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RESEARCH ARTICLE

INVENTORY MANAGEMENT AS A COST REDUCTION TOOL IN MANUFACTURING FIRMS AT TECHIMAN MUNICIPALITY - GHANA

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ABSTRACT

The main challenge for companies today is the need to ensure that there is efficiency at the work place. Most problems in manufacturing companies can be attributed to lack of ensuring quality services to customers which arises as a result of poor inventory management. Meanwhile, industries in Ghana have been blamed by not ensuring proper inventory management practices and which has resulted in customer service dissatisfaction. Hence this research was conducted to examine Inventory Management as a Cost Reduction Tool in Manufacturing Firms in Ghana using selected manufacturing firms in the Techiman Municipality as a case study. A total sample size of one hundred and nine (109) respondents was used for the study. The study uses qualitative and quantitative approach in analysing the data. Primary data was collected with the aid of a questionnaire and analyse using descriptive statistics as well as regression analysis. The regression results show that there exist an inverse relationship between inventory management and cost incurred from a firm. Furthermore, the outcome of the study reveals that among the inventory management practices practiced include accurate record of information, proper accounting records and positive surprise visits. It was also realized that having a good stock plan contributes immensely to organizational performance. It also came out from the study that positive surprised checks on employees are part of the important strategies to be adopted in inventory management. The study recommends that the company should try by all means to adhere to inventory polices made. In order to ensure that the company adheres to inventory policies, under no circumstance should items of inventory be allowed to leave stores without proper requisition.

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INTRODUCTION

As a corporate organization, there is a competition of striving to become more efficient and effective in which there is the need for all cost drivers to be reviewed to ensure that excess costs are eliminated. This is to let organizations stand firm in getting the desired returns on investments and that customers are supported in the way they desire. Private firms in particular are challenged with finding new ways to reduce cost and partnering with a strong chain management can assist firms consistently achieve desire outcomes. In all these, a core competency area often not paid attention to by firms is effective inventory management and performance. Therefore in this current competitive world backed by increase in globalisation and consumer awareness, firms that are very much interested in maintaining their customers must sustain its services since customers can easily divert their patronage (Sharma, 2009).

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Inventories are a capital investment area and a substantial cost driver that can be maintained properly. Organizations with substantial static inventories can become more efficient by collaborating with companies that have well-developed expertise in the area of chain management. Given the market liberalization among manufactured firms across the globe (Shafie, 2004), the way and manner companies compete with each other largely depends on their responses to the needs and aspirations of their customers (Hogstron & Grigorjey, 2003). There is pressure on firms to decrease their time engaged in marketing, managing various risks within the supply chain system in order to reduce cost associated with supply chain and the need to ensure the provision of quality service to its customers. This has made it almost unavoidable for service companies' worldwide to come out with various strategies and procedures to reduce these challenges and help reduce manufacturing cost so that they can remain in competition (Berlin, 2011). Inventory involves a comprehensive description of goods either as raw materials, in-process or finished products, which are very necessary in the industry. It is an

important and vital component of any firm. Inventory serves to reduce risk, as it reduces fluctuations in demand or supply of goods which are necessary to the administration of the firm. It assists in sustaining and maintaining constant manufacturing activities, which culminates into better utilization of human resources to result in the organizational effectiveness. It is a necessity of which organizations cannot exist without and it brings costs, as it requires time capital and other overheads to maintain it (Sheila, 2010). In fact, it forms a sizeable portion of the total cost of a particular product. Moneys invested gets lock-up when stocks are not patronised. Managing inventory needs careful consideration and thus offers a strategic advantage. Inventory control involves getting to know the right quantity of inventory to meet the manufacturing requirements on time and to minimize the total cost of production.

