

Journal of Procurement & Supply Chain



Effect of Material Handling Practices on Supply Chain Efficiency of Flour Processing Firms in Eldoret

Naomi Jebet Rono & Dr. Enock Gideon Musau, PhD.

ISSN: 2617 - 3581

Effect of Material Handling Practices on Supply Chain Efficiency of Flour Processing Firms in Eldoret

¹Naomi Jebet Rono

School of Entrepreneurship, Procurement and Management, Jomo Kenyatta University of Agriculture and Technology, Kenya

Email: naojebe@yahoo.com

²Dr. Enock Gideon Musau, PhD.

Lecturer, School of Business and Economics, Department of Management Science, Kisii University, Kenya

Email: enockmusau@kisiiversity.ac.ke

How to cite this article: Rono N. J. & Musau E., G (2020): Effect of Material Handling Practices on Supply Chain Efficiency of Flour Processing Firms in Eldoret. *Journal of Procurement & Supply Chain*, Vol 4(1) pp. 69-80.

Abstract

The storage of goods and distributions from the same warehouses are done haphazardly that is without any order, theft cases have been on the rise giving a compromise on the general ethics of workers. The purpose of the study was to find out the effect of material handling practices on supply chain efficiency of flour processing firms in Eldoret. The study was guided by the following theories; Queuing theory, Agency cost theory, Reinforcement theory and Lean theory. The study adopted a descriptive survey design. The study was based on flour processing firms in Eldoret town, in Uasin Gishu County. The target population of this study comprised of the branch managers, store clerks, procurement staff, finance staff and logistics staff of the flour processing firms in Eldoret. The overall accessible population for the study was 77 employees from the selected flour processing firms in Eldoret. The study collected quantitative data and therefore quantitative analysis was adopted to achieve the objectives of the study. The data collection instrument was the questionnaire. The study conducted pilot study at Kitale millers processing firm in Kitale. The study found reliability of the instrument of 0.802 which was reliable for the study. The study found out that materials handling practices ($\beta_1 = 0.319, p < 0.05$), have positive and statically significant effect on supply chain efficiency of flour processing firms in Eldoret town Kenya. The study found a positive influence of material handling practices on supply chain efficiency of flour processing firms in Eldoret, Kenya. Material handling is an indispensable element in most production and distribution systems and has adverse effects on performance of organizations. Mechanical devices and machines are necessary for many material handling

operations. The study recommends for the enhancement stock control and the workforce needs external guidance with regard to stock control

Key Words: *Material Handling Practices, Supply Chain Efficiency & Flour Processing Firms*

1.0 Introduction

Supply chain continues to be adopted by organizations as the medium for creating and sustaining a competitive advantage and points out that such a displacement is understandable considering the potential benefits of successful supply chain management (Hussain, 2011). These benefits attributed to supply chain management include inventory reduction, improved delivery service, and shorter product development cycles (Giunipero, Hooker & Densloe, 2012). Supply chain management aims at improving value delivery to customers; relying on just-in-time system; eliminating waste; getting the involvement of all stakeholders in the value creation process as well as working closely with suppliers. SCM is one of the most effective ways for firms to improve their performance (Ou *et al.*, 2010).

The objectives of supply chain management include focusing in satisfying end customers, to formulate and implement strategies based on capturing and retaining end-customer business and also to manage the whole chain effectively and efficiently. SCM is one of the most effective ways for firms to improve their performance (Ou *et al.*, 2010). With the purpose of managing the supply chain actions for realizing improvement in enterprise performance, it is necessary to improve the planning and management of activities such as materials planning, inventory management, capacity planning, and logistics (Gimenez & Tachizawa, 2012)) with suppliers and clients. With the purpose of managing the supply chain actions for realizing improvement in enterprise performance,

Material handling is an indispensable element in most production and distribution systems and has adverse effects on performance of organisations. Mechanical devices and machines are necessary for many material handling operations (Sahari, Tinggi & Kadri, 2012). Mechanical alternatives to manual handling of materials should also be used whenever possible to minimize lifting and bending requirements. A combination of labour and handling equipment is utilized in mechanical handling systems to facilitate receiving, processing and shipping (Pong & Mitchell, 2012). Generally, labour constitutes a high percentage of overall costs in mechanized handling. Fully automated handling systems ensure that they are delivered to the production line when required without significant manual intervention.

