European Journal of Business and Management
ISSN 2222-1905 (Paper) ISSN 2222-2839 (Online)
Vol.9, No.23, 2017

Determinants of Efficiency in Cargo Logistics: A Case Study of Bollore Transport and Logistics Kenya Limited.

Mulyungi Martin Ikuthu* Geoffrey Kipkorir
Department of Business and Economics, School of Human Resource Development, Jomo Kenyatta University of Agriculture and Technology (JKUAT), P.O BOX 62,000 – 00200 NAIROBI

Abstract
This study sought to examine the determinants of efficiency in cargo logistics of Bollore Transport and Logistics Kenya limited. The specific objectives of the study were; to establish the effects of customs processes on efficiency of Bollore Transport and Logistics Limited; to establish the effects of logistics infrastructure on efficiency of Bollore Transport and Logistics Kenya Limited; to determine the effects of information technology on efficiency of Bollore Transport and Logistics Kenya Limited and to assess the effects of government clearing procedures on efficiency of Bollore Transport and Logistics Kenya Limited. To strengthen the conceptual framework the researcher used theories such as resource base theory, the theory of constraints and system's theory. The study was primary data which was collected through the use of questionnaires with respondents at the Bollore Transport and Logistics Company. The sample size was 93. A modified Likert scale questionnaire was developed and divided into three parts. A pilot study was carried out to refine the instrument. The quality and consistency of the study were further assessed using Cronbach's alpha. Data analysis was performed using Statistical Package for Social Science (SPSS Version 23) for Windows. The analysis was done using frequency counts, percentages, means and standard deviation, regression, correlation and the information generated will be presented in the form of graphs, charts and tables. From the research findings, the study concluded all the independent variables studied have a significant effect on the efficiency of cargo logistics as indicated by the strong coefficient of correlation and a p-value which is less than 0.05. The overall effect of the analysed factors was very high as indicated by the coefficient of determination. The overall P-value of 0.00 which is less than 0.05 (5%) is an indication of the relevance of the studied variables, significant at the calculated 95% level of significance.
Keywords: Determinants, Efficiency, Cargo Logistics, Bolomore Transport Kenya

1. Introduction

Logistics service delivery from the perspective of 'consumer benefits from lower transport costs' can be estimated by calculating the additional costs when a 'second best' port would have to be used; these additional costs do not have to be incurred because of the presence of the port. Thus, they can be regarded as the benefits of the presence of this port (Mugi, 2015). Due to the competition between ports, for instance, competition between the port of Mombasa Kenya and that of Dar es Salaam Tanzania it can be assumed that these benefits are passed on to the port users, and finally to the consumers in the hinterland served by the port, in this instance the hinterland being the east African land locked nations such as Uganda, Rwanda, Burundi, Ethiopia, DRC Southern Sudan. Even though some economic impact studies do argue along these lines, the benefits to consumers in the port hinterland are not presented explicitly. Some of the additional costs are as a result of bureaucracies within the port setting such as delays in loading and or offloading cargo, documentation processing delays by the harbour authorities, system breakdowns, extended port customs procedures and even port staff apathy to work or just inefficiencies and lack of proper competencies. Woo & Pettit (2010), logistics service delivery measurement framework, include timeliness, reliability, lead time, cargo damage and accuracy of information along with responsiveness, flexibility and claims.

The Port handles approximately 90% of Kenya external trade regarding tonnage. Mombasa port has 17 deep water berths. Cargo traffic through Mombasa port is about 24 million tonnes in the year 2014 including over 1million TEUs of container traffic. The development and maintenance of physical infrastructure is a key driver for both domestic and international trade which in effect leads to economic growth and poverty reduction. Markets accessibility and volume of commerce are widely dependent on the quality of infrastructure and especially transport which facilitates the physical movement of people and goods. Traffic congestion occurs when a city's road network is unable to accommodate the volume of traffic that uses it. Rapid growth in motorization causes this situation and with less than the corresponding improvement in the road network, traffic management techniques and related transport infrastructure. Road traffic congestion is a phenomenon that is associated with urban environment all over the world.

