

Role of Humanitarian Logistics Adoption on Supply Chain Performance in Norwegian Church Aid Organization

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Abstract: Despite the wide support which many humanitarian transitions offer to affected people during disasters, many challenges still arise, making it difficult for them to effectively undertake various humanitarian logistics functions and support most of the disaster victims. Over 50% of humanitarian organizations in Kenya face various humanitarian logistical challenges that hamper their operations in times of need, and this affects their supply chain performance. The overall objective of the study is to determine the effect of humanitarian logistics on supply chain performance in humanitarian organizations in Kenya: A case of Norwegian Church Aid Organization. The study-specific objectives include to; identify the effect of humanitarian lead time on supply chain performance in humanitarian organizations in Kenya; assess the effect of humanitarian demand forecasting on supply chain performance in humanitarian organizations in Kenya; determine the effect of humanitarian inventory management on supply chain performance in humanitarian organizations in Kenya and to establish the effect of ICT adoption on supply chain performance in humanitarian organizations in Kenya. A descriptive research design was employed. The target population is 184 staffs and the sample size was 124 staffs stratified in the top, middle and operational level staffs within Norwegian Church Aid organization. Data was collected through the use of semi-structured questionnaires which were administered to respondents and analyzed using statistical package for social sciences (SPSS) version 23.0. A pilot study was conducted to pretest the validity and reliability of data collection instruments. Both quantitative and qualitative data were collected, analyzed and presented in tables and graphs format for easier interpretation.

Keywords: Demand Forecasting, Inventory Management, Information Communication Technology, Supply Chain Performance (SCP).

1. INTRODUCTION

Humanitarian logistics is the process of planning, implementing, and controlling the efficient, cost-effective flow and storage of goods, and materials, as well as related information, from the point of origin to the point of consumption to alleviate the suffering of vulnerable people. Considering the meaning of humanitarian logistics, it focuses mainly on alleviating the affected people while the definition of the humanitarian supply chain is broader and copes with more activities to respond to the stakeholders in the supply chain. Humanitarian organizations often underestimate the importance and impact of proper logistics. It is customary to exchange product information via ERP in the business world, but the humanitarian sector at times suffers from a severe confusion of tongues, with everyone using their product codes and terminology. Standardization of these terms through training, but also the active use of proven logistics concepts like vendor managed inventory and postponement might, for instance, very much improve warehouse management in the sector.

In Africa, one of the biggest challenges for SCM in many humanitarian organizations is managing costs while meeting customer demands. All supply chain actors within a humanitarian organization from the Resource Mobilization to the Programming, Procurement and Logistics units at headquarters, regional bureau, and country offices – have one overarching objective: to meet beneficiaries' needs. This requires a reliable, agile, scalable supply chain with the capacity

to adapt timely and efficiently to different types of requirements. In Kenya, even though the structure of humanitarian chains is similar to most business supply chains, the humanitarian supply chain is often unstable.

2. EMPIRICAL REVIEW

In particular, effective and efficient supply chain management enables humanitarian organizations to make the best use of resources, by matching the available supplies with the highest priority needs in the shortest possible time, under the constraint of limited funding. Humanitarian logistics as “the process of planning, implementing and controlling the efficient, cost-effective flow and storage of goods and materials, as well as related information, from the point of origin to the point of consumption, to alleviate the suffering of vulnerable people). The field of humanitarian logistics has been extensively studied so far, especially during the last three years. Five literature reviews have been published so far on this topic since 2006. However, they all take a different perspective and approach for analyzing the literature[3]. In their paper published in 2007, [2] conduct a qualitative literature review of the field of humanitarian logistics, with the aim of creating a classification framework for disaster relief logistics. They provide useful definitions and attributes of humanitarian logistics, which was used in this review.