The integration of IT in SCM and in particular inventory management holds great potential to unlocking the efficacy of inventory management in today's supply chains by improving information sharing, increasing predictability, reducing waste in value chains, better monitor demand for certain products and place orders to prevent an out-of-stock situation, hence reducing bullwhip effects and lead time (Mwebi, 2013). Information Technology (IT) continues to be one of the most important enablers of effective supply chain management and improves supply chain agility, reduces cycle time, achieves higher efficiency and deliver products to customers in a timely manner (Otiso, Chelangat, & Bonuke, 2012). A great deal of interest in supply chain management stems from the availability of information and the methods to analyze this information to reach meaningful results.

The swift development of IT, as well as the declining prices for its use, has considerably enhanced its diffusion during the last few years. As a consequence, the impact of IT on productivity has

become a broadly discussed topic in management sciences, and several studies find empirical evidence for the positive productivity effects of IT at the firm level (Chang, Tsai & Hsu, 2013). Nevertheless, IT adoption may increase organizational flexibility and competitiveness and the increasing importance of electronic business brings to fore new opportunities and the widespread use of internet makes IT tools a source of competitive power for many companies (Cousins & Lamming, 2012). Further, IT has been adopted in inventory management processes by firms as a competitive edge and to build strategic long-term relationships along the supply chain.

Training and development basically deal with the acquisition of understanding, know-how, techniques and practices. In fact, training and development is one of the imperatives of human resource management as it can improve performance at individual, collegial and organizational levels (Hau & Omar, 2015). As the process of ‘increasing one’s capacity to take action, organizations are now increasingly becoming particular with organizational learning and therefore collective development. Organizational learning, on the other hand, refers to the “efficient procedure to process, interpret and respond to both internal and external information of a predominantly explicit nature (Imna & Hassan, 2015). Training & development increase the employee performance like the researcher said in his research that training & development is an important activity to increase the performance of health sector organization.

Training and development are planned learning experiences which teach employees how to perform current and future jobs more effectively. Kanwa (2015) emphasizes that training focuses on present jobs while development prepares employees for possible future jobs. Basically, the objective of training and development is to contribute to the organization's overall goal. The emergence of the concept of organizational learning is central on the hitherto idea that prior advocacies of learning are tended to its commercial significance and are lacking of empirical information on learning processes. Employee performance depends on many factors like job satisfaction, knowledge and management but there is relationship between training and performance (Imna & Hassan, 2015). This shows that employee performance is important for the performance of the organization and the and the training & and development is beneficial for the employee to improve

Inventory management, strikes an equilibrium in the midst of deficit stock and surplus stock. Inventory is made up of huge numbers of quick/liquid assets especially in firms dealing in retail trading and processing. With the view to sustain this stock levels of such enormity, large financial resources are invested to the firms (Edwin & Florence, 2015). Inventory management performance is a huge determinant for the prosperity or downfall of a business. For a huge reduction of investment in working capital and exceptional operational performance, the organized management and orderly control of inventories assist in it all. Thus, according to Gupta & Gupta, (2012) the overall calculated business objective should be inventory management since it has a remarkable capacity on profitability.

Well established inventory management levels outcomes by intensifying competitive ability and market share of firms. Companies can experience high-ranking competition and high-level of financial performance from correctly controlled inventories (Elsayed, 2015). This also ensures the development of a firm and prosperity as the product quality is intertwined to the product volume sold and overall firm’s profit (Eroglu & Hofer, 2011). Nonetheless, to determine inventory costs and to control purchase in most instances may not be able to curb purchasing costs in a similar manner to the industry which is competitive. Inventory management provides great potential for firms to reduce costs and improve customer service performance (Elsayed, 2015).

2.0 Literature Review

2.1 Effect of Material Handling Practices on Supply Chain Efficiency of Flour Processing Firms in Eldoret

Kathurima, Ombul and Iravo, (2016) did a study on the effects of materials handling systems on performance of cement manufacturing firms in Machakos County. The aim of this research was to establish the effects of materials handling systems in order to achieve better performance and generate available efficiency and cost reduction benefits. A descriptive correlational research design was incorporated in the study where a respondent was drawn from selected departments. The target population was 60 employees. The study found out that there was a positive and significant effect of automating material handling systems on performance in that 32.8 percent of the performance of cement manufacturing firms in Machakos County can be explained by automating material handling systems ($R^2 = 0.328$). The study has relied on smaller sample size hence, similar study can be conducted using larger sample size.