Logistics is concerned with the efficient transfer of goods and related information from the source of supply through the place of manufacture to the place of consumption in a cost effective way while providing an acceptable service to the customer (Rushton, et al., 2015). The key elements of freight logistics include warehousing and materials handling; transport and distribution; inventory management; information and control;

packaging and unitization. Transportation logistics involves managing the physical flow of goods and related information from the port of origin, to the port of destination, and to the final delivery point (Hensher & Puckett, 2015). Transport plays a vital role in freight logistics by facilitating the physical flow of goods through the various processes in distribution.

Mombasa is the second largest city in Kenya and the main logistics hub. Lying on the Indian Ocean, it has a major port and an international airport. With a population of 939,370, as per the 2009-census, the city is located on Mombasa Island and sprawls to the surrounding mainlands of Changamwe, Likoni, Nyali and Kisauni. Mombasa is the starting point of logistics along the Northern Economic Corridor leading to the landlocked countries of Uganda, Rwanda, Burundi and South Sudan (KSC, 2009). As Kenya's biggest and busiest seaport, the Port of Mombasa is the doorway to a vast hinterland where people depend on agriculture for their livelihood. It serves Kenya, Uganda, Rwanda, Burundi, the Democratic Republic of Congo, southern Sudan, Ethiopia, Somalia and northern Tanzania. The port is a natural harbour with deep water berths for larger vessels such as bulk carriers, container ships, motor vehicle carriers and luxury cruise ships. The port's principal markets encompass Western Europe, Asia, the Far East, America and the rest of Africa. It also provides anchorage and storage for regular feeder services between Mombasa and Dar es Salaam, Durban, Mogadishu, Djibouti and Dubai. It is the best-connected port of call in the East Africa region after Durban, with about 35 shipping lines calling and having direct connectivity to over 80 seaports (Cyplik, et al., 2014).

According to KPA Handbook (2015), the port recorded a container throughput of 1,012,002 TEUs and 24.87 million tons of cargo in the year ending 2014. This represents an 11.6% growth in throughput compared to the year 2013. The increased cargo traffic is seen as an indicator of economic activity in East Africa. Despite the strong import growth, the overall volumes handled in Mombasa are low by international standards. In 2012, Mombasa handled 21.92 million tons of cargo. This represents almost double the amount of Dar es Salaam, which recorded 13.7 million tons, but less than a quarter of Durban and only 2-2.5 percent of the amounts which go through the busiest ports in the world, Singapore and Hong Kong (see figure 1.1 below). A major impediment to cargo movement at the port is the relatively low volume of cargo carried by rail, with most goods being hauled by road. Around 95% of all the cargo coming in through the port is ferried to its final destination by road, with railway accounting for a paltry 5% (PREMUAR, 2010). This has contributed to congestion on roads around Mombasa whose network is largely underdeveloped.

In the manufacturing sector today, human capital is still essential for most factories to carry out a variety of manual operations, in spite of the rapid advancement of automation technology and robotics. A futuristic vision of "unmanned manufacturing" (Deen 1993) is forbiddingly expensive because all its hardware components need to be computer controlled to communicate with each other freely; and yet, most of the outcomes are not promising (Sun & Venuvinod 2001). By and large, factories equipped with relatively simple machinery controls will require the continuous attendance of human operators; for examples, textile mills, leather products, and medical appliances. With limited capital investments in production equipment, the main budget of their fixed costs lies on the workforce size (Techawiboonwong *et al.* 2006).