For this reason and because they focus on the most relevant papers only, their selection of papers (51) excludes a significant proportion of the literature. The others reviews include papers on humanitarian logistics, but do not specifically focus their paper collection on this field. Therefore, their analysis is limited to papers published in OR journals and does not specifically focus on humanitarian logistics. [6] perform a literature review on critical success factors in commercial supply chains, and consider their applicability to humanitarian aid. Although this review covers our research topic, it does not analyze humanitarian logistics literature.

3. CONCEPTUAL FRAMEWORK

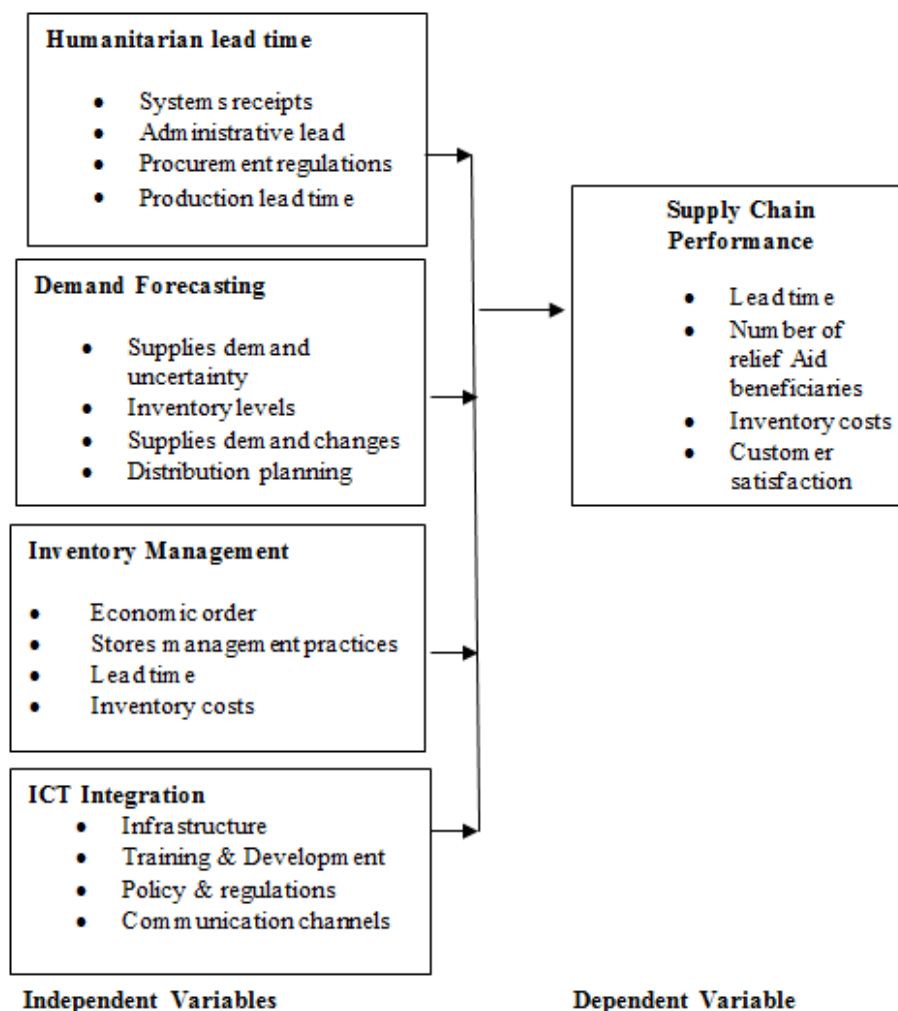


Figure 2.1: Conceptual Framework

4. SUMMARY AND CRITIQUE OF EXISTING LITERATURE

[5] Admits that the evaluation or measurement of procurement performance has always been a vexing problem for procurement professionals. He asserts that traditionally, firms concentrate on analyzing their internal trends which do not portray the true picture of how they compare well with competitors. Such an approach ignores what the competitors are doing. [4] Reveals that a firm does not wish to make known to its competitors how or what it is doing for obvious competitive reasons. This has been the case in the public sector where procuring entities have not been making available their procurement data due to the sensitive nature of the data.