Mwebia and Mutua (2016) established the analysis of storage and material handling on the profitability of mastermind Tobacco Company in Migori County, Kenya. This research study contributes to new knowledge to the staffs of Mastermind Tobacco Company on how to store and handle materials effectively. It entailed system theory and inventory control theory in literature review. A sample size of 21 respondents was used. The data was collected using both primary and secondary methods. Collected data was analysed using simple statistical methods such as percentage and frequencies. The study also found that as concerns transparency in the procurement process, 96% of respondents agreed that tenders are openly advertised. The study only targeted staffs that are directly linked to stores of the company and did not provide the participation of the community being served.

Kisioya and Moronge (2019) examined the influence of material handling practices on performance of large scale processing firms in Nairobi County, Kenya. The study adopted descriptive survey design and the target population was 355 large -scale-manufacturing firms in Nairobi county Kenya. Stratified random sampling was adopted to select a sample size of 188 large-scale manufacturing firms in Nairobi County, Kenya. Primary data was collected using structured questionnaires inform of Likert scale. The analysed data was presented inform of tables. It was established that most of the material handling practices indicators have positive impact on performance of the firm. The study found that material packaging elements have an impact in overall performance of the manufacturing firms calling for the need to research on more variables of material handling.

Milan and Vieira (2011) investigated the materials handling management: A case study in Indian Manufacturing sector. The study adopted the descriptive design. The population under consideration which was the unit of analysis comprises of Mumias Sugar Company. The respondents for this study were drawn from the employee listings which were obtained from Mumias Sugar Company. Stratified random sampling was used to select 79 respondents in the Company. The sample of 79 was equivalent to 10% of the target population which is regarded as statistically significant. The Statistical package for social sciences (SPSS) was used to generate the required frequencies and percentages to answer the research questions. The study concluded that materials procurement and inventory control positively influenced the performance of sugar

manufacturing industries in Kenya. The study relied on one Sugar Company; hence similar study can be done on other company so as to widen the sample size.

2.2 Queuing Theory

This theory guide the study in investigating the relationship between material handling equipment and effective inventory management. Queuing theory is a mathematical study of waiting lines or queues (Shingo, 2005). The theory enables mathematical analysis of several related processes, including arriving at the back of the queue, waiting in queue (a storage process) and being served in front of the queue. The theory permits the derivation and calculation of several performance measures including the average waiting time in the queue or the system, the expected number waiting or receiving service, and the probability of encountering the system in certain states such as empty, full having an available server or having to wait a certain time to be served. However, it is important, and more challenging, to integrate the existing capabilities (bundled resources) across the supply chain, and leverage them effectively, in order to create a competitive advantage. In so doing, firms can realize greater cost reductions or profit improvements with the help of their supply chain partners.

One limitation of the queuing theory is based on the inability to compile an empirical study to measure performance. Due to the heterogeneity of the companies, it is hard to impossible to compile a homogeneous sample. Furthermore, the queuing theory does not consider the demand side of the market. The capabilities provided by each partner along the supply chain can be integrated such that the supply chain contributes to the focal firm achieving more efficient and effective outcomes. This ambiguity makes the collective capabilities and leveraging strategy difficult to imitate and produces greater value for the customer

2.3 Conceptual Framework

The conceptual framework of this study was derived as per the views of different authors. According to Encyclopedia Britannica (2010), a conceptual framework refers to a group of concepts that are broadly defined and systematically organized to provide a focus, rationale, and a tool for the integration and interpretation of information, usually expressed abstractly through word models. In this study, the conceptual framework involves the relationship between independent variable and dependent variable.

Independent Variables

Dependent Variable

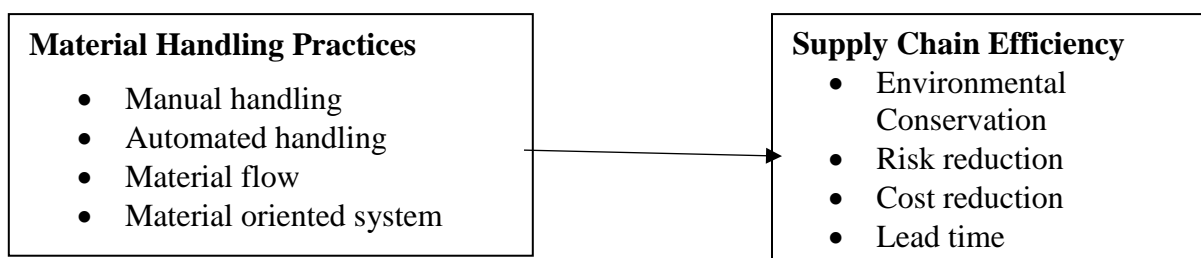


Figure 1: Conceptual Framework

3.0 Research Methodology

3.1 Research Design

The study employed a design research which helped to obtain the role of warehouse management on supply chain efficiency in flour manufacturing firms in Eldoret in Kenya. The study adopted a descriptive survey design because it involved examining and collecting of evidence from a small number of people selected from the population and reporting the findings just the way the case study research design was chosen because was easier to collect accurate, objective information from selected area (Moses, 2008).