About cost-effectiveness, labour planning always opts for the minimum number of workers needed to deal with the daily operations, as well as the probable rate of disturbance (Lim *et al.* 2008). The workforce disturbance is often ascribed to absenteeism and turnover, which may result in considerable loss of productivity for any labour-intensive division (Easton & Goodale 2002). Buffering with redundant skilled workers (Molleman & Slomp 1999) or relief workers (Redding 2004) might be a direct solution to absenteeism; however, the rising labour cost must be justifiable because under utilisation of labour during low demand seasons is considered a waste of resources. Absenteeism is the measure of unplanned absences from the workplace due to some reasons like a personal emergency, accident, illness, etc. Turnover occurs when an active worker resigns from the company of his own accord, thus leaving a vacant post until a replacement is found. If such disturbance has caused a large number of tasks become unattended and overdue, the company is then vulnerable to overtime cost, shrunk capacity and productivity, extra queuing time, lost business income, etc. To prevent these deteriorative effects, optimising the number of workers can be helpful. As a fundamental branch of knowledge in manufacturing business, workforce management will never fall behind the times. Therefore, it is worth an attempt to incorporate a novel methodology, such as HMS, into the state of the art of workforce sizing.

1.1 Statement of the problem

The major bottleneck to the port's expansion programme is the lack of an appropriate transport infrastructure composed of intermodal freight system to facilitate efficient cargo evacuation and freight logistics systems. Negative impacts of increased container traffic are already being experienced along the highways, and at transit towns including Nairobi. Mombasa city is now faced with road traffic gridlocks, and the route to the Mombasa airport is constantly overwhelmed by traffic jams. This calls for work on the proposed by-pass and link road to be started immediately.

If construction of the by-pass is not speeded up and synchronized with newly planned capacity increases at

the port and comprehensive transport infrastructure development the efficiency of freight logistics will be severely compromised (Maltz, 2014). This study, therefore, seeks to examine the following determinants of cargo logistics on customs processes, logistics infrastructure, information technology and government procedures in clearing and forwarding in Bollore Transport and Logistics Kenya Limited.

1.2 Specific Objectives of the study

The specific objectives of this study were:

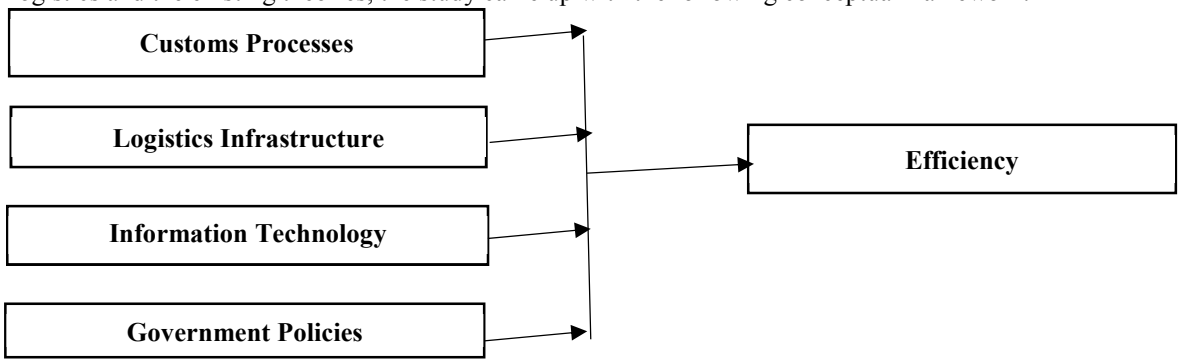
a) To examine the effects of customs processes on the efficiency of Bollore Transport and Logistics Kenya Limited.
b) To assess the effects of logistics infrastructure on efficiency of Bollore Transport and Logistics Kenya Limited
c) To assess the effects of information technology on the efficiency of Bollore Transport and Logistics Kenya Limited.
d) To assess the effects of government policies on the effectiveness of Bollore Transport and Logistics Kenya Limited.

2. Literature Review

This study will be anchored on the following theories; resource based theory, the theory of constraints and system's theory. The Resource-Based View theory demonstrates that logistics resources and capabilities can have a significantly positive relationship to firm performance. Therefore, the RBV provided a theoretical foundation for this research to examine the relationship between logistics infrastructure and efficiency in cargo logistics clearing firms. Theory of Constraints (TOC) is useful in measuring the determinants of efficiency in freight logistics clearing firms a case study of Bollore transport and logistics Kenya.

