

INVENTORY MANAGEMENT TOOLS – WHY APPLICATION IS LIMITED? FINDINGS FROM ZANZIBAR

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Abstract

This study was conducted to investigate on the application of inventory management tools by firms operating in Zanzibar. The study was approached using multiple embedded case study design where five cases holding inventories were involved. Data and information were collected and analyzed using qualitative methods. Findings of the study show that business operators in the study area have low level of awareness with regards to application of inventory management techniques. It has been uncovered that participating firms understand only about 30% of the uses of the techniques. The study has further uncovered that all the firms studied apply the fixed time period (P-system) in deciding about replenishment of inventories. Finally, it has been found out that the cases under study face many challenges in an attempt to apply the inventory management techniques during their operations. The major challenge facing the firms is the low level of consciousness on the relative importance of inventory management tools and their application. It is recommended that business community particularly those dealing with trading in computer based software make available and also promote facilities such as computers and required software for management of inventories. Finally, the government should increase awareness to the business community on the use of various operations management techniques especially the inventory management tools.

Key words: Inventory, Inventory costs, Inventory systems, Inventory Management tools

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1.0 Introduction

Inventory may be defined as the stock of any item or resource used in an organization. Broadly, inventory may include inputs such as human, financial, energy, equipment, and physical items such as raw materials; outputs such as parts components, and finished goods; and interim stages of the process, such as partially finished goods or work in progress (Davis et al., 2003). Holding of inventories is inevitable when engaging in production or provision of services. This is so because in production facilities for instance, one must hold inventories either in the form of raw materials, work in progress or finished goods ready for shipment to customers. Davis et al., (2003) enumerate several reasons why organizations hold inventories. These include protecting against uncertainty, ensuring that sufficient goods are available to meet anticipated demand, absorbing variations in demand and production, taking advantage of bulk purchasing discount, enabling production processes flow smoothly and efficiently, allowing the three functions of purchasing, manufacturing, and distribution to operate independently of one another, among others.

Despite the importance of holding inventories, they involve incurring enormous costs and thus calling for the need for their vigilant management. In order to manage inventories therefore, management scientists have come up with competing inventory control models (Davis et al., 2003; Baradyana and Ame, 2005; Waters, 2003). Such models are well known in their ability to help in the management of stocks of items in production or service operations. Without applying them, there is danger of incurring unnecessary costs which would at the end have negative impacts on profits. In general, inventories can be classified into three major types which are raw materials, work-in-process and finished goods.

Notwithstanding the acknowledged importance of the application of inventory management techniques in cost saving in all operations management situations, there is little or no practical usage of them (Baradyana and Ame, 2005). There are few organizations or instances where such tools are applied in managing inventories to the advantage of the organizations. The situation is worse in most developing countries, Tanzania being one of them. For the case of developed countries, there are reported instances which show the applications of the techniques (Nenes et al., 2010; Syntetos et al., 2009; Porras and Dekker, 2008; Syntetos and Boylan, 2006). The

biggest dilemma happens in the developing countries where in some situations, people are not even aware of the existence of the techniques in solving operations problems (Baradyana and Ame, 2005). A lot of effort have been put in place to bring attention to the societies about the existence and hence application of various operations research tools including inventory management techniques. Such effort include but not limited to introducing operations research courses in higher learning institutions in order to create experts, enabling availability of computer based software which support the techniques and establishing Operations Research Societies (For example, the International Federation of Operational Research Societies – IFORS, Operations Research Society of South Africa – ORSSA, Operations Research Society of East Africa – ORSEA, etc) which would put practitioners and managers together in finding the way forward towards successful use of the models.

The issue at hand is to understand the reasons behind the non application of the operations research techniques, especially the inventory management technique despite its acknowledged ability of reducing cost of production for both manufacturing and service firms. It is on that basis that this study was put in place to investigate on the application of inventory management tools by taking firms that hold inventories the case of Zanzibar. In so doing, the study intended to meet the following objectives.

