International Journal of Advanced Research in Accounting, Economics and Business Perspectives | IJARAEBP
Volume 2, Number 1 September, 2018

ISSN
Hard Print: 2636-6894
Online: 2636-6886

Impact of Inventory Management Practices on Organizational Performance: A Study of College of Education Akwanga

[1]Agum Charles, [2]Awogbemi Petson Olanrewaju & [3]Taimako Sunday Anyuabaga

[1&3]Department of Economics,
Faculty of Social Science, Nasarawa State University, Keffi
[2]Computer Security/Forensic Unit,
Independent Corrupt Practices Commission (ICPC), Garki, Abuja

Abstract

The objective of this study was to examine the impact of inventory management on organizational performance, using college of education Akwanga as a study. Ordinary Least Square (OLS) regression method was adopted for carrying out the empirical analysis. The main instrument used for the data collection is the questionnaire which was administered to various staff of College of Education Akwanga who engaged in inventory management practices. Using smith (1984) sample formular, a sample size of 106 was arrived at from a population of 517. Findings from the study revealed that inventory planning has a significant impact on operational efficiency. In addition, the empirical analysis showed that inventory valuation has a significant impact on timely delivery It showed that there is a highly positive correlation between good inventory management and organizational profitability. Lastly, findings from the study revealed that there is a significant relationship between inventory control and cost reduction. Management should not only undertake Inventory planning in order to improve operation and sustain the performance of the institution and its competitiveness and financial performance. Management should put into consideration the degree of control and evaluation of inventory invested in so that these assets can provide liquidity to the institution with ease. Improving inventory practices calls for a high degree of collaboration and visibility across all parties as well as utilizing sophisticated technologies.

Keywords: *Inventory control, Inventory planning, Inventory valuation, Operational efficiency*

Corresponding Author: Agum Charles

http://internationalpolicybrief.org/journals/international-directorate-for-policy-research-idpr-india/intl-jrnl-of-advanced-research-in-accounting-economics-and-business-perspectives-vol-2-no-1-sept-2018

Background to the Study

Inventory management is pivotal in effective and efficient organization. It is also vital in the control of materials and goods that have to be held (or stored) for later use in the case of production or later exchange activities in the case of services. The principal goal of inventory management involves having to balance the conflicting economics of not wanting to hold too much stock. Inventory problems of too great or too small quantities on hand can cause business failures. If a manufacturer experiences stock-out of a critical inventory item, production halts could result.

Therefore, organizations are exploring ways toward postponement strategy in response to constantly changing demands (Yang et al.2004). Graman and Magazine (2006) argued that today, the cost of holding inventory, extensive product proliferation and the risk of obsolescence, especially in rapidly changing markets, make the expense of holding large inventories of finished goods excessive and that high demand items naturally have safety stock assigned to them, but in many organizations there are so many very-low-demand items that keeping any stock of these items is unreasonably expensive, so they argue that companies must now provide good service while maintaining minimal inventories.

Inventory management approaches are thus essential aspects of any organization. Inventory is the raw materials, work-in-process goods and completely finished goods that are considered to be the portion of a business's assets that are ready or will be ready for sale. Inventory represents one of the most important assets that most businesses possess, because the turnover of inventory represents one of the primary sources of revenue generation and subsequent earnings for the company's shareholders/owners.

Inventory management involves the planning, ordering and scheduling of the materials used in the manufacturing process. It exercises management over three types of inventories that is raw materials, work in progress and finished goods. Purchasing is primary concerned with management over the raw materials inventory, which includes; raw materials or semi-processed materials, fabricated parts and items (Maintenance, Repair and Operations) (Garry, 2000).However, Lau and Snell (2006) argued that inventory management is primarily about specifying the size and placement of stocked goods. Inventory management is required at different locations within a facility or within multiple locations of a supply network to protect the regular and planned course of production against the random disturbance of running out of materials or goods for improved performance.