The main purpose of ensuring efficient inventory control is to ensure that there is always adequate reserve of goods available according to the manufacturing plan. One primary aim of inventory control is to reduce the cost inventory incur by firms in terms of materials, work-in-process and finished goods. The need for inventory control cannot be underestimated as it is a factor for ensuring the effective performance of manufacturing industries in ensuring effective growth by reducing delivery time and price fluctuations. Improper inventory management is a challenge to the productive level of a manufacturing organization. It can bring about stock out resulting in disruption of the processes of production which is very important to a firm. With this process of liberation and of global economy forcing companies to map up strategies to cope with this drastic change in the business environment, it is very important that the issue of inventory management be properly looked at especially as a means of cost reduction tool in manufacturing firms. Inventory has resulted in a great impact on the way industries make profit which is one motivational factor for this research work. Since large sums of money are committed to stocking raw materials, engaging in work-in-progress and finished goods it is important that these stocks be managed well to salvage companies from collapsing. Undoubtedly, efficient management of inventory is very necessary for manufacturing firms who are poised to face this competitive world (Manjrekar, Bhonsale & Kamath, 2008). In all instances, companies must strive at all cost to reach an investment inventory optimum point since it is costly to associate waste capital due to unmanaged inventory. Obviously, the study examines inventory management practices as a cost reduction tool on operational performances of manufacturing industries.

LITERATURE REVIEW

Inventory Management Techniques

Inventory management is a means of tracking and managing commodities that involves monitoring of commodities moved into and out of stockroom location and reconciliation of inventory balances. The Techniques been practices include

ABC Analysis

This technique assigns items different groups regarding the influence of that item that constitute the group. These thoughts had the highest influence, constitutes group ‘A’, while goods perceived to be having lesser influence are classified in ‘B’ and ‘C’ group (Coyle et al., 2003).Within the ABC analysis, a well-known challenge is having a thought of both the ‘B’ and ‘C’ group are less relevant compared to group ‘A’ items. Decisions are therefore usually made by assuming higher levels of in-stock for the group ‘A’ and with little for the group ‘B’ and group ‘C’. The false aspect in this scenario is to consider all items very necessary. The main aim for classifying these items is ensuring that purchasing staff use resources to maximize profit through having a concentration on those items perceived to have more potential savings. Being selective in this case is effective than treating all items equal (Lysons & Gillingham, 2003)

Economic Order Quantity (EOQ)

Dave (2001), explains Economic Order Quantity as an accounting principle that sums inventory and order costs at the minimum point. These Economic Order Quantity approach have stood the test of time in determining effective inventory management technique as the demand and lead time are relative stable. The model is important to this research since it gives a stock or inventory that a firm keeps to reduce the cost of transaction.

Material Requirement Planning (MRP I)

According to Lysons and Gillingham (2003), material requirement planning involves a computer technique involving product-oriented purported to reducing inventory and maintaining schedules of delivery. Coyle et al.,(2003), explained that material requirement planning is a principle of logically related standards incorporated in other to translate a schedule of master production into inventory requirement time-phased net which takes care of every item relevant for the implementation schedule.

Manufacturing Resource Planning (MRP II)

The America production and inventory control association defines Manufacturing Resource planning (MRP II), as a process developed around materials requirement planning and also involving extra planning functions pertaining to production, master production scheduling and capacity requirement planning. That is, it guards an organization to undertake “what if”’ analysis and aid in determining the required movement of product strategies required at and within the operations of the organization.

Enterprise Resource Planning (ERP)

Lysons and Gillingham (2003) also posited that ERP is a business management system which involves support by multi-module application software that integrates all aspects of the organization. They further explained ERP as a current and mostly observed development of MRPI and MRPII. With MRP I and MRP II manufacturers can monitor good services supplied, work-in-progress and the output of finished goods to meet set targets.