- 1) To establish firm managers awareness on the application of inventory management techniques;
- 2) To find out the extent of usage of inventory management tools by firms in the study area;
- 3) To understand the type of inventory management systems applicable in the study area, and;
- 4) To understand the challenges facing the business firms in the application of inventory management tools.

4.0 Materials and Methods

This research was conducted in Zanzibar within the Zanzibar Municipality where more than 75% of business activities take place in Zanzibar. Specifically, the study was based in some super markets and spare parts shops which according to their transactions hold a lot of inventories where five cases were involved. Three of the selected cases were supermarkets, one was a spare parts shop and the other was appliances shop. All these outlets were selected primarily because

they all handle large inventories in their businesses. The selection techniques employed were two. The first one was an opportunity to learn and the second was theoretical sampling for multiple embedded cases (firms doing different businesses and handling different types of inventories were considered).

The study employed mostly primary data. Participants who were involved in the study were purposely selected on virtue of their positions. The targeted respondents were the firm managers or their representatives. So, in all shops visited, the person who was responsible with the operations of the entity was requested to participate in the study. In all cases, owners were found to be present and were the ones who provided the required data and information. Data collection was done through the use of interviews which were guided by a pre-tested study protocol. The study applied qualitative data analysis techniques in giving meaning to information collected. This was done by taking the information organized from the case stories which were built from the interviews conducted with the firm operators. The main data analysis techniques employed were three which are pattern matching of data and information between cases, comparison of scenarios and by using explanation building as proposed by Yin (1994). Finally, reliability and validity was improved by applying the two techniques among those suggested by Silverman (1993) with respect to the logic of qualitative research. The methods employed were pilot testing the study protocol and respondents validation. As regard to pilot testing, data was collected after making some revisions on the study instrument. For the case of respondent validation, the reports that were written on individual cases were taken back to firm owners before final analysis and report writing.

5.0 Results

This section is devoted for description of cases which exactly represent the results. The narration was guided by the analytic strategy as recommended by Yin (1994).

5.1 Case 1: Mombasa Super Market

Mombasa Super Market is one among several super markets that are found in Zanzibar town municipality. This super market was established in 1998 at Mombasa Street where middle class

people live. The business started as a food shop selling various types of food items like rice, wheat flour, beans, maize, millet, vegetable oils to sugar, etc. These food commodities were bought from the wholesale shops and sold in small volumes and hence no special storage facilities were required at this stage. No proper recording system of the stocks was established during this stage and therefore no inventory management tool was used. The shop was then inherited from the father (original owner) to the son (present owner) following the old age of the father that resulted to inability to handle business activities. The shop continued to serve as a food shop until in 1998 when it was promoted to the super market.

5.1.1 Application of Inventory Management Tools

The super market owner has got some knowledge on inventory management systems that are used to facilitate good inventory management in the business. Normally, commodities that are sold at the shop are imported from Dubai. The commodities are packed in containers in order to minimize the freight costs and for the comfort during the freight. The average time required for the commodities to be received and cleared in Zanzibar ranges between one to three months under normal circumstances. Other commodities come from Tanzania mainland and the neighboring Kenya through Mombasa port.

The method used in the inventory management in this firm is by recording different aspects of the business in the note books. These aspects include the commodities received from different consignments, the list of different commodities to be ordered, daily records of the sales and stock movements. From the records that are kept, it is possible to get important information of the inventories such as levels of the stock at a given period, order level for different commodities which would determine the proper time to place an order for new consignments from the suppliers. The stock level for different commodities which is an important parameter in a business at any given moment is checked from the records that are kept by the storekeeper. Stock levels help the firm to keep away from ordering materials that can be piled up in the store. However, in this shop, there are over accumulation of some commodities while others are out of stock for long period of time.

