

Research Application Summary

Logistics and transportation practices on organizational performance in the milk processing firms in Kenya

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Abstract

The study sought to determine the impact of logistics and transportation practices on performance of Kenya Cooperative Creameries (KCC). The objectives were to establish the level of implementation of logistics and transportation practices and to determine their relationship with operational performance. Descriptive research design was used. The study population comprised of 17 licensed processing factories of KCC whereby a census was carried out and data collected using questionnaires. Data were analyzed using descriptive and inferential statistics. The study found that transport management practices were implemented to a large extent, distribution management and inventory control to a moderate extent while logistics information practices to a low extent. There also existed a positive relationship between transportation and logistics practices and performance at KCC and the main challenge was lack of adequate funds. The study recommends that the management at KCC regularly conduct an evaluation of these practices and allocate necessary budget.

Key words: Distribution practices, inventory control practices, Kenya Cooperative Creameries, logistics information system, transport management practices

Résumé

L'étude a cherché à déterminer l'impact des pratiques logistiques et de transport sur la performance de Kenya Cooperative Creameries (KCC). Les objectifs étaient d'établir le niveau de mise en œuvre des pratiques logistiques et de transport et de déterminer leur lien avec la performance opérationnelle. Un modèle de recherche descriptif a été utilisé. La population étudiée comprenait 17 usines de transformation agréées de la KCC, une enquête a été effectuée et les données ont été collectées à l'aide de questionnaires. Les données ont été analysées à l'aide de statistiques descriptives et inférentielles. L'étude a révélé que les pratiques de gestion du transport étaient largement mises en œuvre, la gestion de la distribution et le contrôle des stocks de manière modérée, tandis que les pratiques d'information logistique étaient peu développées. Il existe également une corrélation positive entre les pratiques de transport et logistique et la performance du KCC. Le principal défi est le manque de fonds adéquats. L'étude recommande que la direction du KCC procède régulièrement à une évaluation de ces pratiques et alloue le budget nécessaire.

Mots clés : Pratiques de distribution, pratiques de contrôle des stocks, Kenya Cooperative Creameries, système d'information logistique, pratiques de gestion du transport.

Introduction

Recent changes in business dynamics necessitates organizations to recognize the importance of strategically re-looking at their business processes (Nyaberi and Mwangangi, 2014). Particularly, every company aims at gaining part in the growing global market and taking advantage of the advancement in technology. Thus the need for supply chain practices in operations has increased immensely as it has been established to impact positively in gaining competitive advantage. Logistics and transportation are among these supply chain practices that enhance proper coordination of activities in organization (Lai *et al.*, 2008). Management in supply chains is termed as the coordination of activities in a firm aimed at ensuring smooth operations from the initial production processes to the final distribution processes (Fawcet and Magnan, 2001).

Supply chain management encompasses many strategies of which logistics and transportation has gained increased popularity in the recent past largely due to its benefits in organization (Ballou, 2004). The management of logistics cater for how information and products flow while transportation enhances other supply chain activities such as customer service, procurement and inventory management (Harrison and Hoek, 2008). Transportation on the other hand ensures efficient product delivery to the final consumer and that the ultimate customer needs are served better and the organization yields maximum returns (Shankar 2001).

Kenya Cooperative Creameries (KCC) constitutes one of the leading milk processing firms in Kenya. The company enjoyed monopoly till 1992 when milk marketing was liberalized (Rosemary and Karuti, 2005). This entry of new players into the milk processing industry led to intensified competition leading to diminished returns. This necessitates the management to constantly evaluate its operation strategies, such as supply chain management to remain dominant. However, the effects that these strategies, such as logistics and transportation have on performance are not well established by the existing literature. Therefore, establishing the link that exists is necessary to provide possible future directions for coordination and performance improvement at KCC.