On the other hand, [1] argues that traditional government contracts worldwide have tended to focus on inputs rather than outputs. He suggests that the focus should instead be on what projects can deliver rather than how much the project costs which calls for high level of performance management in the entire process. In Kenya, to manage effectively and more efficiently the procurement process, procuring entities through the existing legal framework are required to firstly consolidate departmental procurement plans to provide the entity's corporate procurement plan which before its implementation must get the accounting officer's approval. This implies that all procurement plans must be well integrated into the budget process based on the indicative budget as appropriate and in compliance with the procurement performance. The theoretical and empirical review gave an account of past major studies and theoretical issues on the effect of humanitarian logistics on supply chain performance in humanitarian organizations. However, most of the reviewed studies have not managed to explain the effect of humanitarian logistics on supply chain performance. This, therefore, demonstrates that past empirical studies about the study problem are of little significance towards addressing the effect of humanitarian logistics on supply chain performance in humanitarian organizations.

All the literature reviewed indicates that previous research only concentrated on a few variables the roles of humanitarian logistics adoptions on supply chain performance in Norwegian church aid. From a survey of relevant literature, it has been found that there are few studies specific to humanitarian logistics in relations to the critics and research gaps study. This study fills these pertinent gaps by studying the roles of humanitarian logistics adoptions on supply chain performance in Norwegian church aid.

5. RESEARCH METHODOLOGY

Descriptive research design was used to allow the researcher to gather, summarize, present and interpret information for clarification. It is mainstreamed to fact-finding and may result in the formulation of important principles of knowledge and solution to significant problems. The target population is 184 employees within working with procurement department at Norwegian Church aid offices in Nairobi. The unit of observation was 124 employees in procurement department composed of senior managers, middle-level managers, and support staff. The study employed a census approach to collect data from the respondents. Hence no sampling techniques were used. The study used self-administered questionnaires and observation schedules. This study utilized both primary and secondary data. Questionnaires were used to collect primary data which was distributed to the staff. The researcher made personal-follow ups to ensure that the questionnaires are filled and collected.

6. RESULTS AND DISCUSSION

Response Rate:

Gender of the respondent showed a domination of males in the organization where 73 (58.9%) of the respondents are males while 51 (41.1%) are females indicating a bias in favor of males regarding access to job opportunities compared to females. Furthermore, the findings regarding the age of the respondents showed that 60 (48.4%) are aged between 31 to 40 years, 44 (35.5%) are aged 41 to 50 years while 20 (16.1%) are aged 20 to 30 years showing a clear inclination to experience in the organization in terms of age. The assessment of the job category that the respondents occupied in the organization showed that 113 (91.1%) of the respondents who were interviewed were operations level staff, 8 (6.5%) were middle-level staff while 3 (2.4%) were top management staff which was in line with the stratified sample for this study. In terms of the level of academic qualification of the respondents, the findings showed that 60 (48.4%) are graduates, 33 (26.6%) are certificate holders, 16 (12.9%) are post graduate degree holders while 15 (12.1%) are diploma holders which indicated a mix of experience and expertise hence a diverse and rich source of information for the study especially with regard to humanitarian logistics and supply chain. Finally, the study also sought to establish the number of years worked in the organization especially concerning an earlier finding that the dominant age category was between 31 to 40 years.

The findings regarding the number of years that the respondents had worked in the organization showed that 59 (47.6%) of the respondents had worked for 1 to 2 years, 35 (28.2%) had worked for a year or less while 30 (24.2%) have worked for 3 years and above which again showed a blend of experience.

Pilot Study:

Therefore four questionnaires were piloted by issuing them to respondents who were included in the final study sample. The pilot data collected were analyzed to determine how much time is taken on each questionnaire, and decide whether the instruments should be revised for length. The pilot also tested the data for relevance, interpretability, and usefulness in addressing the study objectives. Finally, the responses drawn from the pilot study were used for establishing more efficient and practical ways of administering them.