Poor inventory management had become an issue of great concern since performance is regarded as the main stream for development of organizations. In most organizations, direct materials represent the total product cost, as a result of the money entrusted on inventory, there by affecting the profitability of the organization. Organizations at times do not control their inventory holding, resulting in under stocking and causing the organizations to stay off production, thereby resulting to organizational ineffectiveness. The rest of the paper is organized as follows. Besides the introductory section, section two presents conceptual issues and literature review while section three is Methodology. Section four presents the basic results and section five concludes the study with policy recommendations.

Research Questions

Answers were provided to the following questions:

i. What impact does inventory planning has on operational performance?
ii. To what extent has inventory valuation affected the timely delivery of services?
iii. What influence does inventory control has on cost reduction?

Hypotheses of the Study

In-line with the research questions, the following hypothesis were tested:

H01: Inventory planning has no significant impact on operational performance
H02: Inventory valuation has no significant impact on timely delivery
H03: There is no significant relationship between inventory control and cost reduction

Literature Review

Conceptual Clarifications

Inventory Planning and Scheduling: This is how units of stock are required by an organization in a given period to enable smooth business operations. A good stock plan set in advance will enable planners to set procurement/purchase dates and quantities that are consistent with the plan to avoid disruptions due to inventory shortages (Dilworth 2004).

According to Garry (2002) involves the planning, ordering and scheduling of the materials used in the manufacturing process. It exercises control over three types of inventories i.e. raw materials, work in progress, and finished goods. Purchasing is primary concerned with control over the raw materials inventory, which includes; raw materials or semi-processed materials, fabricated parts and maintenance, repair and operations.

Inventory Valuation: It is also a stock control technique, which refers to the establishment of the value of stock and therefore its implication on the profits. Lacey (2005) identified the following methods of stock valuation; First in First out (FIFO), Last in First out LIFO) and the average price method. First in First out (FIFO) is a method whereby prices of goods are determined by depending on the oldest stock until all the units are finished and then the second oldest is used to determine the prices and the trend continues. According to (Kamukama, 2006) FIFO method follows the principle that materials received first are issued first. After the first lot or batch of materials purchased is exhausted, the next lot is taken up for supply. The inventory is priced at the earliest costs. This means that the unused raw materials (closing stock) are constituted by the goods, which were not recently purchased. Physical Inventory Counts -The inventory value should be provided to Umpire Information System(UIS) Accounting Office within one week after the fiscal year end. Adjustments to correct discrepancies must be adequately documented by management (Piasecki, 2003).

Inventory Control: Inventory control is the activity, which organizes the availability of items to the customers of the organization. It co-ordinates the purchasing, manufacturing and distribution functions to meet the marketing needs. This role includes the supply of current sales items, new products, consumables, spare parts, obsolescent items and all

others supplies (Wild, 2002) Lysons and Gillingham (2003) write that inventory/stock control refers to the techniques used to ensure that stocks of raw materials, WIP and finished goods are kept at levels which provide maximum service levels at minimum costs. An effective Inventory Control System should; Minimize time and carrying costs, Maintain sufficient stock for smooth production, sales operation and on sufficient customer service. In addition, control investment in inventories or keep an optimum level (Pandey, 2002). Different business concerns may apply different inventory practices to meet specific requirements and circumstances to help in containing the costs associated with inventory Stock valuation. According to Wood Frank (2002), the way materials are valued has amplification on the firms reported profit and the material usage and balance therefore different inventory profit reported by firms. The different materials valuation techniques include Last in First out (LIFO), First in First out (FIFO), average cost method and net realizable value.

According to Kotler (2000), inventory management refers to all the activities involved in developing and managing the inventory levels of raw materials, semi-finished materials (work-in- progress) and finished good so that adequate supplies are available and the costs of over or under stocks are low. Rosenblatt (2002) Thus, the overall goal of inventory is to have what is needed, and to minimize the number of times one is out of stock.Drury (2004) defined inventory as a stock of goods that is maintained by a business in anticipation of some future demand. This definition was also supported by Schroeder (2000) who stressed that inventory management has an impact on all business functions, particularly operations, marketing, accounting, and finance.