Research Gap

Several studies have been conducted to show the importance accrued from incorporating supply management strategies in the operations of a business firm. However, majority of these studies have been conducted mostly in developed countries where companies have extensively adopted or hired logistics service providers while minimal studies have been conducted locally. Additionally, the available theoretical framework is not sufficient enough in explaining the relationship that exists between the variables.

This shows that despite logistics and transportation as well as financial performances being widely studied, few studies have revealed consistent results on the impact of logistics and transportation practices on firms. Also there are few studies on the effect of logistics and transportation on organizational performance of milk firms in Kenya. This study sought to address this knowledge gap by establishing how transport and logistics practices impact organizational performance. Hence this study specifically examined affects of logistics and transportation practices on organizational performance of the milk processing firms in Kenya, a case study of the Kenya Cooperative Creameries.

Literature review

Logistics is termed as the part of supply chain management that is involved with both the forward and reverse flow of information, products and services (Stevenson, 2009). In a similar way, Kiraga (2014) offered the definition of logistics to be the process of planning, implementation and control of procedures for effective supply chain management practices. Transportation on the other hand

entails those methods and techniques that ensure timely and well-coordinated delivery of goods (Stock and Lambert, 2001).

Logistics and transportation are integrated in organizations to cover the flow of products and information between firms. This is with the additional features of time and place utilities. Through this, the organizational performance is enhanced through reduced cost, reduced capital and improved service delivery (Petrovic-Lazarevic *et al.*, 2007; Onyango, 2011). A robust and efficient supply chain enables an organization gain a competitive advantage through superior customer service (Stevenson, 2009). The customers' demands as well as their feedbacks are well addressed thus increasing their loyalty and dependability on the organization.

The concept of transport and logistics is relatively new in Kenya, especially in the milk processing companies. As such, it still has low levels of acceptance in most firms. This is largely due to most managers fearing having to incur additional costs in integration of transport and logistics practices; they tend to prefer the old manual ways. Additionally, the implementation of transport and logistics strategies are difficult to most firms despite the strategies being well formulated. This brings up challenges which may be solved through closely evaluating the supply chain practices which are best suited for each firm (Shepherd and Gtinter, 2006).

The impact that logistics and transportation have on the organizational performance is one that has received considerable interest in the recent past from both scholars and academicians. The interest has been largely due to the perceived importance that these supply chain management practices are believed to have on the organizations' returns. This has seen numerous studies being conducted locally and internationally aimed at determining the relationship that exist. However, the studies show mixed results on how the supply management practices affect the performance.

Logistics aid the efficiency in the operations through enhancing business activities, reducing aggregate costs and minimizing the business risks and enabling the companies to gain competitive advantage (Gunasekaran *et al.*, 2001; Green *et al.*, 2008). This is supported by Mugo (2013) who investigated logistics and transportation of the mobile service providers in Kenya. The study sampled the mobile phone companies in Kenya and found that proper logistics management aid in efficiency of organisations. However, the study's findings may not be used in explaining logistics and transportation practices on performance in the milk processing firms due to differing organizational structures with the mobile service providers.

Research design.

The study adopted a descriptive research design in obtaining information about the impact of logistics and transportation on operational performance of KCC. A descriptive study is concerned with establishing the way things are and thus aids in determination of the current nature of a phenomenon under study (Cooper and Schindler, 2003). Moreover, this research design enables establishing close association between the variables while ensuring minimal interference by the researcher. Hence it was appropriate for this study.

The population of the study comprised of different processing factories of KCC which are registered under the Company's Act. These are 17 in total and all were chosen to enable comparing operational performance among all the branches. A census approach was used to enable comprehensive determination of the phenomenon with equal representation especially because the study elements were few. This is supported by Mugenda and Mugenda (2003) who stated that a census approach is appropriate where the sample is small and manageable to minimize biasness and ensure completeness of findings. The respondents were managers in procurement, operations and production departments, distribution, marketing and finance departments in KCC who were

directly involved in transportation and logistics.