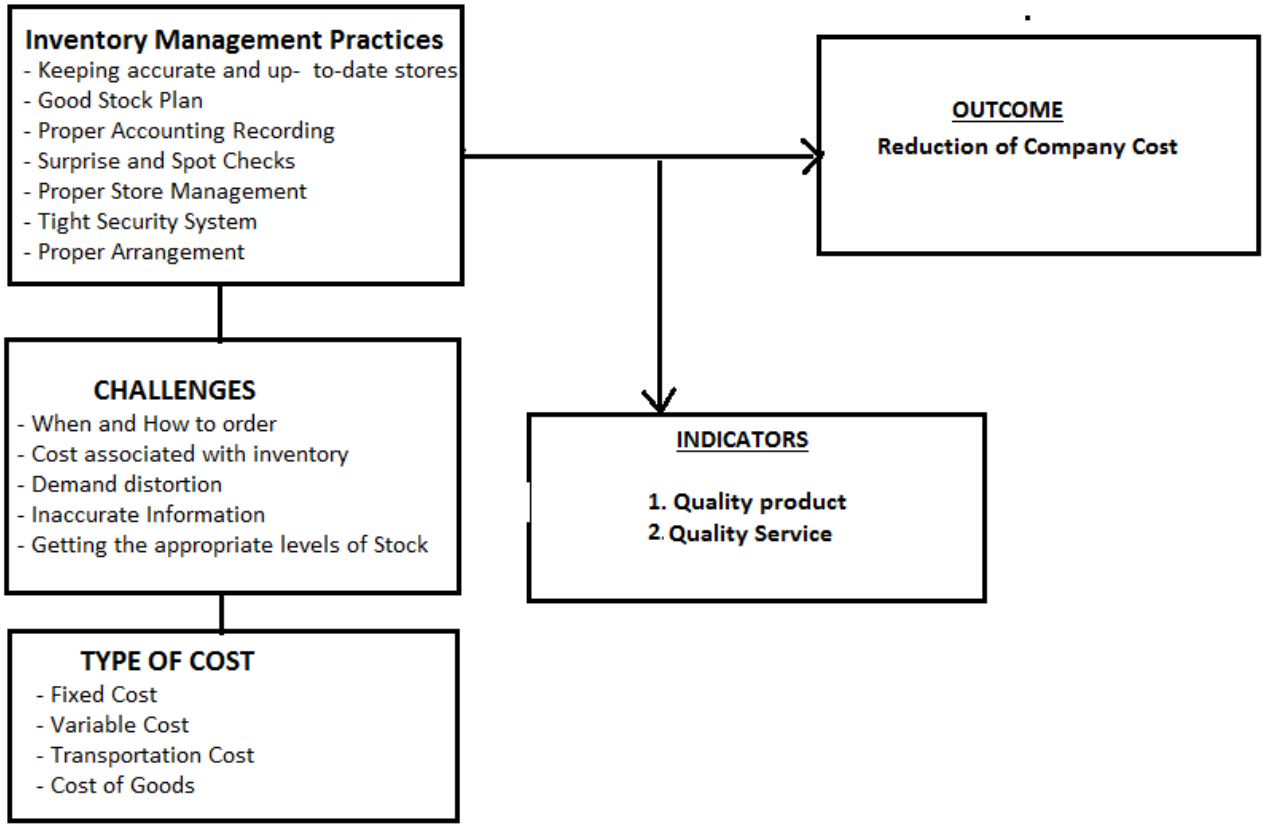
Distribution Resource Planning (DRP)

Lysons and Gillingham (2003) defines DRP as an inventory control measure that requires material requires planning to distribution inventories. It is also considered as a method of stock replenish handling in a multi-echelon environment. The main aim DRP is to precisely predict demand level and to incorporate schedules of production into the organization.

Through this way, a firm is poised to reduce inbound inventory by adopting MRP in relation to schedules of production. Outbound Inventory is reduced with the help Distributing MRP (Coyle et al., 2003).

Contributions of proper inventory management practices to financial performance

Inventory management is very essential to the growth and survival of any organization since its failure will mean that the firm will liable to loss customers leading to poor service delivery and decline in sales. There is the need to emphasize on the need for inventory management on the balance sheet of companies. According to Coyle, Bradi and Langley (2003) inventory is an asset on the balance sheet and it has taken a relevant role since many firms want to reduce their investment in fixed assets. Obviously, every firm finds it necessary to hold stock because it would be practically impossible to operate with only one item to be sold or used in the firm. Due to the unpredictable nature of future demand stock is sometimes held to ensure an availability of goods to reduce the overall cost associated with stock management (Drury, 2000). Pandey (2002) argued that precautionary motive is one of the central roles of inventory management.