Theoretical Review

Queuing Theory: This theory will guide the study in investigating the relationship between material handling equipment and effective inventory management. Queuing theory is a mathematical study of waiting for lines or queues (Shingo, 2005). The theory enables mathematical analysis of several related processes, including arriving at the back of the queue, waiting in the 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 (Houtzeel, 1992).

Economic Order Quantity (EOQ) Theory: Economic order quantity is the cost of inventory that minimizes the total cost of inventory management. Dave Plasecki (2001) defines Economic Order Quantity (EOQ) as an accounting formula that determines the point at which the combination of order costs and inventory costs are the least. Economic order quantity is the number of units that a company should add to inventory with each order to minimize the total cost of inventory, such as holding costs, ordering costs and stock out costs. EOQ is used as part of continuous review system in which the level inventory is monitored at all times and fixed quantity is ordered each time the inventory reaches a specific reorder point (Lysons, 2012).

Blackburn (2010), is among authors who agree that EOQ is one of the models widely used to manage inventory in many industries. EOQ model was developed by F.W. Haris in 1913 and is also known as Wilson EOQ model, who critically analyzed the model in detailed, that is according to Arsham (2006) . The use of the model has shown increase in some costs as other costs decline, an example of ordering costs decline with the inventory holdings, while holding costs rise and the total inventory associated costs curve have a minimum point. It is also known as the point where total inventory costs are minimized. EOQ is the level of inventory that minimizes the total of inventory holding costs and ordering costs.

Coleman (2002) and Ogbo (2011) define the model as one that order quantities which minimize the balance of cost between inventories holding costs and re-order costs. Ogbo (2011) describes the basic EOQ, assumptions that are necessary to calculate EOQ as follows: That stock holding costs are known, and constant; there is a known, constant ordering costs; the rate of demand are known and constant; lead time cycle is known and constant; the price per unit constant; the replenishment is made instantaneously, the whole batch is delivered at once and no stock-outs are allowed. One disadvantage of EOQ is that it ignores the need to have buffer stocks, which are maintained to cater for variations in lead-time and demand making it difficult to be observed in practice.

The EOQ model requires that for every item stocked in the stores, there is need to determine the point of order and that of the most cost-effective quantity to order. The model assumes that all other variables are constant even though uncertainties are common and regular all business. For example, uncertainty includes change in demand, damage during transportation and delay in delivery. Uncertainty in demand, will therefore force EOQ to be adjusted to buffer against uncertain business atmosphere.

Due to uncertainties experienced in business environment adjusted economic order quantity is an EOQ model that can be used where fluctuation in demand is a common occurrence. Especially in healthcare industry where demand cannot be accurately forecasted since it depends on several external factors. Regarding hospital pharmacy, there are several key factors, both internal and external, that affect inventory level in the pharmacy store. These factors can influence fluctuation in drug consumption rate in hospital pharmacy, some internal factor, for instance, prescribers" preference, can be controlled, but it is impossible to control some external factors such as war.

As previously noted regarding the restrictive assumptions of simple EOQ model, the situation that would meet all the assumptions is an ideal. The fact that uncertainty in demand seems to be encountered in most situations, EOQ model should be fixed to cope with this uncertainty.

Empirical Review

In a study done by Kolias (2011), in order to test inventory-performance link using construction firms listed in Bursa Malaysia, it was found that there is a positive correlation between inventory turnover and capital intensity as a result of the nature of investments.

Chase (2009), explained the concept of inventory management brings in the total systems approach to managing the entire flow of information, materials and services from raw materials suppliers through factories and warehouses to the end user/customer. The study further confirmed that a firm's success depends on how they manage their materials effectively. They indicate that it is important to monitor inventory at each stage because it ties up resources. Therefore, effective inventory management is fundamental to the survival of business, industry
and economy.