Data collection. The study used primary data in obtaining information pertaining to logistics and transportation practices at KCC. The data were collected by use of questionnaires which were preferred due to their efficiency in collecting a wide range of data within a short period of time. The questionnaires were semi-structured having both open ended and close ended questions. This ensured that data were not only quantitative but also qualitative to give room for the respondents to say more.

The questionnaires were divided into sections with each addressing a specific objective. Section A captured the background information of both the organization and the respondents; Section B was on the logistics and transportation practices; Section C on challenges experienced during implementation of the logistics and transportation practices; and Section D highlighted the operational performance of the firm.

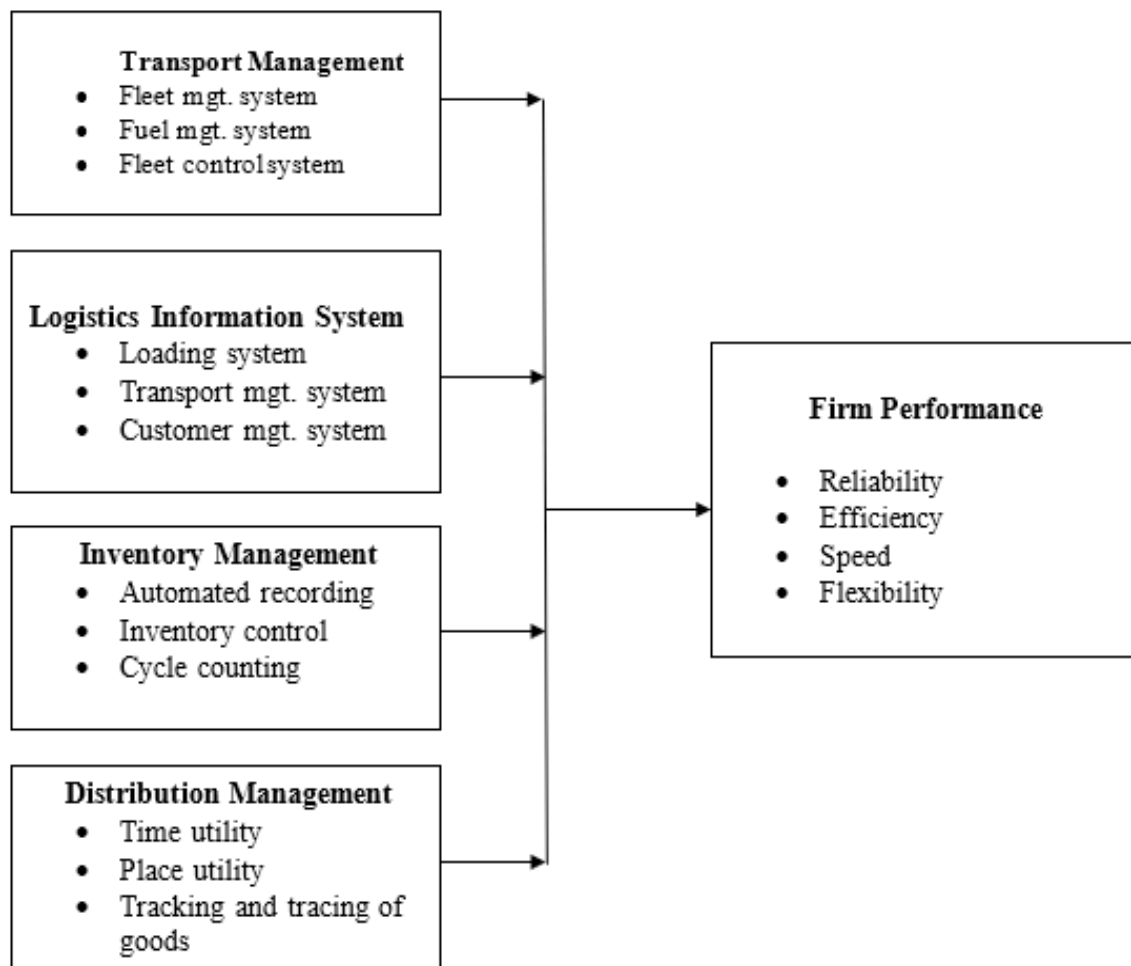


Fig 1. Conceptual framework.