When new materials are brought in the country from the suppliers, they are first received by the store-keeper who accept the new materials after thorough inspection and record them in ledger

books. When the shopkeeper makes requisition for materials from the store, the store-keeper issues the materials from his ledger and subtract from the balance.

5.1.2 Challenges Facing the Firm in Applying the Inventory Management Tools

According to the business owner, the challenges facing the application of inventory management tools in his business are:

1. Understanding the client's demand for effective supply.
2. Establishment of maximum and minimum stock levels for satisfaction of client's demand.
3. Difficult in determination of re-order level.
4. The data recorded in this method are not sufficient for adequate analysis.

5.2 Case 2: Mashaallah Shop – Appliances Shop

Mashaallah Shop started in the year 2008 as specialized dealer of used equipments and parts. The shop is located at Kwamchina Street in Zanzibar town municipality along the Mtoni-Kiembesamaki main road. The business runs under the partnership of two friends. Most of the items being traded at the shop are imported from England and then shipped to Zanzibar through ships that are regularly carrying goods from Europe to East Africa. Customers served by the shop are those who buy for home use and those who purchase large quantities of commodities for resale. Among the used materials that are imported by Mashaallah Shop include computers, televisions, refrigerators, radios, blenders and other home used machines and parts.

5.2.1 Application of Inventory Management Tools

The method used in the management of inventories at the shop is through recording all important information in special note books. The records for individual commodities are kept in separate note books. In each note book, detailed records of the item are kept to include; quantity of the commodity received, daily sales, stock level and the order level of the item. This enables to access the stock rotation of all the commodities and therefore stock control in the shop is attained. Also, information on stock levels at any given time helps the firm to place order timely and in required quantities for commodities that are in demand in the market. Hence, this leads to

the increase in sales and hence increasing the income for the business. However, the owner admitted that they do not apply any method that tells them the exact quantity to order.

5.2.2 Challenges Facing the Inventory Management Tools Application

The challenges that are facing the application of inventory management tools at Mashallah Shop are as listed below:

- 1) Breaking of some items in the package during the freight that results to a great loss in the business.
- 2) Delaying of the ship which results to the deficiency of some commodities at the shop causing some clients to find other alternative shop.
- 3) Sometimes the quantity of items received is different from that ordered causing shortage of such items at the shop.

5.3 Case 3: New Kwerekwe Auto Spare – Spare Parts Shop

New Kwerekwe Auto Spare is a shop that deals with motor vehicles spare parts business. It is found along Kwerekwe Street – Makunduchi main road. The shop was established in year 2002 under the sole proprietorship. During its growth and development, another share holder contributed to the capital and at present the business operates under partnership. The shop is one of the largest dealers of all types of spare-parts, motor vehicles and lubricating oils in Zanzibar. Almost all the commodities for the shop are imported from abroad. The great number and types of spare parts obtained in this shop has made the name of the business to be popular and thus raising the sales of the shop to a great extent.

5.3.1 Application of Inventory Management Tools

The only inventory management tool that is being used is through note book. Different records such as that of received commodities, daily sales, stock circulation and placed orders are made using the note book. These records enable the operator to know the stock level at any required time, to determine when to place an order for specific commodities and to determine the average sales of the firm. To make the inventory management more effective in the control of stock and sales, the operators are given guidance by the owners concerning good recording approach.

Although there are efforts for the application of inventory management at the firm for its future achievements, the inventory management tool and method used at present are not efficient and accurate. On the other hand, the cost of getting a well trained operator who can use such required computerized program and the cost of the program and computer are deemed too high by owners of the firm.

5.3.2 Challenges Facing the Inventory Management Tools Application

The firm faces the following challenges in applying the inventory management tools:-

- 1) The tools being used at present are less efficient and therefore can store few data.
- 2) Limitation of the data recorded also confines the degree of data analysis that can be performed.
- 3) Difficult to determine the actual stock movement of individual or overall items.
- 4) Meeting the customer's satisfactions through identification of demand level of various commodities.

