

FACTORS AFFECTING LOGISTIC SUPPORT IN MILITARY OPERATIONS: CASE OF THE KENYA DEFENCE FORCES

Otieno Godfred Ohndyl

Jomo Kenyatta University of Agriculture and Technology, Kenya

Noor Isamil Shale (Ph.D.)

Jomo Kenyatta University of Agriculture and Technology, Kenya

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ABSTRACT

The study sought to examine the factors that affect logistic support to military forces: Destination (areas of operation), Distance (lines of communication), Demand (magnitude of requirements) and Duration (deployment period) and their impact on Operation Linda Nchi (OLN). The study adopted descriptive research methodology. The target population was 1200 soldiers comprising the Battalion that was deployed for the operation. The study used stratified random sampling technique and the Krejcie and Morgan table to draw sample size of 291 respondents. The instruments used were structured questionnaires, selected interviews and observations. The collected data was classified, coded, tabulated, and presented in graphs, frequency distributions, percentages and pie charts for analysis and interpretation. The data was processed using Statistical Process for Social Science (SPSS version 20). The study found out that to a greater extent all the parameters influence logistic support to military operations, that is, Language, climate, infrastructure and attitudes of the local population. From the results, Duration as a component of Logistic Support contributes

most to the Logistic Support, which had the greatest t value of 4.504, while Distance contributed the least with t value of .748. The study revealed that buffer stocks are very critical for unforeseen eventualities, size of the force significantly influence volume of materiel support, the intensity of operation drives the level of materiel requirements, environment, weather & distance directly impact on demand levels. The study concludes that Destination, Distance, Demand, and Duration significantly affect Logistics Support. The study recommends that KDF should invest in superior logistic assets (strategic air lift, long hauliers, warehouses in NEP), predeployment training in logistic and superior technology for intelligence gathering and the Government of Kenya should invest in major infrastructures of roads, airfields and sea ports in the general area and around North Eastern Province (NEP). The study also recommends further research on factors affecting logistics to other security agencies and to the commercial sector.

Key Words: *military forces, terrorist, infrastructure network and Logistic Support*

INTRODUCTION

Logistic Support commonly known as Combat Service Support (CSS) holds key to the success and victory in any military operation (Pagonis, 2012). Historical wars such as the First World War (WWI), Second World War (WWII), The Vietnam War, the Gulf Wars, the Afghanistan War and the Libyan Intervention; were all virtually fought and won on the strength of superior logistic support accorded to the forces in combat (Morgan, 2011). Logistics in military doctrine refers to the art and science of designing, planning, acquiring and carrying out the movement of the forces including their combat equipment and supplies in the battle field (Thope, 2010).

The hasty deployment of KDF troops into Juba Land in October 2011 to defend Kenya's sovereignty and territorial integrity against the AS militia marked a turning point for the involvement of Kenya into the longest Civil War on African continent. The AS militia had persistently undertaken and sponsored terrorist attacks on innocent Kenyans and security forces leaving behind trails of deaths, injuries, losses, anguish, abductions and trauma (Rice, 2011).

Kenya hastily deployed its forces deep into Juba Land to pursue the AS militia and create a buffer zone to deny AS un-checked entry into Kenya territory through the porous border Kenya-Somali border. The next challenges that followed for the troops was the logistic support problems. The big number of troops and their heavy military hardwares required huge logistic support effort in the form of ammunition, fuel, food, water, medical and maintenance services. The characteristics of the Area of Operation (AOR) presented the following challenges to the forces: Lack of local supplies, difficulties in communication, very poor and dilapidated physical infrastructure, long lines of communication (LOC) and insurgency. This left no alternative as all supplies had to be shipped into the AOR from other locations which included Nairobi and Mombasa both towns located over 1000 Kilometres by road, sea and air (Odhiambo et.al., 2012). Thus the strategy adopted for the logistic support was required to enhance both operational effectiveness and efficiency through a well designed SCM system with the ability to obtain the right product, to the right place, at the right time, at the right price and the right cost through an advanced inventory planning and replenishment system (Morgan, 2011).