Source: Researcher, 2017

Data analysis. Data were cleaned up before analysis to eliminate any discrepancies, and thereafter the data were coded and keyed into the computer. The data were sorted, tabulated and summarized using descriptive statistics such as means, standard deviations, factor analysis and regression analysis. Factor analysis reduced the independent variables to a manageable set and correlation analysis indicated the direction and relationship for each variable whereas regression analysis was used to determine the relationship between logistics and transportation practices on the operational performance of KCC. The multiple regression model was in the form of:-

$$Y = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon$$

Whereby Y = Supply chain performance

a = Constant

X_1 = Transport Management Practices

X_2 = Logistics Information Systems

X_3 = Inventory Control Practices

X_4 = Distribution Practices

ϵ = error term

Results and discussions

A total of 54 questionnaires were distributed, 42 were received back whereas 12 were not responded to. Therefore, the response rate was 78% whereas the non-response was 22%. This response rate of 78% is considered very good for determination of the phenomena that exists, (Mugenda and Mugenda, 2008), and a response rate of 75% is recommended for generalization.

Of the respondents, 55% were male and 45% female, showing that there was a good balance and representation of both gender. Of the respondents, 48% of the respondents were from procurement department, 33% from finance department and 19% from distribution department. Majority of the respondents, (57%) had a first degree, 29% had a postgraduate degree whereas 14% had a diploma. Further 43% of the respondents had worked in KCC for 1-3 years, 33% for 4-6 years, 21% for more than 6 years and only 2% for less than 1 year.

Transport and logistics practices. The study sought to determine the extent of implementation of the transport and logistics at KCC. Specifically, the study investigated four main practices namely: transportation, logistics information system, inventory control and distribution.

The study found out that transport management practices were implemented to a large extent, distribution management was implemented to above average extent and inventory control was implemented to a moderate extent while logistics information practices were implemented to a low extent (Table 1)

Table 1. Logistics and Transportation Practices

Inventory	Mean	Std. Deviation
Transport Management Practices	4.01	0.9969
Distribution Management Practices	4.05	0.9301
Inventory Management Practices	3.21	0.5746
Logistics Information System	2.88	0.6661

Table 2. Transport Management Practices

	Mean	Std. Deviation
Departmental Organization	4.55	1.4632
Proper Supplier coordination practices	4.52	1.3269
Customer Oriented Transportation schemes	4.17	1.0492
Vehicle maintenance policy	3.93	0.7503
Fuel Management Practices	3.43	0.6423
Automated Transportation system	3.52	0.7496
Average	4.01	0.9969

The findings also showed that departmental organization, proper supplier coordination practices and customer oriented transportation schemes were implemented to a very large extent as they had high means (Table 2). Vehicle maintenance policy was implemented to a large extent with a mean of 3.93 while automated transportation system was implemented least with a mean of 3.52.

The findings indicate that though the transport management had enhanced the coordination with the suppliers, automation was yet to be embraced and fully implemented in most of the KCC branches. This ought to be improved as automation results in reduction in the transportation costs that needs to be achieved, so as to reduce cost, enhance timely delivery and increase transportation velocity while making optimum use of the firm's resources. Transportation targets to properly manage and organize all the activities in a cost proficient manner (Byrne and Markham, 1991).