2.1 Conceptual Framework

Based on the existing literature on determinants of effectiveness in cargo logistics of Bollore Transport and Logistics and the existing theories, the study came up with the following conceptual framework:



3. Research Methodology

The researcher used descriptive research design. The study targeted 120 employees of Bollore Logistics Company limited in the top, middle-level management and junior employees distributed as follows:

Management Level	Population
Executive Management	24
Top Management	36
Middle Management	60
Total	120

The stratified random sampling method was used to select appropriate respondents from various departments of Bollore Logistics Company Limited where the sample size was 93. The researcher used structured questionnaires to collect data from Bollore Logistics company limited respondents. Descriptive and inferential statistics were used for data analysis.

Descriptive statistics were used to describe the study using percentage, mean standard deviation and coefficient of variation and presented using tables, charts and graphs. Inferential statistics incorporated multiple regression analysis to show the effect and influence of the independent variables on the dependent variables. The relationship was as follows;

$$\mathbf{Y=\alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta 4X4 + \varepsilon}$$

Y = Represents the dependent variable, Efficiency

α= Constant

β_1, β_2, β_3, and β_4= Partial regression coefficient
X_1 = Customs Processes
X_2 = Logistics Infrastructure
X_3 = Information Technology
X_4 = Government Policy
ε = error term or stochastic term

4. Findings

4.1 Efficiency in Cargo Logistics

Descriptive Statistics

	N	Mean	Std. Deviation
Customs processes have been automated, and this increases efficiency in the company	66	4.65	.480
There is an increase in the number of customers	66	4.64	.485
There is improved fleet scheduling thus creating efficiency	66	4.00	1.301
Valid N (listwise)	66		

The statement in agreement customs processes have been automated, and this increases efficiency in the company had a mean score of 4.65 and a standard deviation of 0.480. The statement that there is an increase in the number of customers had a mean score of 4.64 and a standard deviation of 0.485. The statement that there is improved fleet scheduling thus creating efficiency had a mean score of 4.00 and a standard deviation of 1.301.

4.2 Pearson Correlation

Correlations

	Efficiency in Cargo Logistics	Customs Processes	Logistics Infrastructure	Information Technology	Government Policies
Efficiency in Cargo Logistics	1				
	66				
Customs Processes	.497**	1			
	.000				
	66	66			
Logistics Infrastructure	.698**	.295*	1		
	.000	.000			
	66	66	66		
Information Technology	.525**	.258*	.653**	1	
	.000	.004	.000		
	66	66	66	66	
Government Policies	.913**	.514**	.527**	.325**	1
	.000	.000	.000	.001	
	66	66	66	66	66

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

According to the findings, it was clear that there was a positive correlation between the independent variables, customs processes, Logistics infrastructure, information technology and government policies and the dependent variable efficiency in cargo logistics. The analysis indicates the coefficient of correlation, r equal to 0.497, 0.698, 0.525 and 0.913 for customs processes, Logistics infrastructure, and information technology and government policies respectively. The implication of the result is that there was a positive relationship between the independent variable and dependent variable. The study also further indicated that at a confidence level of 95% the dependent variable is significantly affected by the independent variables in the study.

4.3 Coefficients of Determination (R^2)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.954[a]	.910	.904	1.21595

a. Predictors: (Constant), Government Policies, Information Technology, Customs Processes, Logistics Infrastructure

The model explains 91.0% of the variance (Adjusted R Square = 0.904) on Efficiency in Cargo Logistics. There are factors other than the four proposed in this model which can be used to predict savings mobilisation.

However, this is still a good model as Gaur and Gaur (2009) pointed out that as much as lower value R square 0.10-0.20 is acceptable in social science research.

This means that 91.0% of the relationship is explained by the identified four factors namely customs processes, logistics infrastructure, information technology and government policies. Other factors explain the rest 9% in the efficiency in cargo logistics not studied in this research. In summary, the four factors studied namely, customs processes, logistics infrastructure, information technology and government policies or determine 91.0% of the relationship while the rest 9% is explained or determined by other factors.

