrics performance. This is supported by coefficient of determination also known as the R square of 65%. This means that distribution cost, quality, productivity and cycle–time explain 65% of the variations in the dependent variable which is logistics metrics performance. This results further means that the model applied to link the relationship between the variables was satisfactory. Table 8 provides the results on the analysis of the variance (ANOVA).

**Table 8: Analysis of Variance**

| Indicator | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Regression | 7.329 | 4 | 1.832 | 27.050 | **0.000** |
| Residual | 3.996 | 59 | 0.068 | | |
| Total | 11.325 | 63 | | | |

The results indicate that the overall model was statistically significant. Further, the results imply that the independent variables are good predictors of logistics metrics performance. This was supported by an F statistic of 27.050 and the reported p value (0.000) which was less than the conventional probability of 0.05. Table 9 presents the regression of coefficient results.

**Table 9: Regression of Coefficients**

| Variable | B | Std. Error | T | Sig. |
|---|---|---|---|---|
| (Constant) | -2.096 | 1.047 | -2.002 | 0.05 |
| Logistics Cost | -0.335 | 0.119 | -2.807 | 0.007 |
| Logistics Quality | 0.321 | 0.107 | 3.01 | 0.004 |
| Logistics Productivity | 0.408 | 0.103 | 3.041 | 0.004 |
| Logistics Cycle-Time | 0.45 | 0.092 | 4.871 | 0.000 |

Regression of coefficients results in table 9 shows that there is negatively significant relationship between logistics cost and logistics metrics performance (β=-0.335, p=0.007). Further, results indicate that there is positively significant relationship between quality and logistics metrics performance (β=0.321, p=0.004). The relationship between productivity and logistics metrics performance was also found to be positive and significant (β=0.408, p=0.004). Finally, the findings revealed a positive and significant relationship between cycle-time and logistics metrics performance (β=0.450, p=0.000).

Thus, the optimal model for the study is;

*Logistics Metrics Performance = -2.096-0.335LogisticsCost+0.321Logistics Quality+0.408Logistics Productivity + 0.450Logistics Cycle-Time*

This study finding support the findings by Fugate, *et al.* (2010) who conducted a study on logistics performance and the influence it had to firm performance in the USA. The study using 150 firms revealed that increase in logistics efficiency, effectiveness, and differentiation decreased expenses, inventory, cash requirements and increased inventory availability, timely delivery, on-time and damage-free deliveries, line item fill rates and sales.

This study finding further agree with that of Liu and Luo, (2008) who examined the effect of logistics capabilities on the manufacturing firm ‘s performance in China. They classified logistics capabilities as customer-focused capabilities and information-focused capabilities.

The study indicated that customer-focused capabilities and information-focused capabilities respectively significantly affected firm performance directly and indirectly.

## 5.0 Conclusion

Based on the findings, the study concluded that there is negative and significant relationship between logistics cost and logistics metrics performance. In particular, the study concluded that a unit increase in logistics cost led to a decrease in logistics metrics performance by 0.335 units. Further, based on the findings, the study concluded that there is a positive and significant relationship between quality, productivity, cycle-time and logistics metrics performance. In particular, the study concluded that a unit increase in quality, productivity and cycle-time led to a corresponding increase in logistics metrics performance by 0.321, 0.408 and 0.450 units respectively.

## 6.0 Recommendations

Based on the findings, the study recommended that logistic companies should find ways of reducing their logistics cost, since it affects their performance. For example, they should consider outsourcing for transport services instead of using their own vehicles for transport.

In addition, the study recommended that logistic companies should adopt measures towards improving the quality of their services. Good quality will translate to improved performance.

Further, the study recommended that logistic companies should invest in improving their productivity. For example, they should motivate their employees to be more productive through incentives such as promotion, recognition, training and better remunerations.

Finally, the study recommended the need for logistic firms to adopt efficient time management systems. This will ensure maximum utilization of time as a resource.

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