3.2 Target Population

A population is a sum of all the organisms of the same group who live in the same area while the target population is the specific population about which information is desired (Debois, 2016). The study target population was based on flour processing firms in Eldoret town, in Uasin Gishu County. The accessible population was derived from branch managers, stores clerks, procurement staff, finance staff and logistics staff of flour processing firms in Eldoret. The overall accessible population for the study was 77 employees from the selected flour processing firms in Eldoret.

Table 1: Accessible Population

Employees	Accessible Population
Branch Managers	5
Stores clerks	20
Procurement staff	29
Finance staff	8
Logistics staff	15
Total	77

3.4 Sampling Frame

The sampling frame refers to the groups or individuals which is drawn from the larger population (Mugenda & Mugenda, 2016). The sample frame refers to the list of all population of the individuals or groups. The sample frame for the study comprised of all the flour processing firms in Eldoret, Kenya.

3.5 Sample Size and Sampling Technique

In this study, census was used to select the sample which was investigated in the study. The study issued the questionnaires to all the accessible 77 employees. The method was convenient because the accessible population is less than 200. According to Sekaran (2011) census has the least bias and offered the most generalization and hence for the study to be more representative, it is important that the right method was chosen. A sample size of employees of flour processing firms in Eldoret were selected from different departments.

3.6 Data Collection Instrument

The data collection instrument used was open and closed ended questionnaire which was carefully designed to cover relevant headings or themes of the study. A questionnaire is a research instrument whose purpose is to communicate to the researcher what is required and draw out desired response in terms of empirical data from respondents in order to achieve the desired objective (Debois, 2016). The study adopted self-administered questionnaires. Primary data was collected using questionnaires. A five-point Likert scale questionnaire was used. The Likert measures the level of agreement or disagreement where the scale ranks are follows: Strongly Disagree =1; Disagree =2; Neutral =3; Agree =4; Strongly Agree =5. The instrument helped the researcher to evaluate the influence of warehouse management practices for supply chain efficiency of large flour processing firms in Eldoret Kenya.

3.7 Pre-Test of Research Instruments

Pre-testing is the main chance for researchers to gauge the meaning attributed to survey questions before it is too late. Pilot study was carried out to test validity and reliability of research questionnaires. 10% of the sample population was used to determine the number of respondents to be used in piloting hence 7 respondents were used in the pilot study. The piloting of the tools was conducted at Kitale Millers flour processing firms in Tranzoia County.

3.7.1 Validity of the Instrument

Validity is the degree to which an instrument measures what it is supposed to measure. Validity explains how well the collected data covers the actual area of investigation. Validity is not a property of the tool itself, but rather of the interpretation or specific purpose of the assessment tool with particular settings and learners. The study used content and face validity. Content validity of the instrument was ascertained through peer review and scrutiny by research experts, comprising of my supervisor, to ensure that the content in the questionnaire was appropriate and relevant to the study. This facilitated the necessary revision and modification thereby enhancing legitimacy.

3.7.2 Reliability of the Instrument

The study used Cronbach coefficient alpha to measure the internal consistency reliability of the instruments used in the study. Therefore, the research used this technique since it had many variables. The findings are presented in Table 2.

Table 2: Reliability Statistics

	Variables	Cronbach's Alpha	N of Items
i.	Material handling system	.883	4
ii.	Integrated information system	.764	4
iii.	Warehouse staff development	.818	4
iv.	Inventory management practices	.760	4
v.	Supply chain efficiency	.786	4
	Average	0.8022	

The findings from the Table 2 shows that the data applied in the study were reliable evidenced by Cronbach coefficient alpha being above 0.7 for all the items. The acceptable range of is 0.70 and above. The average alpha is 0.8022 which is above 0.7, hence all the items tested in the questionnaire were reliable.