4.4 Multiple Regression Analysis

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	38.595	3.745		10.305	.000
	Customs Processes	.029	.096	.013	3.297	.000
	Logistics Infrastructure	.160	.044	.204	3.623	.001
	Information Technology	.248	.088	.144	2.820	.000
	Government Policies	.393	.073	.751	14.897	.000

a. Dependent Variable: Efficiency in Cargo Logistics

The regression equation was:

$$Y = 38.595 + 0.029\mathbf{X_1} + 0.160\mathbf{X_2} + 0.248\mathbf{X_3} + 0.393\mathbf{X_4}$$

Where;

Y = the dependent variable (Efficiency in Cargo Logistics)

X_1 = Customs Processes

X_2 = Logistics Infrastructure

X_3 = Information Technology

X_4= Government Policies

5. Conclusion

From the research findings, the study concluded all the independent variables studied have a significant effect on the efficiency of cargo logistics as indicated by the stable coefficient of correlation and a p-value which is less than 0.05.The overall effect of the analysed factors was very high as indicated by the coefficient of determination. The overall P-value of 0.00 which is less than 0.05 (5%) is an indication of the relevance of the studied variables, significant at the calculated 95% level of significance. This implies that the studied independent variables namely customs processes, logistics infrastructure, information technology and government policies have significant on factors influencing the efficiency of cargo logistics in Bollore Transport and Logistics Kenya Limited.

References

AfDB. (2016). African Development Bank. New York: Oxford University Press.

Aldin, N., Brehmer, P. O., & Johanson, A. (2014). Business Development with Electronic Commerce: Refinement and Repositioning. Business Process Management Journal, 10 (1) 44-62.

Barako, D. G., & Gatere, P. K. (2015). Outsourcing Practices of the Kenyan Banking Sector. African Journal of Accounting, Economics, Finance and Banking Research, 2 (2).

Bardaki, C., Kourouthanassis, P., & Pramatari, K. (2014). Modelling the Information Completeness of Object Tracking Systems. Journal of Strategic Information Systems. 20 (3): 268-282.

Barney, J., & Clark, M. (2016). The Future of Resource-Based Theory: Revitalization or Decline? Journal of Management, 37 (5) 1299-1315.

Bryman, A., & Bell, E. (2015). Business Research Methods. London: Oxford University Press.

Chang, S. C., & Lee, M. S. (2014). The Effects of Organizational Culture and Knowledge Management Mechanisms on Organizational Innovation: An Empirical Study in Taiwan. The Business Review, 7 (1) 295-302.

Cohen, L., Manion, L., & Morrison, K. (2013). Research Methods in Education 5th Edition. London & New York: Routledge Falmer Taylor & Francis Group.

Cooper, R., & Schinder, S. (2013). Business Research Methods. New York: McGraw-Hill.

Cyplik, P., Hadas, L., & Domanski, R. (2014). Implementation of the Theory of Constraints in the Area of Stock Management Within the Supply Chain; A case study. Electronic Scientific Journal of Logistics, 5 (6), 34.

Flores, L. A., & Primo, M. A. (2013). Failure Recovery management in the performance of logistics services in a B2B Context: A case study using 3PL Perspective. Journal of Operations & Supply Chain Management, 1 (1), 29-40.