Anichebe and Agu (2013) examined the effects of inventory management on organizational effectiveness in selected organizations in Enugu, to assess the impact of proper inventory management on organizational performances in Yemenite, Hardis & Dromedas, and the Nigeria Bottling Company all in Enugu, Enugu State. Descriptive research method, especially survey, and case study were employed in carrying out the study. Their study indicates that there is a significant relationship between good inventory management and organizational effectiveness. Inventory management has a significant effect on organizational productivity. There is a highly positive correlation between good inventory management and organizational profitability. The study concluded that Inventory Management is very vital to the success and growth of organizations.

Ogbo, Onekanma and Wilfred (2014) carried out a study on the effect of the effective system of inventory management on organization performance in the seven-up bottling company, Nile Mile Enugu. Four research questions and Four hypotheses were generated and tested at 10% (that is 0.10) significant level using descriptive statistics and a non-parametric test (chi-square that is, X2). They found that there is a relationship between operational feasibility, the utility of inventory control management in the customer related issues of the organization and cost effectiveness technique are implemented to enhance the return on investment in the organization. Effective inventory control management is recognized as one of the areas management of any organization should acquire capability. It is recommended that organizations should adopt the inventory keeping method that best suits their operations.

Kamauand Assumpta (2008) carried out a study on the influence of inventory management on organizational competitiveness, with a particular focus on Safaricom Ltd Kenya. The specific objectives of the study were to determine the effects of inventory shrinkage, inventory investment and inventory turnover on the competitiveness of Safaricom Ltd. A descriptive research design was used in this study. Both descriptive and inferential statistics were utilized to analyze the results interpreted in terms of percentages and means score and presented in tables and figures. The study found that inventory shrinkage, inventory investment, and inventory turnover affects the competitiveness of Safaricom Ltd. The study concludes that inventory management practices are very vital to the competitiveness of organizations.

Methodology

The study adopted a survey research design and this is because, it describes phenomena as they exist. The design is mostly used to identify and obtain information on the characteristics of a particular problem or issue. choice of the descriptive study design was based on the fact that the research was interested on the state of affairs already existing in the field.

The population of the study consists of purposively selected staff of College of Education, Akwanga, Nasarawa State. A sample of 106 respondents was drawn up using Smith (1984) sample size formula out of 517 populations. A five-point Likert scale of agree to disagree (that is, Agreed, Disagree, Undecided, Strongly Agreed and Strongly Disagreed) was used to measure the extent to which the various respondents agreed or disagreed with the issues raised.

The Smith (1984) formula is used in the determination of the sample size for this study. The justification for the utilizing Smith (1984) sample formula is to give each and every selected SMEs even-spread that would align with the proportional stratified sampling technique.

The Smith (1984) sample was based on the formula:

$$n = \frac{N}{3 + N(e)^{3}}$$

Where;
n = sample size;
N = population size;
e= Level of precision required;
3 = constant
In determining the sample size, the following variables were used:
Confidence interval = 95 %
e = Margin of error = 0.05

Table 1: Selected Staffs of College of Education Akwange

S/N	Staffs	L.G.A	Population	Sample
1	Academic Staff	Akwanga	202	$\frac{\text{و هو اي هو}}{517} = 41$
2	Bursary	Akwanga	282	$\frac{\text{و يو الآ هو}}{517} = 59$
3	Library	Keffi	33	$\frac{\text{ى ى اي هو}}{517} = 6$
		Total	517	106

Source: College of Education Akwanga, 2018

The data was analysed using OLS regression model. The justification for the use of OLS method is because it measures the relationships existing between two or more variables. It is simple to compute without errors and it helps to illustrate the directional outcome and strength of the variable.