Reliability is the level to which results are consistent within given time limits. If the reliability level is high or acceptable in a given study, then this means that if the same research instrument or even methodology can be applied in a different setting, albeit the same set of findings will be obtained. The Cronbach’s alpha is usually used to test the reliability level of a research instrument. It is a coefficient of internal consistency.

Table 4.21 Reliability Results

| Cronbach's Alpha | N of Items |
|------------------|------------|
| 0.681 | 5 |

4.1 Humanitarian Lead Time:

The findings in revealed that 68 (54.8%) and 17 (13.7%) of the respondents disagreed and strongly disagreed respectively that organization humanitarian logistics process meets its objectives/ goals specified while 25 (20.2%) and 14 (11.3%) were neutral and agreed respectively. These findings showed a gap or challenges existing regarding logistics process and how this impacts the achievement of the organizational goals. The means response was 2.29 (std. dev. = 0.844) and indicated an overall disagreement with the statement. The findings further showed that 56(45.2%) and 1 (0.8%) of the respondents disagreed and strongly disagreed respectively that supply systems receipts in the organization are clearly specified while 23 (18.5%), 32(25.8%) and 12 (9.7%) of the respondents were neutral, agreed and strongly agreed respectively. The mean response of 2.98 (std. dev. = 1.067) indicated overall neutrality about supply systems receipts in. The findings also revealed that 44 (35.5%) and 14 (11.3%) of the respondents agreed and strongly agreed that organization staffs are well trained on humanitarian logistics to lead time. However, 19 (15.3%), 42 (33.9%) and 5 (4%) were neutral, disagreed and strongly disagreed with the statement resulting in a mean response of 3.16 (std. dev. = 1.136) that indicated overall neutrality with regard to training on humanitarian logistics lead time which ideally showed a gap in terms of training mechanisms and strategy in the organization. Finally, the findings also showed that 43 (34.7%) and 38 (30.6%) of the respondents agreed and strongly agreed respectively that the organization awards tenders based on their resources while 20 (16.1%), 17 (13.7%) and 6 (4.8%) of the respondents were neutral, disagreed and strongly disagreed respectively with the statement. This resulted in a mean response of 3.73 (std. dev. = 1.178) indicating an overall agreement with the statement. In general, an assessment of the skewness and kurtosis values revealed that they were all within the range of +/- 1.96 which is a rule of thumb hence indicating that the data on lead time did not violate the normality assumptions.

4.2 Humanitarian Demand Forecasting:

The findings showed that 46 (37.1%) and 10 (8.1%) of the respondents agreed and strongly agreed respectively that the organization reviews supplies demand daily while 42 (33.9%) and 26 (21%) were neutral and disagreed respectively with the statement translating to a mean response of 3.32 (std. dev. = 0.898) which indicated an overall neutrality with the statement and since majority of the respondents were operations level staff, it showed that they were either not sure or were not involved in the process. The findings further showed that 57 (46%) and 27 (21.8%) of the respondents agreed and strongly agreed that the organization involves its members in distribution planning translating to a mean response of 3.74 (std. dev. = 1.011) which indicated overall agreement with the statement. However, 26 (21%), 9 (7.3%) and 5 (4%) of the respondents were neutral, disagreed and strongly disagreed with the statement which also showed some level of non-involvement of members in the distribution planning. The findings also revealed that 38 (30.6%) and 62 (50%) of the respondents agreed and strongly agreed respectively that the organization inventory levels are clear to its members. However, 9 (7.3%) and 15 (12.1%) of the respondents were neutral and disagreed respectively with the statement

resulting in a mean response of 4.19 (std. dev. = 1.015) indicating overall agreement with the statement. The mean response was 3.86 (std. dev. = 0.949) which indicated overall agreement with the statement. However, some gaps were identified especially regarding the review of supplies demand, receipt of enough revenue on time and involvement of the members in decision-making in distribution planning. The assessment of the skewness and kurtosis values indicated no violation of the normality assumption for the demand forecasting data because they are within the prescribed limits of +/- 1.96.