Accordingly, precautionary motive implies that stock held to guard against unpredictable changes in demand and supply. Mostly, the demand level of goods and the requirement for supply cannot be known with certainty and hence to ensure and maintain production, the organization maintains additional amount of safety stock to meet regular production. Companies need to invest in stock management for a precaution motive to act as a buffer against demand and supply so that production can be directed towards constant output. Precautionary means of inventory control necessitates the guidance against risk of fluctuations in demand and supply forces and other factors (Pandey, 2002).

Pandey (2002), claimed that transaction motive emphasizes on the need to maintain and facilitate smooth production and sales operation. Firms need to make sure that they have backups inventory either in excess or low levels to take advantage of price fluctuations. They should therefore buy goods and stock them in advance if they can.

Conceptual Framework

The study evaluated the various proper inventory management practices which included proper arrangement of inventories, tight security system, proper store management, surprise and spot checks, proper accounting recording, good stock plan as well as keeping accurate and up-to-date records. Respondents were to ascertain whether their companies practise any of these inventory management practices. In addition, respondents were to assess the type of cost incurred by their respective companies. The researchers evaluated these inventory management practices (independent variables) as a contribution to the cost incurred by their respective companies with respect to the quality of products and services rendered by these companies. In view of this, the following hypotheses were formulated:

H1: There is a significant and positive relationship between inventory management techniques and performance of a firm

H2: There is a significant and positive relationship between proper inventory management practices and performance of a firm

METHODS AND MATERIALS

The population used for the study consists of all managers within the operational and production department, managers within the firm's warehouse, personnel within the quality control departments, sales and distribution executives, stores,

requisition personnel and production engineers within the selected manufacturing firms selected in the Techiman Municipality. A sample size of one hundred and nine (109) was used for this study. Systematic Simple random sampling was used to select the top management staff comprising of the production departments, sales department and the marketing department in the five selected firms within the Techiman Municipality. To achieve the aim of this research, both primary and secondary data was used during the research process. There are two sources of data (primary and secondary sources of data) but the researchers adopted primary source of data in this study generated through the distribution of well-structured questionnaires for the respondents. First, the researchers contacted the CEOs and Managers of the institutions under study personally asking for permission to carry out the research in their firms, and also assist in communicating his objective to their staff. The questionnaire was self-administered by the researchers to ensure high recovery rate. The respondents were assured of confidentiality of any information provided. Informed consent was implied by returning and completing the questionnaire. Each respondent received a questionnaire packet that contained the questionnaire and a cover letter describing the purpose of the study. In addition, the study took certain measures to further ensure confidentiality. Data collected within the study was analyzed using descriptive statistics (mean values, frequencies and percentages as well as relative importance index). In addition, the study employed Correlation and Regression analysis to evaluate associations and the extend of relationship that exist between proper inventory management and cost of a firm.

Empirical Discussion and Analysis

Distribution of Sample respondents by profile

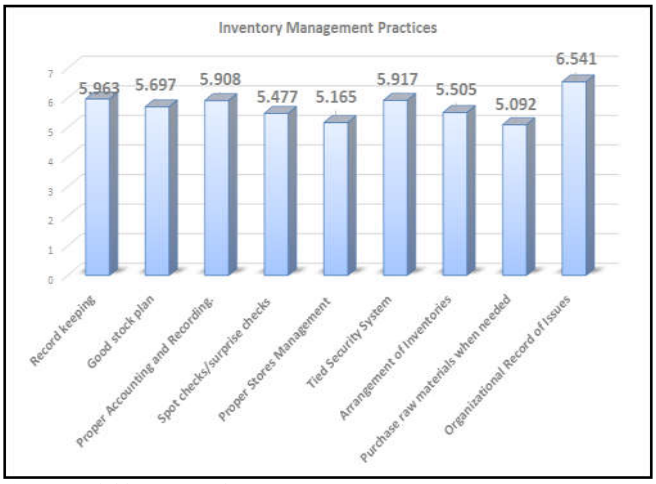
Table 4.1.1. Profile

Questions	Categories	Number	Percentage
Gender	Male	71	65.1
	Female	38	34.9
Age	18 – 30years	38	30.28
	31 – 40 years	48	44.95
	41 – 60 years	23	21.10
Level of Education	SHS	0	0
	Diploma	31	28.40
	Degree	57	52.30
	Masters	21	19.30
Working Experience	Less than 1 year	4	3.7
	1-5yrs	22	20.2
	6-10years	25	32.1
	11-15 years	29	26.6
	16-20 years	19	17.4
	Above 20yrs	0	0