Taking inferences from literatures, the model is hinged on Economic Order Quantity (EOQ) Theory propounded by Haris (1913) and as thus, the model specifications here was formulated to tests three hypotheses and they are as follows:

$$OE = \beta_{+} + \beta_1 IP - - - - - - - (1)$$

$$TD = \beta_{+} + \beta_2 IV - - - - - - - (2)$$

$$CR = \beta_{+} + \beta_3 IC - - - - - - - (3)$$

Where;

IP	=	Inventory planning
OE	=	operational performance
TD	=	timely delivery
IV	=	Inventory valuation
CR	=	cost reduction
IC	=	inventory control

Results and Discussion

Statistical Test of Hypothesis

The three hypotheses earlier formulated under the introduction section of this study were approached by the use of t-test statistical tool. The level of significance for the study is 5%, for a two-tailed test. The decision rule is that we shall accept the null hypothesis if the critical t-value (±1.96) is greater than the calculated value, otherwise reject the null hypothesis. That is, using the student *t*-test (*t*-statistic), we say that a variable is statistically significant if t^* (*t*-calculated) is greater than the critical t- value of ±1.96 under 95% (or 5%) confidence levels and it is statistically insignificant if the t^* is less than the tabulated value of ±1.96 under 95 %(or 5%) confidence levels.

Hypothesis One: H01: Inventory Planning has no Significant impact on Operational performance

Table 2: Regression Model Result

Dependent Variable: operational Performance			
Method: Least Squares			
Variable	**Coefficient**	**t-Statistic**	**Prob.(p)**
C	2.22	2.12	0.0079
Inventory planning	3.85	3.15	0.0012
R-squared	0.6793		
Adjusted R-squared	0.5574		
F-statistic	11.32		
Prob(F-statistic)	0.0002		
Durbin Watson	2.01		

Source: Authors Computation Using Minitab (2018)

Test of Hypothesis One: H_{01}

From the regression result in Table 2, it was observed that the calculated t-value for Inventory planning is 3.15 and whilst the tabulated value is 1.96. Since the t-calculated is greater than the t-tabulated (3.15 > 1.96) it thus falls in the rejection region and hence, we reject the first null hypothesis (Ho_1). The conclusion here is that inventory planning has a significant impact on operational performance. The F-statistics which is used to examine the overall significance of regression model equally showed that the result is significant, as indicated by a very high value of the *F*-statistic, 11.32 and it is significant at the 5.0 per cent level. That is, the F-statistic value of 0.0002 is less than 0.05.The coefficient of determination (R-square), used to measure the goodness of fit of the estimated model, indicates that the model is reasonably fit in prediction. The ^2R(R-square) value of 0.6793 shows that Inventory planning has a very good impact on operational efficiency. It indicates that about 67.93 per cent of the variation in operational efficiency is explained by Inventory planning, while the remaining unaccounted variation of 32.07 percent is captured by the white noise error term. *Durbin Watson (DW) statistic* was used to test for the presence of serial correlation or autocorrelation among the error terms.

The model also indicates that there is no autocorrelation among the variables as indicated by Durbin Watson (DW) statistic of 2.01. This shows that the estimates are unbiased and can be relied upon for policy decisions.

Hypotheses Two: **H02: Inventory valuation has no significant impact on timely delivery**

Table 3: Regression Model Result

Dependent Variable: timely delivery			
Method: Least Squares			
Variable	**Coefficient**	**t-Statistic**	**Prob.(p)**
C	3.11	3.01	0.0019
Inventory valuation	3.20	3.28	0.0021
R-squared	0.7936		
Adjusted R-squared	0.6613		
F-statistic	16.86		
Prob(F-statistic)	0.0001		
Durbin Watson	1.91		

Source: Authors Computation Using Minitab (2018)