4.3 Humanitarian Inventory Management:

The findings showed that 82 (66.1%) and 19 (15.3%) of the respondents agreed and strongly agreed that the organization inventory controls from reconciliations are well regulated. However, 23 (18.5%) of the respondents were neutral on the statement. The mean response was 3.97 (std. dev. = 0.583) indicating overall agreement with the statement. The findings also showed that 42 (33.9%) and 35 (28.2%) of the respondents agreed and strongly agreed that the organization has effective invested mechanisms within its economic order in service delivery. Regarding the inventory audit committee meetings, 36 (29%) and 22 (17.7%) of the respondents agreed and strongly agreed that the organization inventory audit committee meetings are properly regulated. The findings further showed that 49 (39.5%) and 17 (13.7%) of the respondents agreed and strongly agreed that the organization inventory reports are properly prepared within specified regulations while 27 (21.8%) and 31 (25%) of the respondents were neutral and disagreed respectively with the statement resulting in a mean response of 3.42 (std. dev. = 1.013) that indicated overall neutrality in terms of preparation of inventory reports following specified regulations hence a gap. Finally, 47 (37.9%) and 36 (29%) of the respondents agreed and strongly agreed respectively that inventory management practices are strictly constrained within legal financial regulations while 26 (21%), 12 (9.7%) and 3 (2.4%) of the respondents were neutral, disagreed and strongly disagreed respectively with the statement resulting in a mean response of 3.81 (std. dev. = 1.039) which indicated overall agreement with the statement. The findings regarding skewness and kurtosis revealed no violations of normality assumption given that the values were within the +/- 1.96 rule of thumb.

4.4 Humanitarian ICT Integration:

The findings revealed that 38 (30.6%) and 40 (32.3%) of the respondents agreed and strongly agreed that the organization has put in place mechanisms that ensure there is regular monitoring of ICT infrastructures while 43 (34.7%) and 3 (2.4%) were neutral and disagreed respectively. The mean response was 3.93 (std. dev. = 0.876) which indicated overall agreement with the statement. The study also showed that 14 (11.3%) and 34 (27.4%) of the respondents agreed and strongly agreed respectively that there is clear communication channels within the organization while 65 (52.4%) and 11 (8.9%) were neutral and disagreed respectively resulting in a mean response of 3.57 (std. dev. = 0.989) that indicated overall agreement but with a reservation that there were some gaps in terms of communication channels in the organization. The findings further showed that 45 (36.3%) and 33 (26.6%) of the respondents agreed and strongly agreed that the organization has proper controls mechanisms in its applications while 28 (22.6%), 16 (12.9%) and 2 (1.6%) of the respondents were neutral, disagreed and strongly disagreed respectively which showed some gaps. The mean response was 3.73 (std. dev. = 1.045) which indicated overall agreement. Finally, 23 (18.5%) and 28 (22.6%) of the respondents agreed and strongly agreed that the organization has proper financial regulations policies that guide its members to embrace ICT while 45 (36.3%), 15 (12.1%) and 13 (10.5%) were neutral, disagreed and strongly disagreed with the statement resulting in a mean response of 3.31 (std. dev. = 1.244) that indicated overall neutrality hence showing the existence of gaps in terms of financial regulations in the organization that are aimed at enabling the members to embrace ICT. The assessment of skewness and kurtosis values indicated not violation of the normality assumption with regard to the ICT integration data because they were all within the +/- 1.96 limits.