(Source: Field survey: July, 2016)

Results from Table 4.1.1 showed that most of the respondents who participated in the study were males as they constitute 65.1% of the total respondents. On the other hand, 34.9% of the respondents were females. It could therefore be deduced that, employees of the three selected manufacturing firms are predominantly males. From the table 1, 44.95% of the respondents were between the ages of 31-40years, followed by ages between 18-30 (18%). The least of age's ranges between 41-60 years representing 14%. The result indicates that majority of the respondents are very young and falls between 31-40 years. This implies that the authority has youthful employees who could be trained and developed to enhance their competence. In addition, the highest number of respondents had attained degree which represents 52.30%. This clearly indicates that more than have of the employees of the company holds degree. Following that is those employees with diploma which was made up of 28.40%. Beyond that, 19.30% of the respondents were those holding masters' qualifications. None of the respondents were SHS leavers. It could be deduced that the companies had a balance labor force, in that it had employed individuals from at least majority of the levels of education. Moreover, respondents who have served for 6-10 years representing 32.1% form the majority whilst 26.60% of the respondents have served between 11-15 years. 20.2% of respondents have served within the range of 1-5with respondent within the range of 16-20 years make up 17.40%. The remaining respondents had worked less than one year for the respected firms. However, none of the respondents fell above 20 years of service at the firms. The result implies that the firms have good Human Resource policies in place which has resulted in its ability to attract and retain competent staff.

Respondents view on inventory management practices



(Source: Field survey: July, 2016)

Fig. 1. Inventory Management Practices

From the Fig. 1, it is quite clear that majority of the respondents concluded that inventory is manage by keeping accurate and up-to- date stores records. This was indicated by a high mean score of 5.963. This implies firms at the Municipality considers recording of data as very necessary to improve upon a company's performance. The researchers beliefs that to achieve the set objectives of the firm, there is the need to minimize stock related costs in order to maintain adequate stock level to smoothen business operations. Kalyango (2001) highlights, accurate and up-to- date stores records are keys to effective stores management. When it comes to the assertion that good stock plan is part of how inventory is managed, the study recorded a mean score of 5.697. This implies that respondents agreed to the assertion that the concept of ensuring good stock plan is an important inventory management practice in their various companies. Undoubtedly, good stock plan helps in organizational performance and it is therefore not surprising that respondents admitted that it is component of inventory management. Usually, the required procedures for good stock plan includes counting and recording promptly after receipt and issuance of a good or a service and whenever there is a store transaction, issues should be properly monitored and recorded to show details such as registered number, transaction quantity, and voucher reference (Muller, 2003).

It is undertaken by organizations to reduce errors of managing stock and ensuring accurate and efficient record of stock. It involves surprise and spot checks stock records and measuring of quantity of each item in stock and recording the results (Brooks et al., 2007). Moreover, concerning spot checks/surprise checks depicting a form of inventory management, the study recorded a mean score of 5.477 which implies that participants are in agreement that spot checks/surprise checks depicts a form of inventory management. It emerged from the research outcome that positive surprise checks constitutes a very important strategic inventory management. It ensures that employees at the various companies work towards ensuring that their subordinates comply with set rules. Needham (1995) concluded in his study that a prime objective of every organization is to produce goods and service at affordable price and this could be achieved through proper inventory management practices.

In conformity with this principle asserted by Needham (1995), the study recorded a mean score of 5.165 which implies that participants are in agreement that proper stores management is a form of inventory management. This means that respondents within the study perceived this variable to be an important practice that would lead to organizational performance. There is the need to have a way of measuring what it costs to make sales because once organizations record a reduction in proportion to sales made, that firm can be said to become more efficient. Dickerson (1995) explained that the critical role of store management is to provide the level of stock that will sustain operations of a firm at minimal cost, which calls for carrying out stock management and forecasting future demands to determine how much inventory to hold, when to place orders and how many units of stock to order at a particular point in time. When this is done, firms will be directed towards maintaining inventory levels which will balance the benefits of having optimum levels of stock against the cost associated with having high and low levels of inventory. In response to the question "Adopting tied security system at the store being one effective way of ensuring inventory management", the study recorded a mean score of 5.917 indicating its adoption as relevant within their firm.