STATEMENT OF THE PROBLEM

The hasty deployment of KDF troops into Juba Land in October 2011 to defend Kenya's sovereignty and territorial integrity against the AS militia marked a turning point for the involvement of Kenya into the longest Civil War on African continent (Rice, 2011). The next challenge that followed for the troops was the logistic support problems. The big number of troops and their heavy military equipment required big quantities of logistic support in the form of ammunition, fuel, food, water, medical and maintenance services. The characteristics of the AOR presents the following challenges to the troops: Lack of essential supplies, difficulties in communication, very poor and dilapidated physical infrastructure and insurgency (Ahmed, 2012).

Most or all supplies had to be shipped into the AOR from other far locations of Nairobi and Mombasa through Garissa, Liboi, Wajir, Mandera, Lamu and Kismayu. The big number of troops put huge pressure on the demand, nature and quantity of supplies required by the troops in the battle field to match the rates of consumptions, replenishments, and repair services to the unserviceable equipment. While the forecasting and determination of the support is based on the operational demand matching the operational supply with the operational demand tempo and tenacity became a Herculean task. The OLN had huge magnitude of logistic support requirement that frequently remained un-predictable due to the insurgent activities of the AS. The AS militia had persistently undertaken and sponsored

terrorist attacks on innocent Kenyans and security forces leaving behind trails of deaths, injuries, losses, anguish, abductions and trauma (Rice, 2011). Thus the AOR presented mirrored challenges to the effective and efficient operation of KDF as the period of engagement too remained uncertain (Ahmed, 2012). This study therefore sought to analyze the effect of these factors; destination, distance, demands and duration on logistic support to the military units deployed in the operation.

The nature and level of logistic support is often important in deciding the overall outcome of the war. The failure of Germany Navy to sink enough cargo in the second Battle of the Atlantic allowed Britain to stay in war (Molana, 2009). Success in military campaigns and victories in war cannot be achieved without providing good logistical support (Pagonis, 2012).

LITERATURE REVIEW

A study conducted by Major Herberman (2010), “Sustaining Military Operations in the 21st Century” to evaluate factors critical for successful military intervention and humanitarian operations in the fledging conflicts around the world particularly in the weak political states and the civil war ravaged nations. The study notes that for NATO to field expeditionary forces that can move quickly to wherever they are needed and sustain the operations over long distance and time and achieve their objectives. There will be a continuing need to adapt to new challenges to ensure that NATO Nations have the structures deployable and sustainable forces capable of responding to emerging threats in the future (Herberman, 2010).

Herberman further notes that shift to more expeditionary operations has significant implications for NATO logistics policy and posture. The deployment of forces to locations with little or no Host Nation Support at much greater distances than previously necessary, operating along extended and perhaps very limited lines of communication, places an emphasis on deployable logistic capabilities to cater for territorially-based defense. The uncertain location of operations and composition of forces to be deployed poses challenges for logistic readiness. Operations of any significant duration also raise sustainability issues, including those relating to the logistics force elements required to keep the combat forces supplied and maintained (Tsu, 2010).

Admiral Henry (2013), US Marine Corps in his seminal work “Logistics and National Defence” notes that logistics is the bridge between military operation and national economy presented in a countries’ economic resources and systems used to generate personnel and materiel. The General recommends for the nations to harmonize the national goals to the strategic military plans and ensure that the national economy supports the army through proper recruitment, training and equipping forces.

He notes that logistic support to the military directly influences the swiftness with which the country can mobilize and how long a country can endure a conflict. Brigadier Kennedy (2013) US Army, in his study “Refining Military Logistic Plans “observes that the logistic planners must emphasize the five principles of logistics i.e Fore Sight- predicting and

circumventing critical logistic constraints to the commanders' freedom of action. Cooperation - Sharing responsibilities to optimize the logistic footprint. Flexibility- proactively seeks the optimum solution to logistic problem responsively to have the resources to meet the unexpected demand. Simplicity - the broad and complex span of logistic demands a simple plan to keep it manageable and Economy-achieving more with the same or the same for less.