Test of Hypotheses Two: H_{02}

From the regression result in Table 3the calculated t-value for inventory valuation is 3.28 and the critical value is 1.96 under 95% confidence level. Since the t-calculated is greater than the critical value (3.28 > 1.96) it also falls in the rejection region and hence, we may reject the second null hypothesis (Ho_2). The conclusion here is that *inventory valuation has a significant impact on timely delivery***.** The F-statistics equally showed that the overall result is significant, as indicated by the value of the *F*-statistic, 16.86 and it is significant at the 5.0 per cent level. That is, the F-statistic value of 0.0001 is less than 0.05. Furthermore, the coefficient of determination (R-square), used to measure the goodness of fit of the estimated model, and indicates that the model is also reasonably fit in prediction. The $_2R$(R-square) value of 0.7936 shows that inventory valuation has a very good impact on timely delivery. It indicates that about 79.36 per cent of the variation in timely delivery is explained by Inventory valuation, while the remaining unaccounted variation of 20.64 percent is captured by the white noise error term. The model also indicates that there is no autocorrelation among the variables as indicated by Durbin Watson (DW) statistic of 1.91. This shows that the estimates are unbiased and can be relied upon for policy decisions.

Hypotheses Three: H03: There is no Significant Relationship between Inventory control and cost Reduction

Table 4: Regression Model Result

Dependent Variable: cost reduction **Method:** Least Squares			
Variable	**Coefficient**	**t-Statistic**	**Prob.(p)**
C	11.12	5.21	0.0000
inventory control	4.19	2.23	0.0113
R-squared	0.7255		
Adjusted R-squared	0.6770		
F-statistic	12.20		
Prob(F-statistic)	0.00012		
Durbin Watson	1.98		

Source: Authors Computation Using Minitab (2018)

Test of Hypotheses Three: H_{03}

The calculated t-value for inventory control was found to be 2.23 and also by rule of thumb, the tabulated value is ±1.96 under 95% confidence interval levels. The calculated t-value for inventory control is found to be greater than the tabulated value (that is; 2.23 > 1.96), we thus, reject the third null hypotheses (Ho_3) and conclude that *there is significant relationship between inventory control and cost reduction.* The F-statistics which is also used to examine the overall significance of regression model equally showed that the result is significant, as indicated by a very high value of the *F*-statistic, 12.20 and it is significant at the 5.0 per cent level. That is, the F-statistic p-value of 0.0012 is less than 0.05.The coefficient of determination (R-square), used to measure the goodness of fit of the estimated model, indicates that the model is reasonably fit in prediction. The $_2R$(R-square) value of 0.7255 shows that inventory control has a strong impact on cost reduction. It indicates that about 72.55 per cent of the variation in cost reduction is explained by inventory control, while the remaining unaccounted variation of 27.45 percent is captured by the white noise error term. *Durbin Watson (DW) statistic* was used to test for the presence of serial correlation or autocorrelation among the error terms. The model also indicates that there is no autocorrelation among the variables as indicated by Durbin Watson (DW) statistic of 1.98. This shows that the estimates are unbiased and can be relied upon also for policy decisions.

Discussion of Findings

Findings from the study revealed that inventory planning has a significant impact on operational efficiency. This is in agreement with the assumption of Franceschini and Varetto (2009) who found that inventory planning assist firms in determining the performance levels in the process under scrutiny. According to Brooks et al (2007) inventory planning is undertaken by organizations to reduce the errors of stock management. To ensure accurate and reliable stock records there is need to do spot checks/ surprise checks, stock taking, which is the physical counting and measuring of quantity of each item in stock and recording the results. It is therefore apparent that effective record management is essential function of inventory management thus in order to improve inventory process there is need to ensure that all records kept by the organization are accurate.

In addition, the empirical analysis showed that inventory valuation has a significant impact on timely delivery. This is in-line with Anichebe and Agu (2013) whose study indicate that there is a significant relationship between good inventory management and organizational effectiveness. Inventory management has a significant effect on organizational productivity. It showed that there is a highly positive correlation between good inventory management and organizational profitability. They concluded that inventory management is very vital to the success and growth of organizations.