4.5 Supply Chain Performance:

The findings revealed that 66 (53.2%) and 29 (23.4%) of the respondents agreed and strongly agreed respectively that the organization inventory costs are clear to its members resulting in a mean response of 3.81 (std. dev. = 1.102) that indicated overall agreement with the statement. However, 17 (13.7%) and 12 (9.7%) of the respondents were neutral and strongly disagreed with the statement. Furthermore, 77 (62.1%) and 28 (22.6%) of the respondents agreed and strongly agreed that the organization has a vast number of beneficiaries in its relief aid resulting in a mean response of 3.94 (std. dev. = 0.904) while 6 (4.8%), 10 (8.1%) and 3 (2.4%) were neutral, disagreed and strongly disagreed with the statement. However, with a mean response of 3.32 (std. dev. = 1.024), there was overall neutrality with 55 (44.4%) and 10 (8.1%) of the respondents agreeing and strongly agreeing respectively that the lead time of the organization is clear to its

stakeholders while 30 (24.2%), 23 (18.5%) and 6 (4.8%) of the respondents were neutral, disagreed and strongly disagreed respectively with the statement which indicated existing gaps in terms of the clarity of the lead time in the organization. Finally, 32 (25.8%) and 24 (19.4%) of the respondents agreed and strongly agreed respectively that the organization has an open free policy in ideas generation to improve its performance while 35 (28.2%), 32 (25.8%) and 1 (0.8%) were neutral, disagreed and strongly disagreed with the statement which indicated a challenge in terms of an open door policy in the organization in which its absence denies the organization the ability or capacity to harness the power of idea generation from its members. The mean response was 3.37 (std. dev. = 1.093) which indicated an overall neutrality with the statement. The skewness and kurtosis measures revealed that the normality assumption is not violated in the supply chain performance data given that they all are within the rule of thumb of +/- 1.96.

4.5 Correlation Analysis:

Correlation analysis is usually carried to determine the degree to which two variables converge or diverge together depending on the case to establish the significance of the relationship. As such, a positive value of the correlation coefficient shows that the two variables move together in the same trend, and when there is a negative value, it shows that the variables move in opposite direction or trend. Essentially, correlation analysis depicts to a given degree, the aspect of how one factor influences another although correlations do not imply a cause-effect relationship. Consequently, a correlation analysis of the independent factors and the dependent factor was carried out and the findings were summarized and presented in Table 4.2 in which the inferences were derived by using the Pearson's Product Moment Correlation coefficient.

Table 4.2: Summary of Pearson's Correlations

| | | Humanitarian Lead Time | Demand Forecasting | Inventory Management | ICT Integration |
|---|-----------------|-------------------------------|---------------------------|-----------------------------|------------------------|
| Demand Forecasting | R | 0.088 | 1 | | |
| | Sig. (2-tailed) | 0.333 | | | |
| Inventory Management | R | 0.082 | 0.018 | 1 | |
| | Sig. (2-tailed) | 0.363 | 0.844 | | |
| ICT Integration | R | 0.273** | 0.406** | 0.081 | 1 |
| | Sig. (2-tailed) | 0.002 | 0.000 | 0.372 | |
| Supply Chain Performance | R | 0.518** | 0.480** | 0.188* | 0.543** |
| | Sig. (2-tailed) | 0.000 | 0.000 | 0.036 | 0.000 |
| **. Correlation is significant at the 0.01 level (2-tailed). | | | | | |
| *. Correlation is significant at the 0.05 level (2-tailed). | | | | | |

From the findings in Table 4.2, the humanitarian lead time has a positive and significant relationship with supply chain performance ($r = 0.518$, p -value = 0.000) at 0.01 level of significance. This implies that there is a probability of 0.518 that supply chain performance will increase with an increase in humanitarian lead time. The findings also showed that demand forecasting has a positive and significant relationship with supply chain performance ($r = 0.480$, p -value = 0.000) at 0.01 level of significance means that there is a 0.480 probability that supply chain performance will increase with an increase in demand forecasting. The findings also revealed that there is a positive and significant relationship between inventory management and supply chain performance ($r = 0.188$, p -value = 0.036) at 0.05 level of significance and this implies that there would be a probability of 0.188 that supply chain performance will increase with an increase in inventory management. Finally, the findings showed that there is a positive and significant relationship between ICT integration and supply chain performance ($r = 0.543$, p -value = 0.000) at 0.01 level of significance. This implies that there is a probability of 0.543 that supply chain performance will increase with the increase in ICT integration. The findings also revealed significant inter-factor relationships between humanitarian lead time and ICT integration ($r = 0.273$) and between demand forecasting and ICT integration ($r = 0.406$) both at 0.01 level of significance.