A mean score of 5.092 was recorded for the assertion that the practice of purchasing raw materials after the customers have ordered for goods is one way of how inventories are managed. When it comes to the assertion that organization record of issues to produce them when customers are in need of them ensuring inventory management, the study recorded the highest mean score of 6.541 implying that majority of the respondents totally agreed to it.

Contribution of proper Inventory Management practices on the performance of manufacturing organizations

Table 4.1.3. Correlations Analysis

Variables	1	2
1. Proper Inventory Management	1.000	
2. Cost	-.106**	1.000

(Source: Field survey: July, 2016)
**. Correlation is significant at the 0.01 level (2-tailed).

Table 4.1.3 reports the correlations analysis for the studies. The results record a negative association. There is a negative correlation between proper inventory management within firms and cost (-0.106).

The negative correlation suggests that proper inventory management and cost incurred in a firm move in opposite direction. This implies that as a firm improves its inventory management, there is a decrease in cost incurred from a firm. To analyse the contribution of proper inventory management practices on the performance of manufacturing organizations, the researchers computed a variable called total cost by averaging all the responses on the cost variables. The same was done for inventory management practices. Then simple regression was employed. A summary cost as independent and inventory management as dependent is shown in Table 4.1.4

Regression Analysis and Hypothesis Testing

Table 4.1.4 summary of Regression

Model	B	Std. error	Beta	t	Sig.
Constant	-1.743	.300		5.811	.000
cost	-.511	.077	.789	6.647	.000

(Source: Field survey: July, 2016)

The result of the analysis shows that the model accounted for 78.9% (Beta = .789) of the variance in inventory management and this was significant. This shows that the factors that are not covered amount only to 20.7%. It therefore means that the four cost factors (variable, fixed, transportation and cost of goods) have a big role to play on the management of inventory in a firm. As observed from Table 7 above, cost significantly and negatively predicted inventory management (β= -1.743, p< .05). This means that as a firms total cost (which consists of fixed, variable, transportation and cost of goods) increases, implies that there is reduction in the way that firm managed its inventory. In other words, an increase in inventory management practice results in a decrease in the total cost incurred by the company. From the above outcome, it can be concluded that proper inventory management practices within an organization guarantees an optimal production process as well as the competitiveness of the firm through cost reduction. Interestingly, this position is supported by quite a large number of previous and extant inventory management research (see Bloomberg, Lemay and Hanna, 2002; Chandra and Kumar, 2001; Chen; 2005; Alao, 2010). Bloomberg, Lemay and Hanna (2002) reported that effective management of inventory has enormous potentials for improving the efficiency of organizations and reducing cost, and firms that use scientific inventory control practices have a significant competitive advantage in the market. This, therefore, implies that the rejection of good inventory management practices can seriously undermine the business growth and success by increasing cost of the organization.

Table 4.1.5.Costs Associated with Inventory

Inventory Cost	RII	Level	Rank
Fixed Cost	0.84	High	1st
Variable cost	0.81	High	2nd
Transportation Cost	0.75	High	3rd
Cost of goods sold	0.71	High	4th

(Source: Field survey: July, 2016)

The costs associated with inventory in manufacturing firms

From table 4.1.5 fixed Cost emerged as the number one inventory cost implication in the study with a relative index score of 0.84 followed by the variable cost which also scored 0.81. Respondents believed that transportation cost have implications on the cost of inventory.