3.8 Data Collection Procedure

The researcher visited the processing firms in Eldoret Kenya during the data collection process and make arrangements for information gathering. The study issued the questionnaires and gather them. The respondents were enlightened on the intention of the research and given a data sheet, which was on the first page of the data collection tool.

3.9 Data Processing and Analysis

Analysis of data was done with the help of SPSS (Version 24.0). Regression model was used to establish the significance difference between role of represents material handling for supply chain efficiency of large flour processing firms. Inferential statistics was done through regression model.

$$Y = \beta_0 + \beta_1 X_1 + \epsilon \dots \dots \dots \text{Equation 1}$$

Y Represents the dependent variable (supply chain efficiency)

β_0 represents the constant of equation

β_1 , the coefficients of independent variables

X_1 Represents Material handling

ϵ - error term

4.0 Research Findings and Discussions

4.1 Materials Handling Practices and Supply Chain Efficiency

The researcher sought the respondents' perception in regard to the material handling practices. The means and standard deviations values were established to enable the researcher make inferences concerning the study variable. The findings from the analysis were as presented in Table 3.

Table 3: Descriptive Statistics for Material Handling Practices

Statements		SA	A	N	D	SD	Min	Max	M	St.d
1.Manual handling leads to distribution systems	F	32	30	4	2	2	1	5	4.25	0.91
	%	45.7	42.9	5.7	2.9	2.9				
2.Automated handling reduces or 3.Eliminates the need for humans	F	37	27	1	2	3	1	5	4.33	0.97
	%	52.9	38.6	1.4	2.9	4.3				
Material flow enhances the description of the transportation	F	5	59	2	2	2	1	5	3.90	0.68
	%	7.1	84.3	2.9	2.9	2.9				
4.Material oriented system enhances distribution network	F	28	37	1	1	3	1	5	4.22	0.90
	%	40.0	52.9	1.4	1.4	4.3				

Valid N=70

From the findings presented in Table 3, majority of the respondents agree that Manual handling leads to distribution systems which improves overall supply chain (M=4.25 SD=0.91), Also majority of the respondents agree that the automated handling reduces or eliminates the need for humans to check-in along the organizational supply chain (M=4.43 SD=0.97), furthermore, majority of the respondents agreed that Material flow enhances the description of the transportation within the supply chain (M=3.90 SD=0.68), On whether the Material oriented system enhances distribution network, majority of the respondents were in agreement that Material oriented system enhances distribution network (M=4.22, SD=0.90). The findings agree with the findings of Kathurima, Ombul and Iravo, (2016) who found out that there was a positive and significant effect of automating material handling systems on performance in that 32.8 percent of the performance of manufacturing firms in Machakos County can be explained by automating material handling systems.

Table 4: Hypotheses Summary Table

Hypotheses	β and P values	Decision
H₀₁: Material handling practices has no significant effect on supply chain efficiency of large flour processing firms in Eldoret Kenya.	$\beta_1=0.319$, $p=0.039 < 0.05$	Rejected the null hypothesis

5.1 Summary

The first study objective sought to establish the influence of material handling practices on supply chain efficiency of flour processing firms in Eldoret, Kenya. The study found out that the respondents agreed on all of the four aspects of material handling practices. They agreed that manual handling leads to distribution systems which improves overall supply chain, automated handling reduces or eliminates the need for humans to check-in along the organizational supply chain, material flow enhances the description of the transportation within the supply chain and Material oriented system enhances distribution network. The study findings also showed that material handling practices was statistically significant and have a positive influence on the supply chain efficiency of flour processing firms. The study rejected the null hypothesis that there is no statistically significant influence of material handling practices on supply chain efficiency of flour processing firms in Eldoret, Kenya. The study findings also revealed that that material handling practices greatly influences the supply chain efficiency.

6.1 Conclusion

The study aimed at determining the influence of material handling systems on supply chain efficiency of large flour processing firms in Eldoret Kenya. The study found a positive influence of material handling practices on supply chain efficiency of flour processing firms in Eldoret, Kenya. Material handling is an indispensable element in most production and distribution systems and has adverse effects on performance of organizations. Mechanical devices and machines are necessary for many material handling operations. Mechanical alternatives to manual handling of

materials should also be used whenever possible to minimize lifting and bending requirements. Fully automated handling systems ensure that there is delivery to the production line when required without significant manual intervention

5.3 Recommendation

The study recommends for the enhancement stock control and the workforce needs external guidance with regard to stock control. There is need for more time to be taken in the processes within the warehouse. The organization should have adequate inventory control measures in place. The impact of stock control training as enhanced by the organization should be well established in compliance with the rules and regulations. The study recommends for the proper

Distribution planning enhancing organizational productivity in the state corporations. The organization should have internal assessment when planning. The distribution planning should ensure timely delivery. Since this study explored the warehousing management practices and supply chain efficiency of flour processing firms in Eldoret Kenya it recommends that; such like studies should be executed in different sectors of the Kenyan economy for comparability purposes and to permit for rationalizations of results on the warehousing management in Kenya. The study vouch for that an in-depth study should be accrued out on constituents motivating adoption of warehousing management practices in flour processing firms in Kenya.