Ganotakis, P., & Love, J. (2014). The Innovation Value Chain in New Technology Based Firms: Evidence from the UK. Journal of Product Innovation Management, 3 (4), 34-42.
Goldratt, S. E., Griffis, T. J., & Cooper, M. (2015). Aligning Logistics Performance Measures to the Information Needs of a Firm. Journal of Business Logistics, 28 (2), 35-56.
Gu, J., Goetschalckx, M., & McGinnis, L. F. (2015). The Impact of IT Implementation on Supply Chain Integration and Performance. International Journal of Production Economics. 120 (1) 125-138.
Hofenk, K. D., Schipper, R., Semeijn, J., & Gelderman, C. (2014). The Influence of Contractual and Relational factors on the Effectiveness of 3rd Party Logistics Relationships. Journal of Purchasing and Supply Chain Management, 17 (3): 167-175.
Kilasi, B. L., Juma, D., & Mathooko, P. M. (2013). The Impact of Outsourcing of Logistics on the Competitive Advantage Strategy of East African Breweries Limited. International Journal of Art & Entrepreneurship, 1 (3), 521 - 529.
Kothari, C. R., & Gang, W. (2014). Research Methodology: Methods and Techniques. New Delhi: New Age International (P) Ltd Publishers.
Kraaijenbrink, P., Spender, J., & Groen, J. (2015). The Resource - Based View: A Review and Assessment of Its Critiques. Journal of Management, 36:349.
Lai, F., Li, D., Wang, Q., & Zhao, X. (2014). The Information Technology Capability of Third Party Logistics Providers: A Resource-Based View and Empirical Evidence from China. Journal of Supply Chain Management, 44 (3) 22-38.
Li, G., Yang, H., Sun, L., & Sohal, A. S. (2015). The Impact of IT Implementation on Supply Chain Integration and Performance. International Journal of Production Economics, 120 (1) 125-138.
Maltz, A. (2014). Outsourcing Supply Management. Journal of Supply Chain Management, 35 (1), 4 - 17.
Mugenda, O. M., & Mugenda, A. G. (2009). Research Methods: Quantitative and Qualitative Approaches. Nairobi: Acts Press.
Mugi, S. G. (2015). Logistics Outsourcing and the Supply Chain Performance of Mobile Service Providers in Kenya. University of Nairobi, Retrieved from https://www.uonbi.ac.ke.
Milam, O. A. (2015). Challenges of Business Outsourcing at Kenya Power. University of Nairobi, Retrieved from https://www.uonbi.ac.ke.
Nottenbom, T. E., & Winkelmans, W. (2016). Structural Changes in Logistics: How will Port Authorities Face the Challenge. Maritime Policy and Management, 28 (1) 71 - 89.
Ntamutumba, C. (2016). Study of the Establishment of a Permanent Regional Corridor Development Working Group in PMAESA Region. Mombasa: PMAESA Report.
Orodho, A. J., & Kombo, D. K. (2013). Research Methods. Nairobi: Kenyatta University, Institute of Open Learning.
Sekaran, U. (2013). Research Methods for Business: A Skills Building Approach. New Delhi: John Wiley & Sons.
Shang, K. C., & Marlow, P. B. (2014). Logistics Capability and Performance in Taiwan's Major Manufacturing Firms. Transportation and Logistics Research, 41, 217-234.
Shi, N., Cheung, R. K., Yu, H., & Lai, K. K. (2014). An Adaptive Routing Strategy for Freight Transportation Network. Journal of the Operational Research Society, 62 (4) 799-805.
Simatupang, T. M., & Sridharan, R. (2014). The Collaborative Supply Chain. International Journal of Logistics Management, 13 (1), 15-30.
Simatupang, T. M., Wright, A. C., & Sridharan, R. (2014). Applying the theory of Constraints to Supply Chain Collaboration Supply Chain Management. An International Journal, 9 (6), 234-276.
Tukamuhabwa, B. R., Eyaa, S., & Derek, F. (2015). Mediating Variables in the Relationship between Market Orientation and Supply Chain Performance: A Theoretical Approach. International Journal of Business and Social Science, 2 (1) 22.
Wong, C. Y., & Karia, N. (2015). Explaining the Competitive Advantage of Logistics Service Providers: A Resource - Based View Approach. International Journal of Production Economics, 128 (1) 51-67.
Yang, C. C., Marlow, P. B., & Lu, C. S. (2015). Assessing Resources, Logistics Service Capabilities, Innovation Capabilities and The Performance of Container Shipping Service in Taiwan. International Journal of Production Economics, 122, 4-20.

Mr. Mulyungi Martin Ikuthu is a post-graduate student of Procurement and Logistics Jomo Kenyatta University of Agriculture and Technology, Kenya. He is a Logistics manager with decades of experience in Procurement, Logistics, Management and Leadership. His research interests are in Procurement, Logistics and Management.
Mr. Geoffrey Kipkorir is a lecturer of Procurement and Logistics in Jomo Kenyatta University of Agriculture and Technology, Kenya. His research interests are in Procurement, Logistics and Management.