Keller et al., (2013) in their studies on "Supplying the Coalition Forces in Afghanistan", They analyzed the effect of operational environment on logistic support to troops. The paper observed that land operations in austere environment with underdeveloped infrastructure puts strain on the systems, processes, and resources intrinsic in military logistics and exacerbate friction along the combatants' lines of communication. They recommended commanders to account for their supply lines and exploit the vulnerability of their enemies. Logistics should also be recognized as an effective force multiplier to achieve joint deployment and sustainment without geographical limits (Keller et al., 2013).

Investigations carried out by the British House of Common (2012), "British Military Failures in Iraq" the following shortfall areas were identified: Insufficient supply chain planning leading to Static demand forecasts with insufficient granularity, No planning of deployed inventory, No infrastructure or capacity planning beyond the Coupling Bridge, No end-to-end balancing of capacity or synchronizing of activity, and No performance measurement to enable the identification of performance inhibitors.

The Committee directed the MOD to do better by improving the Supply Chain Performance for Operations through re-looking into the organization, process, people and tools. Sreenivas & Srinivas (2013), in study entitled, "The Role of Transport in Logistic Chain". The duo set out to analyze the interrelationships, the structures, costs and effects of transportation on logistics chain. The study findings were that operation of transportation determines the efficiency of moving products form the producers to the consumers. The progress in techniques and management principles improves the moving load, delivery speed, service quality, operation costs, the usage of facilities and energy saving. A good transport system in logistics activities could provide better logistics efficiency, reduce operation cost, and promote service quality. The improvement of transportation systems needs integrated and collaborated effort from both public and private sectors. Transportation takes a crucial part in the manipulation of logistic. They concluded that reviewing the current transportation system needs a clear frame of logistics and a proper transport infrastructure and techniques to link production to the market (Sreenivas & Srinivas, 2013).

RESEARCH METHODOLOGY

The study adopted descriptive research design. The target population of this study was a military battalion consisting of 1200 personnel who are deployed as a single entity for assigned operation. The main data collection instrument was the Questionnaire, both structured and unstructured questions, the study also conducted interviews with few selected respondents especially the commanders for clarification of key subjects to the research and

finally the study used observations especially in the verification of the secondary data pertaining to the operation comprising of maps, records, requisitions, states, logistic reports, equipment states, directives and collections from the war library. The study used both qualitative and quantitative techniques in data processing and analysis.

RESEARCH RESULTS

The purpose of the study was to evaluate the factors that affect logistic support to military operations modeled in a case study of the KDF. The study was guided by four research questions which were; How does destination affect logistical support to military forces in operation?, How does distance affect logistic support to military forces in operations?, What is the effect of demand on logistic support to military forces in operations? And, What is the effect of duration on logistic support to military forces in operations?

Destination

The study found out that to a greater extent all the parameters of destination influences logistic support to military operations, that is, Language, climate, austerity of infrastructure and attitudes of the operation area is essential for logistic supply, reliable knowledge of the environment and infrastructure are essential for logistic support, level of threat in a war zone and its environs is crucial in logistic supply and strategic lines of communications are essential for logistic support operations. The study findings concur with those of Thope (2010) who found out that the Destination significantly influences logistic support as it sets the pre-conditions and patterns of wear and tear. Further, he argues that the destination will determine the conditions for the pattern of wear and tear on equipment and the physiological demands on troops deployed for war. Thus it can be concluded that AOR (area of operation) will directly influence the forecasting of demand and logistic estimates required to maintain and sustain the forces in the operational theatre for the duration of the operation. These findings agree with those of Pagonis (2012), who observed that in operational undertaking cyclic and surge demand can easily stretch the logistic capability interfering with the morale and fighting power of the forces. Hence need to plan and store large buffer stocks to cater for unforeseen contingencies and provide for safety, flexibility, expedience, and flexibility in switching operational priorities. Further Hathorn, (2013) argues that demand factor concerns the consumption rate of combat materials of food, water, fuel, ammunition, medicals, and equipment wear and tear. The aggregate consumption rate is driven by the concept and intensity of operation