5.4 Case 4: Shamshu & Sons – Super Market and Dispensing Chemist

This business is located at Darajani Street in Zanzibar town. It was established as a pharmacy in 1986 following announcement of privatization that allowed the private sector to engage in the provision of services like health, education, etc during late of 1984. The business took on at very low speed as the government hospitals still continued to provide free medical services and medicines to the public. Despite the fact that, private hospitals and pharmacies were already allowed in the Islands, only few entities engaged in this business. As this company was among these few private companies and individuals, it managed to sustain during such difficult times as there was very little competition. The business started to grow faster when the Government announced the cost sharing scheme in the government hospitals whereby people were required to contribute some of the health related costs.

The tendency of the shortage of several drugs in the Government hospitals established a smooth way for many pharmacy dealers including Shamshu & Sons to make good income as the sales increased considerably. The good revenue of this company enabled it to open another business of super market that operates along with the first one i.e. pharmacy (dispensing chemist). The two

business centers are located in two different buildings at Darajani Street behind the old market and are managed as family business. The two business centers have good sales and in both centers there are employees with the required skills that assist the owners in running business. The owners have good knowledge on inventory management and at present they have plans to establish effective methods and tools.

5.4.1 Application of Inventory Management Tools

In the early days of operation, the firm did not pay attention on the application of inventory management tools as the business had very little stock. As the volume of business increased, the size of stock also increased and the note books started being used as the inventory management tool where various records on the business were kept. After the establishment of super market that operated along with the pharmacy, the company introduced computers by which more data are stored and analyzed. Thus, the records that were first kept in note books and ledgers are now recorded using computers.

Introduction of computers in the shops enables continuous stock taking of the business. This is carried out through day to day recording of the commodities which facilitates physical monitoring of the stock using data. The commodities received are recorded after physical checking and entered in the stock while the commodities taken from the store are physically checked and then issued. The records of the issued items together with the receipts are well recorded for further data analysis. Stock level is determined through fixing records of minimum stock level against maximum stock level for each item in the stock. Among the information obtained include the anticipated rate of the items which indicates whether they are fast moving or slow moving.

5.4.2 Challenges Facing the Inventory Management Tools Application

Like other entities, this firm faces some challenges in the application of inventory management tools that are:-

- 1) Deficiency of staff with good knowledge in the implementation of inventory management tools.
- 2) Close monitoring of the stock through proper recording of received and issued commodities.

- 3) Lack of Financial support to establish inventory management tools such as for purchase of computers and associated software.
- 4) Lack of communication system between the business centers and the suppliers of the commodities.

5.5 Case 5: Modern Diplomatic Super Market

The name of the entity is Modern Diplomatic Super Market that was the first super market established in Zanzibar in 1994. It was mainly designed to serve the foreign officers with their families living in Zanzibar as much of the items used by the foreigners were not found in the local shops. This Super Market was initially run by the government before the privatization initiative after which it was also privatized. The Modern Diplomatic Super Market is located at Mazizini Street in Zanzibar Town and is located along the Town Center – Airport road, opposite to the Ministry of Education and Vocational Training, Zanzibar. At the Modern Diplomatic Super Market, one would get several commodities a supermarket would be expected to offer.

5.5.1 Application of Inventory Management Tools

The Modern Diplomatic Super Market has the system that is used to assist the firm managing the inventories. The owners have some knowledge of inventory management application. Most of the commodities that are sold in the super market are imported from Dubai and other countries. Although the level of consciousness on the relative importance of inventory management in the firm seems to be low, there are some tools such as note books that are being used for the purpose.

Different commodities in various quantities that are received by the super market from the suppliers are recorded in special note books for further application. The commodities are then transferred to the stores where special ledgers are located for recording the stock. The list of various commodities required from the store is sent to the storekeeper who issues the commodities from the ledgers. In the store, commodities are arranged in special way which brings easy accessibility and are placed according to the priority of their received dates. The stock movement is established such that new received materials are separated from the old ones

in order to ensure that the old stock is issued first before the new stock (that is, FIFO application). Recording the stocks helps the firm to keep away the materials from becoming destroyed or expire by keeping materials in the store for long period of time.