They rated this item as third with a relative score of 0.75 while rating "cost of goods sold" as fourth with a relative index score of 0.71. From the outcome, it is seen that respondents rated fixed cost as the number one effect on firms followed by variable cost having effects on business growth. Respondents believed that fixed cost tend to cripple firm's financial gain due their cost on inventory. This in turn affects the production of goods and services which consequently lead to stunted business growth. When business growth is affected, it is translated to increase in prices hence respondents' view of rating this as the most implicative factor due to inventory cost. Considering variable cost, it was ranked second by the respondents. This implies that most of the respondents said that variables costs are the costs associated with inventory. Variable costs are the costs that vary with level of production .such costs affects inventory management as it reduces on inputs and out puts of organization of which such costs have affected development to the required standards. They for example said that each firm incurs costs that vary with its production levels thus limiting its development. From the study, it is also indicated that transportation cost is also a challenge to inventory. Most respondents said that during the preserve of transporting inventory goods especially in rural areas vehicles find poor roads that break engines of which it increases costs incurred this affecting development of the coca cola company. In view of this, they believed that this is the most important costs that every company must incur, because it is very essential as far as proper inventory management is concerned. This is due to poor roads and high prices of fuel. From the study, findings also reveal that costs of goods sold are the costs that are associated with inventory. They said that in the process of selling inventory goods they meet costs especially during inflation which affects development of the company. They revealed that each organization incurs costs with goods sold and this above all affects its development trends.

Challenges of Inventory in the manufacturing sector

Challenges Associated with Inventory

Challenges	Mean score
Accurate information on orders, stock levels and customer feedback is a challenge to our organization.	5.26
When to order and how much to order so as to meet customer requirements, working capital requirements and profitability is a problem to our organization.	5.15
Inventory costs that could emanate from holding costs, costs of stock outs, acquisition costs is a challenge to the organization.	5.06
Change in demand or demand distortion directly affects the management of inventory.	5.31
Getting the appropriate levels of stock has been a problem to our organization.	5.35

(Source: Field survey: July, 2016)

It is quite clear from Table 4.1.6 above that the most prominent challenge of inventory management on manufacturing operations was getting the appropriate levels of stock. This was indicated by the highest mean score of 5.35. According to Kamukama, (2006), short adherence to stock control should be established in order to minimize the costs associated with stock. Firms should therefore determine the level of stock they require so that excess or inadequate stock is avoided. The second most prominent challenge of inventory management on manufacturing operations with a means score of 5.31 was change in demand or demand distortion.

The third most prominent challenge of inventory management on manufacturing operations was accurate information on orders, stock levels and customer feedback which had a mean score of 5.26. When to order and how much to order so as to meet customer requirements, working capital requirements and profitability which had a mean score of 5.15 constitute the forth challenge associated with inventory management. The least challenge of inventory management was inventory costs that could emanate from holding costs, costs of stock outs, and acquisition costs which had a mean score of 5.06.The re-order level must be sufficient enough to cover the maximum possible consumption of stock during the reorder period. According to Gourdin (2001), said that holding (or carrying) costs are such as storage, handling, insurance, taxes, obsolescence, theft and interest on funds financing the goods. These charges increase as inventory levels rise. In order to minimize carrying costs, management makes frequent orders of small quantities.

Conclusion and Recommendations

The study reveals that inventory management helps organizations to cut down costs incurred by an organization. It can therefore be concluded that inventory management practices are related to performance of an organization, corporation or business as regards service delivery. They should hold stock in order to maximize economies of scale, balance supply and demand, specialization and presentation from uncertainties. Having carried out a study of inventory management in a manufacturing company with a specific focus on manufacturing industries in the Techiman Municipality, the following are some recommendations given by the researchers which if implemented, will have its profitability improved as a result of reduction in cost to enable wider gross margin of the company:

- The production department of organizations should make sure that costs of production are calculated in good terms so as to avoid involvement of losses. Companies /business organization should encourage advertising of their products so as to capture an immediately market and making of high profits.
- Companies should produce good quality products so as to attract customers on the market of which it can make them make high profits leading them to development. Good managerial skills should be encouraged in organizations so as to do away with the making of losses.
- The company should try by all means to adhere to inventory polices made. A situation is a case whereby materials or items are allowed to leave the stores without proper requisition, this shows that the internal control is weak. In order to ensure that the company adheres to inventory policies, under no circumstance should items of inventory be allowed to leave stores without proper requisition.
- Sufficient stock should be held in order to avoid stock-out so that when the ordering level is high; there will be enough stock to be delivered.

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