References

- Chang, H., Tsai, Y. & Hsu, C. (2013). E-Procurement and Supply Chain Performance. *Supply Chain Management: An International Journal*, 18
- Cousins, & Lamming. (2012). *Strategic Supply Management: Principles, Theories and Practice*. Prentice Hall Financial
- Edwin S., Florence M. (2015). The Effect of Inventory Management on Profitability of Cement Manufacturing Companies in Kenya: A Case Study of Listed Cement Manufacturing Companies in Kenya. *International Journal of Management and Commerce Innovations*, 5(13), 63-72.
- Elsayed, (2015). Exploring the relationship between efficiency of inventory management and firm performance: An empirical research. *International Journal of Services and Operations Management*, 21(11), 73–86.
- Eroglu, C., & Hofer, C. (2011). Lean, leaner, too lean? The Inventory Performance Link Revisited. *Journal of Operations Management*, 14(29), 356–369
- Gimenez, C. & Tachizawa, EM. (2012) Extending Sustainability to Suppliers: A Systematic Literature Review. *Supply Chain Management International Journal*, 17(24), 531–543.
- Giunipero, L.C., Hooker, R.E. & Densloe, D. (2012). Purchasing and Supply Management Sustainability: Drivers and barriers. *Journal of Purchasing and Supply Management*, 18(4), 258-269
- Gupta, S. & Gupta, S. (2012). Effective Inventory Visibility- Its Impact on Profitability. *International Indexed & Referred Research Journal*, 4 (39), 59-60
- Hau, T. and Omar, K., (2015). The Impact of Training on Organization Performance: A Study of Hotel Sector in Terengganu, Malaysia. *Journal of Management*, 3(11), 87-94.
- Hussain, M. (2011). Modelling the Enablers and Alternatives for Sustainable Supply Chain Management. *Business and Economics Journal*, 8(5), 53-30.
- Imna, M. & Hassan, Z. (2015). Influence of Human Resource Management practices on Employee Retention in Maldives Retail Industry. *International Journal of Accounting, Business and Management*, 1(1), 1-12.
- Kanwal, S. (2015). Impact of Employees' Training on Organizational Development: A Case of Pakistan. *The International Journal of Business & Management*, 3(11), 102-115.
- Kathurima, R. I., Ombul, K. & Iravo, M. A. (2016). Effects of Materials Handling Systems on Performance of Cement Manufacturing Firms in Machakos County. *International Academic Journal of Procurement and Supply Chain Management*, 2(1), 21-36
- Kisioya, D. K., & Moronge, M. (2019). Influence of Material Handling Practices on Performance of Large Scale Manufacturing Firms in Nairobi County, Kenya. *The Strategic Journal of Business & Change Management*, 6(4), 745 – 760
- Milan, S. G. & Vieira, B. G. (2011) Materials Handling Management: A Case Study. *Journal of Operations and Supply Chain Management* 4 (2), 19 – 30.

- Mugenda, O. M. & Mugenda, A. G. (2016). *Research Methods*. Quantitative and Qualitative Approaches.
- Mwebi, J. O. (2013). Information and Communications Technology and Operational Efficiency in Supermarkets in Nairobi. *Journal of Business Management*, 23(14), 67-78.
- Otiso, K. N., Chelangat, D., & Bonuke, R. (2012). Improving the Quality of Customer Service through ICT Use in the Kenya Power and Lighting Company. *Journal of Emerging Trends in Economics and Management Sciences*, 3(5), 461-466.
- Pong, R. & Mitchell, M. (2012). Inventory Investment & Control: How have UK Companies been Doing? *British Accounting Review*, 173–188
- Sahari, S., Tinggi, M. & Kadri, N. (2012). Inventory Management in Malaysian Construction Firms: Impact on Performance. *Journal of Management*, 4(2), 9-19.