Among the information obtained from the implementation of inventory management tools include the knowledge of the stock level for different items, order level for every commodity and stock movement.

5.5.2 Challenges Facing the Inventory Management Tools Application

Like other businesses, this super market faces some challenges in the application of the inventory management tools which include the following:-

- 1) Lack of efficient required tools such as computers to enable good practice in the establishment of inventory management.
- 2) Lack of staff with good knowledge on the implementation of inventory management methods using the modern tools.
- 3) Low level of consciousness on the relative importance of inventory management tools such as computerized program and their application.

6.0 Findings

This section provides answers to the research objectives put forward in this paper. This was done by analyzing the case stories which have been put forward.

6.1 Awareness on the application of Inventory Management Techniques

The first research objective this study sought to achieve was to establish the level of awareness of inventory management techniques the operators have in dealing with inventories. This study uncovered that business operators in the cases covered have some awareness on the application of inventory management techniques. However, this awareness is at infancy stage because of tools most of the operators apply in handling inventories. It has been found out that four out of the five cases use note books in recording inventories. There is only one case that utilizes a computer in recording inventories.

In fact, majority of the cases keep on memorizing all the prices of the items in the shop. In case they forget, they either have to go back to their note books or simply guess the prices. In any particular day, it is very hard for the operators to determine the level of inventory for all products they hold. It is also not easy for them to understand promptly whether a certain commodity has reached its re-order point or not. Anyway, this seems not a big issue because most of them make orders from abroad which takes long time for their inventories to be replenished. So, there is high possibility to have stock out of some items or of having large quantities of slow moving items.

Another thing that shows low awareness of the application of inventory management techniques is the extent of usage of the techniques. This is further evidenced by the fact that, the business operators do not understand the extent of unnecessary costs they incur as a result of not applying the inventory management techniques properly. In fact, no one could mention the various costs which compose the total inventory cost they incur as a result of their decision to carry inventories. They understand that keeping inventory is part and parcel of the business itself.

6.2 Extent of usage of Inventory Management Tools

The second objective of this study was to unveil the extent of usage of inventory management tools by the firm operators in the study area. Drawing from literature (Davis et al., 2003; Waters, 2003; Silver et al., 1998), it is found that inventory management tools have many uses which include among others:

- 1) Understanding inventory level of items kept in the store;
- 2) Determining the re-order points of items;
- 3) Assessing the movement behavior of items in the store;
- 4) Understanding the costs (prices) of items in the store for example by using point of sale scanners;
- 5) Establishing average lead times of orders through experience of operating systems;
- 6) Close monitoring of the stock;
- 7) Giving hints on the best inventory system or policy to apply given the nature of the business, and;
- 8) Establishing total costs incurred by holding inventories during a year and thus enabling the firm to change its inventory policy.

Accordingly, the cases involved in this study do apply only three of the above mentioned usages of inventory management techniques. These are; understanding inventory level of items kept in the store, determining the re-order points of items and understanding the costs (prices) of items in the store.

Understanding inventory level of items kept in the store

This is one of the usages of the inventory management techniques found to be utilized in the study area. Firms, through the use of records kept in the note books can determine by difficulty the level of inventory of the items maintained. To be able to do so however, they have to go into records, add the items which have gone out of the store and then deduct from the total inventory of that particular item that was held during the last replenishment. It takes quite a long time to establish such information just for one item in the store (say a certain type of biscuit). Another alternative would be to make a physical count of a particular item. Absolutely, it would take more than a week if one wanted to understand the inventory level for all the items in the store.