Demand

The study revealed that buffer stocks are essential for unforeseen eventualities, big number of troops require big volume of materiel support, the intensity of operational engagement drives the level of materiel requirements and operational environment & distance directly impact on demand levels.

These findings agree with those of Pagonis (2012), who observed that in operational undertaking cyclic and surge demand can easily stretch the logistic capability interfering with the morale and fighting power of the forces. Hence need to plan and store large buffer stocks to cater for unforeseen contingencies and provide for safety, flexibility, expedience, and flexibility in swiching operational priorities. Further Hathorn, (2013) argues that demand factor concerns the consumption rate of combat materials of food, water, fuel, ammunition, medicals, and equipment wear and tear. The aggregate consumption rate is driven by the concept and intensity of operation

Distance

It was noted that movement of troops and supply of materiel require suitable transport and logistics equipment and facilities, reliable transport and communication infrastructure are essential for logistic support, accessibility, speed and flexibility are essential for logistic facilities and strategic lines of communications are essential for logistic support operations were key elements of distance in logistic support to military operations. The findings are similar to those of Morgan (2011) who found out that Distance drives the logistic order of battle, the force sustainability plans and would eventually determine and shape the Lines of Communication (LOC). These further cements the findings of Pargonis (2012), who found out that long distance operations expends time, cost and soldier fatigue hence need to consider it in logistic estimates and operational plans.

Duration

The study found out that in terms of duration; longer operations consume more logistic support, deployment and support of military operations consumes heavy funding, development of local infrastructure is essential for operational support and strategic investments are essential in longer operational undertakings. . This findings confirms those of Thope (2010) who found out that duration of military engagement determined the size and volume of logistic requirements and sustainment tasks. He advocates better preparedness and invetments in operations which are likely to run for longer period. This finding confirms those of Thope (2010) who found out that duration of military engagement determined the size and volume of logistic requirements and sustainment tasks.

Forecasting Model

The four independent variables that were studied, explain 61.1 percent of variance in organizational performance as represented by the R². This therefore means that other factors not studied in this research contribute 38.9 percent of variance in the dependent variable. Therefore, further research should be conducted to evaluate the factors that affect logistic support to military operations. The F critical at 5 percent level of significance was 4.27. Since F calculated is greater than the F critical (value =13.424), this shows that the overall model was significant. The significance is less than 0.05, thus indicating that the predictor variables), explain the variation in the dependent variable which is Logistic Support. If the

significance value of F was larger than 0.05 then the independent variables would not explain the variation in the dependent variable.

The data findings also show that a unit increase in Destination variable will lead to a .553 increase in Logistic Support; a unit increase in Demand will lead to .541 increase in Logistic Support; a unit increase in Distance will lead to a .102 increase in Logistic Support and a unit increase in Duration will lead to a .675 increase in Logistic Support.

From the results, Duration as a component of Logistic Support contributes most to the Logistic Support, which has the greatest t value of 4.504, while Distance contributes the least which has the smallest t value of .748.

REGRESSION ANALYSIS

A multi-regression was generated to establish the combine variables destination distance,demand and duration. The multi-regression analysis also provided the relative importance of each of the variables with respect to Logistic support.

Table 1: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.782 ^a	.611	.583	1.02186

a. Predictors: destination,demand,distance and duration

Coefficient of determination explains the extent to which changes in the dependent variable can be explained by the change in the independent variables or the percentage of variation in the dependent variable (logistic support.) that is explained by all the four independent variables (destination,demand,distance and duration)

The four independent variables that were studied, explain 61.1 percent of variance in Logistic Support as represented by the R2. This therefore means that other factors not studied in this research contribute to 38.9 percent of variance in the dependent variable. Therefore, further research should be conducted to evaluate other factors that affect Logistic Support to military operations.