Table 3. Distribution Practices

	Mean	Std. Deviation
Proper tracking and tracing of goods	4.31	1.1713
Real time delivery of goods and services	4.24	1.0638
Scheduling pickups at regional distribution centers	3.76	0.8221
There is place utility	3.62	0.5799
Time utility enhancement	3.60	0.5708
Scheduling drop-offs at regional distribution centers	3.31	0.7230
Avoidance of product rejection return	3.38	0.5240
Average	4.01	0.9969

Source: Research data, 2017

Distribution Practices Proper tracking and tracing of goods and real time delivery of goods were well adopted in KCC to a very large extent with a mean of 4.31 and 4.24, respectively. Indeed, organizations should have well aligned distribution management schemes to ensure smooth flow of operations and commodities (Abidi *et al.*, 2014; Kiraga, 2014). Through this, the speed and efficiency of goods and raw materials delivery will be significantly enhanced.

Table 4. Inventory Control Practices

	Mean	Std. Deviation
Regular Inventory check	4.14	1.0603
Improved inventory control	4.05	0.9301
Automated recording	3.21	0.5746
Improved cycle counting	2.88	0.4385
Average	3.57	0.7508

Source: Research data, 2017

Inventory control practices. Results in Table 4 show that there were four main inventory management practices in place at KCC. These include regular inventory check with a mean of 4.14 and improved inventory control with a mean of 4.05. However, automated recording and improved cycle counting had low means of 3.21 and 2.88, respectively. This could be because of low use of technology in KCC.

Logistics Information System. The findings show that information sharing with the supplier was the most implemented practice with a mean of 4.40. However organization training employee on use of information systems and organization using SCM IS had low means of 2.83 and 2.21 respectively. This implies that the use of supply chain management software and information system was still a fairly new concept in KCC.

Table 5. Logistics Information System

	Mean	Std. Deviation
Information sharing with the supplier	4.40	1.2333
Better quality of information	3.74	0.6740
Organization uses information to aid business decision making	3.64	0.6767
Organisation provides training for employees to utilize information system effectively	3.62	0.6093
Organisation invest resources heavily on the infrastructure of an information system	3.48	0.8295
Better quantity of information	3.21	0.4492
Organization trains employees on information system future maintenance support	2.83	0.4053
Use of SCM applications software	2.21	0.4523
Average	3.39	0.6661

Source: Research data, 2017

Operation performance. The results of the operational performance is shown in Table 6. Overall, these appeared to be high operational efficiency, increased sales, offering good services and overall reduction in costs incurred. The performance was also good in terms of handling customer complaints. However, flexibility in operation ranked lowest with a means of 2.481 (Table 6).

Table 6. Operational Performance

Performance	Mean	Std. Deviation
Better operational efficiency	4.45	1.2121
There is increased sales	4.14	1.1293
Services offered are good	4.12	0.8764
There has been an overall reduction in costs incurred	4.05	1.1942
Improvement of rapid handling of customer complaints	3.67	0.8001
Improvement of customer orders	3.40	0.6102
Customers' requirements are met in terms of quality	3.38	0.5884
Flexibility in operation	2.48	0.3724
Average	3.71	0.8478

Source: Research data 2017

Challenges

There were a number of challenges that were experienced at KCC in the implementation of transportation and logistics practices. This included lack of adequate funds, increased number of intermediaries in the supply chain, increased implementation cost reluctance in venturing in the implementation process, and low acceptance levels (Table 7). Surprisingly, employees lack of adequate training to coordinate new logistics practices was the least experienced challenge with a mean of 3.45. This suggests that employees were well trained to do their work.