4.7 Regression Analysis:

According to Table 4.3, the R-value indicates a relatively strong correlation between predictor variables and the response variable (supply chain performance). This is because the R-value is positive (0.738). This means that the variation in supply chain performance was attributed to 73.8% change in the predictor variables. According to the value of the R-Square, 54.5% of the supply chain performance could be explained by independent variables of ICT integration, inventory

management, humanitarian lead time and demand forecasting. Therefore independent variables would have a 54.5% influence on the supply chain performance while the remaining 45.5% could be attributed to other factors other than predictor variables.

Table 4.3: Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|--------|----------|-------------------|----------------------------|
| 1 | 0.738a | 0.545 | 0.530 | 0.468 |
| a. Predictors: (Constant), ICT Integration, Inventory Management, Humanitarian Lead Time, Demand Forecasting | | | | |

Table 4.4: Estimation of regression coefficients

| | Unstandardized Coefficients | | Standardized Coefficients | | |
|------------------------|-----------------------------|------------|---------------------------|--------|-------|
| | B | Std. Error | Beta | t | Sig. |
| (Constant) | -0.952 | 0.419 | | -2.270 | 0.025 |
| Humanitarian Lead Time | 0.511 | 0.082 | 0.400 | 6.205 | 0.000 |
| Demand Forecasting | 0.375 | 0.078 | 0.324 | 4.783 | 0.000 |
| Inventory Management | 0.275 | 0.136 | 0.126 | 2.028 | 0.045 |
| ICT Integration | 0.270 | 0.065 | 0.292 | 4.163 | 0.000 |

The findings in Table 4.11 showed that humanitarian lead time has a positive and significant effect on the supply chain performance ($\beta_1 = 0.400$, p-value = 0.000) and this can be explained further by assessing the value of the t-test which indicates that supply chain performance would be approximately 6 times higher given the change in humanitarian lead time (t statistic = 6.205). This implies that with each unit increase in humanitarian lead time, supply chain performance will increase by 0.400 units. Procurement can significantly influence the overall success of an emergency response depending on how it is managed. Butcher (2008) notes that it serves three levels of users: the internal customer, programs in response to emergencies and ongoing programs and Prepositioning of stocks, for both internal customers and program needs. The government of Kenya (2009) highlights the importance of successful implementation of disaster procurement functions which incorporate manpower, financial and technological resources.

7. CONCLUSION

From the study findings, it has been established that humanitarian lead time has a significant effect on the supply chain performance. Furthermore, it has been established that humanitarian demand forecasting has a significant effect on supply chain performance. Also, it has been indicated that inventory management has a significant effect on supply chain performance. Finally, it has been established that ICT integration has a significant effect on supply chain performance.

Although this was the case, the staffs have also highlighted on various gaps or challenges such as logistics process and how this impacts the achievement of the organizational goals. Lack of involvement of all staff was not involved in decision-making especially about lead time process, unclear supply systems receipts in the organization being specified, proper internal controls of the lead time in the organization and training mechanisms and strategy in the organization about humanitarian lead time. Furthermore, with regard to humanitarian demand forecasting, it has been established that there exist some gaps in relation to the review of supplies demand, receipt of enough revenue on time and involvement of the members in decision-making in distribution planning that need to be addressed in order to have a fully and efficient functioning supply chain system in the organization. As regards humanitarian inventory management, it was established that the organization inventory audit committee meetings are not properly regulated to a certain level. This also meant that there are gaps in the proper preparation of inventory reports and within specified regulations and lack of clarity of the inventory management policy processes. Finally, concerning humanitarian Information Communication Technology integration,

There exists challenges regarding ICT policy in the organization, communication channels in the organization, proper controls mechanisms in its applications, application of technology in the decision-making process in the organization and financial regulations in the organization that is aimed at enabling the members to embrace ICT.

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