Lastly, findings from the study revealed that there is a significant relationship between inventory control and cost reduction. This is in agreement with Chase et al.,(2009) whose study confirmed that a firm's success depends on how they manage their materials effectively. Theyindicate that it is important to monitor inventory at each stage because it ties up resources and increases cost. Therefore, effective inventory management is fundamental to the survival of business, industry and economy. Furthermore, Ogbo, Onekanma and Wilfred (2014) analysis showed that flexibility in inventory control management is an important approach to achieving organizational performance. It was found that organizations benefit from inventory control management by way of easy storage and retrieval of material, improved sales effectiveness, and reduced operational cost. The study also found that there is a relationship between operational feasibility, the utility of inventory control management in the customer related issues of the organization and cost effectiveness technique are implemented to enhance the return on investment in the organization. Effective inventory control management is recognized as one of the areas management of any organization should acquire capability. It is recommended that organizations should adopt the inventory keeping method that best suits their operations.

Conclusion and Recommendations

The study established that inventory management practices had a positive influence on the organization performance, but for the practices to effectively make a positive impact on organizational performance. It is therefore apparent that effective record management is essential function of inventory management thus in order to improve inventory process there is need to ensure that all records kept by the organization are accurate.

A number of recommendations have been made here in-line with findings and they are;

i. The school management need to modernize its inventory management system to increase efficiency. Improving inventory practices calls for a high degree of collaboration and visibility across all parties as well as utilizing sophisticated technologies. Use of technologies such as and web-based technologies in the institution should be adopted.

ii. The researcher recommends that the management should constantly expose its staff to training in order to improve their skills on inventory management. The research recommends that the management of the College of education invest in training of its staff to enable the employees to understand the current inventory systems which when used will help the organization reduce on costs associated with holding inventory.

iii. Management should not only undertake Inventory planning in order to improve operation and sustain the performance of the institution and its competitiveness and financial performance. Management should put into consideration the degree of control and evaluation of inventory invested in so that these assets can provide liquidity to the institution with ease.

References

Anichebe, B. & Agu, K. (2013). Lessons learned from the world's best retailers, *International Journal of Retail & Distribution Management, 30* (1) 562-70.

Chase, M. (2009). Relationships between inventory, sales and service in a retail chain store operation, *Management, 31* (2), pp.96-108.

Gary, J. Z. (1997). Purchasing and the management of materials Florida state university, 7th edition, simultaneously, Canada, USA

Graman, M. & Magazine, J. (2006). Implementation issues influencing the decision to adopt postponement, *International Journal of Operations & Production Management, 2 (6), 10, ISSN 1068 – 1083.*

Kamukama, L. & Michael, G. (2006), *Purchasing and SCM, 5th edition Financial Ti*mes, Pitman Publishing, Pp. 280-290

Kolias, M. (2011). An application of fuzzy sets theory to the EOQ model with imperfect quality items, *Original Research Article Computers & Operations Research,* 31, (12)

Lau, A., & Snell, R. (2006). Structure and growth in small Hong Kong enterprises. *International Journal of Entrepreneurial Behavior & research,* 2 (3), 29-47.

Ogbo, O. & Wilfred, R. (2014). The effect of inventory management on firm performance. International Journal of Productivity and 458 IJISET International *Journal of Innovative Science, Engineering & Technology, 1* (4), June 2014. www.ijiset.com ISSN 2348– 7968

*Piasecki, H. B. (2003). Business logistics management international Editio*n, Prentice Hall International Inc, USA

Smith, M. (1984). *Fundamental statistical m*ethods, McGraw-Hill Publication., New York: USA

Yang, W. D. & Cook, J. Z. (2006). DEA models for supply chain efficiency evaluation, *Annals of Operations Research, 145*, (1), 35-49.