Table 2: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.018	18	3.754	13.424	.000 ^b
	Residual	15.382	231	.280		
	Total	30.400	249			

a. Dependent Variable: Logistic Support

b. Predictors: (Constant), destination,demand,distance and duration

The F critical at 5 percent level of significance was 4.27. Since F calculated is greater than the F critical (value =13.424), this shows that the overall model was significant. The significance is less than 0.05, thus indicating that the predictor variables, explain the variation in the dependent variable which is Logistic Support. If the significance value of F was larger than 0.05 then the independent variables would not explain the variation in the dependent variable.

Table 3: Coefficients^a

Model		Unstandardized Coefficients		Standardize	t	Sig.
		B	Std. Error	d Coefficients Beta		
1	(Constant)	.984	.452		2.176	.004
	Destination	.553	.123	.626	2.551	.000
	Demand	.541	.212	.612	1.259	.001
	Distance	.102	.136	.126	0.748	.002
	Duration	.675	.536	.379	4.504	.003

a. Dependent Variable: Logistic Support

From the regression findings, the substitution of the equation becomes:

$$\text{Logit}(y) = b_0 + b_1x_1 + b_2x_2 + \dots + b_ix_i + \dots + b_nx_n$$

$$\text{Logit}(y) = .984 + .553X1 + .541X2 + .102X3 + .675X4$$

Where: Y is the dependent variable (Logistic Support) X1 is Destination variable, X2 is Demand, X3 is Distance and X4 is the Duration..

According to the equation, taking all factors (destination,demand,distance and duration) constant at zero, Logistic Support schemes will be .984.The data findings also show that a unit increase in Destination variable will lead to a .553 increase in Logistic Support; a unit increase in Demand will lead to .541 increase in Logistic Support; a unit increase in Distance will lead to a .102 increase in Logistic Support and a unit increase in Duration will lead to a .675 increase in Logistic Support.

From the results, Duration as a component of Logistic Support contributes most to the Logistic Support, which has the greatest t value of 4.504, while Distance contributes the least which has the smallest t value of .748.

The study findings are in line with Charles, (2007) on his study on the Geography of Conflict who found that destination,demand,distance and duration are key ingredients in logistic support.

Further Hathorn, (2013) found out that Demand determines the magnitude of the requirement. It is not simply the aggregate consumption of materiel or usage of medical facilities and other services, but also the pattern, rate of change and variability across the operation. From the

findings, it can be concluded statistically that destination, demand, distance and duration has a significant input in logistic support.

CONCLUSIONS

The general objective of the study was to evaluate the factors that affect logistic support to military operations modeled in a case study of the KDF. Researchers and practitioners have questioned the effect of logistics support on military operations. The study findings revealed that distance, destination, duration and demand as logistics support had a positive influence on military operations at KDF. It reaffirms what some of the previous researchers (Major Herberman, 2010) have found, that for NATO to field expeditionary forces that can move quickly to wherever they are needed and sustain the operations over long distance and time and achieve their objectives. The study further concluded that the 4D's could be used for prediction of military operations at KDF.

RECOMMENDATIONS

Based on the findings and the conclusions, the study recommends that KDF should invest in superior Logistic Support equipments such as strategic air lift, long haulage vehicles, ships. KDF should also invest in manufacturing for essential supplies to supplement the commercial sources, in superior technology for intelligence gathering and information management to provide asset visibility and inventory management and facilitate specialized pre-deployment training for troops on logistic support. The study also recommends that the Kenya Government should invest in major infrastructure such as road network, airfields and the sea ports along the Kenyan coast line. Due to the cost implication of the military operations, the government should also allocate sufficient funds to KDF to effectively undertake its primary role.

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