Table 7. Challenges experienced in Transport and Logistic implementation

Performance	Mean	Std. Deviation
There is an increase in the number and types of intermediaries in the milk supply chain	4.48	1.2053
There is lack of adequate funds to advance from the manual transport and logistics operations	4.40	1.2583
Increased cost in implementation process	4.26	1.0855
The managements are reluctant in venturing into new logistics and transportation practice	4.21	1.0605
There is low acceptance levels for the logistics and transportation practices by the employees	4.17	0.9775
The employees lack of adequate training to coordinate new logistics practices	3.45	0.7308

Relationship between transportation and logistics and performance. The relationship was tested using correlation analysis and regression analysis to establish the relationship that exists between the study variables. The results of the correlation analysis showed that transport management has a positive and significant influence on performance of KCC ($r(41) = 0.333$, $P = 0.0024$) meaning improved transportation management would improve performance. This is consistent with the report by Wathe (2016) that organizations with well-developed transport management practices had better performance compared to the others. The study also established that logistic information system, inventory management and distribution management had a positive relationship with performance with $r(41) = 0.462$, $p=0.231$; $r(41) = 0.658$, $p = 0.00$ and $r(41) = 0.242$, $p = 0.0011$, respectively.

Regression analysis. Regression analysis was done to establish the relationship that existed between the research variables, with transport and logistics dimensions being the independent variables and operational performance the dependent variable. The coefficient of determination R square was 0.698 and R was 0.763. This indicated that 68.9% of the variation in performance was explained by the logistics and transportation factors, thus only 31.1% of the variation was accounted by other factors not present in the model.

The study further conducted an Analysis of Variance to check the significance of the model. The results indicated that the model was significant at 95% level of confidence with p value of 0.000, thus the model was highly significant in explaining the relationship that existed between the study variables.

Conclusion

The study found out that transport management practices were implemented to a large extent, logistics information practices to a low extent, inventory control to a moderate extent and distribution management to above average extent. The study therefore concluded that there are variations in implementation of the practices. To improve performance, there is need to adress the challenges in

this study for implementation to be successful. Finally, the study concludes that there is a positive relationship between transport and logistics on operational performance at KCC.

The study was limited to four practices namely transport management, logistics information system, inventory management and distribution management which was found to account for 68% of operational performance. Future research should consider other practices that might account for operational performance.

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References

- Abidi, H., de Leeuw, S. and Klumpp, M. 2014. Humanitarian supply chain performance management: a systematic literature review. *Supply Chain Management* 19 (5/6): 592-608.
- Ballou, R.H. 1987. Basic Business Logistics: Transportation, Materials Management, Physical Distribution. 2nd Edition. Prentice-Hall, Inc: New Jersey.
- Fawcett, S. E. and Magnan, G. M. 2001. Achieving world-class supply chain alignment: benefits, barriers, and bridges. Tempe, AZ: Center for Advanced Purchasing Studies.
- Gunasekaran, A., Patel, C. and Tirtiroglu, E. 2001. Performance measures and metrics in a supply chain environment. *International Journal of Operations & Production Management* 21 (1/2): 71-87.
- Green Jr, K. W., Whitten, D. and Inman, R. A. 2008. The impact of logistics performance on organizational performance in a supply chain context. *Supply Chain Management* 13 (4): 317-327.
- Harrison, A. and Van Hoek, R. I. 2008. Logistics management and strategy: competing through the supply chain. Pearson Education.
- Lai, F., Li, D., Wang, Q. and Zhao, X. 2008. 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.
- Nyaberi, J. N. and Mwangangi, P. 2014. Effects of logistics management practices on organization performance in Kenya: A case of Rift Valley Bottlers Limited in Uasingishu County. *International Journal of Social Sciences and Entrepreneurship* 1 (12): 458-473.
- Petrovic-Lazarevic, S., Sohal, A. and Baihaqi, I. 2007. Supply chain management practices and supply chain performance in the Australian manufacturing industry. Monash University Faculty of Business and Economics.
- Shankar, V. 2001. Integrating demand and supply chain management. *Supply Chain Management Review* 5 (5): 76-81.
- Shepherd, C. and Gunter, H. 2010. Measuring supply chain performance: current research and future directions. pp. 105-121. In: Behavioral Operations in Planning and Scheduling. Springer, Berlin, Heidelberg.
- Stock, J.R. and Lambert.D.M. 2010. Strategic Logistics Management. 4th Edition. McGraw Hill.