Determining the re-order points of items

Firms which have been covered in this study could establish the re-order level of the various items kept in their stores. However, there was nothing that prompted them for this establishment. They could only understand after going into the records or if a customer comes requesting for something and finding out that it was out of stock. However, it was further discovered that, even if they understood about the re-order levels of some items, it was difficult to place an order immediately because most of the items they sell are imported from abroad. So, it was cheaper and convenient for them to wait for many other items to go out of stock and then place an order for several other items. Another alternative has been to place an order for almost all the items after a specified period of time.

Understanding the costs (prices) of items in the store

It has been established that firm owners often use information kept in records to help them to recall the prices of items they hold in their stores. Whenever they forget prices of items (especially the slow moving items which they sell occasionally), they would go to their note

books to find the information they need). There is only one case among those studied which applies a computer using a point of sale scanner to determine the prices electronically. This also helps the owner to issue receipts and determine without difficulties the level of value added tax to be paid to the Government.

6.3 Types of Inventory Management System Applied

The third objective of this study was to find out the types of inventory management systems that firms do apply in the study area. As determined from literature (Davis et al., 2003; Waters, 2003), there are mainly two types of inventory management systems which firms do apply in establishing inventory policies. These are the fixed order quantity (Q-system) and fixed time period (P-system).

It can be established from the case stories that all the firms studied do apply the fixed time period (P-system). This is ostensibly because they cannot easily determine the re-order levels of the various items they hold in the stores. Even under situations where they determine the re-order points, it becomes not economic to place orders for few items because most of them import merchandise from abroad. Accordingly, it can be found that, they operate using a system which has many disadvantages than advantages. Many practitioners do recommend the use of fixed order quantity (Q-system) as opposed to fixed time period (P-system). However, due to the fact that many of the items traded come from abroad, this remains the only plausible system for them to apply. Nevertheless, it could be improved through the use of computers to establish necessary information in order to enable the operators make timely orders for smooth operations of their businesses.

6.4 Challenges facing the business firms

The fourth and last research objective that this study sought to accomplish was to establish challenges that firms in the study area face in an attempt to use inventory management tools. Going through the case stories, this study documents the following as the major challenges which make the firms not using the techniques as required.

1. Establishment of maximum and minimum stock for satisfaction of client's demand.
2. Difficulty in determination of order level using note books.

3. Difficult to determine the actual stock movement of individual or overall items.
4. Deficiency of staff with good knowledge in the use of inventory management tools.
5. Lack of close monitoring of the stock through proper recording of received and issued commodities.
6. Establishment of communication system between the business centers and the suppliers of the commodities.
7. Low level of consciousness on the relative importance of inventory management tools such as computerized programs and their application.

If one looks at these challenges internally, it can be found out that, they are all a cause of not knowing what exactly the inventory management techniques offer and how to use them. That is lack of awareness of the techniques application and the role of computers in the implementation process.

7.0 Conclusion and Recommendations

7.1 Conclusion

Investigation on application of inventory management tools in the selected firms in Zanzibar was carried out using a protocol as discussed above. The firms that were selected for the study included the super markets, appliances shop and spare part shops that operate in Zanzibar municipality. In general, the application of inventory management tools in the businesses involved is very low. Most of owners have very little knowledge on the relative importance of inventory management. In almost all cases, the owners use their own memories or sometimes records kept in loose papers or note books to recall prices of items. In fact, they do not apply appropriate inventory management procedures in running their businesses. On the other side, the operators that have been employed for running the businesses are also low skilled and hence difficult to train them such computerized program regarding inventory management.

Another observation is that, many of the investments were initiated using small amount of capital and due to the limited market; the rate of their growth is also slow. Thus, many of the firms have no enough income to enable them to employ well skilled personnel who can use advanced inventory management tools such as computer program for running the business successfully.

The cost of computers and the associated software is also a hindrance for such business owners as they are scared of whether they are going to increase income or not through such investment.

In general, different ways of raising awareness to the owners, operators and the public on the importance and advantages of inventory management tools application to the business is critically required. Seminars and workshops can be used to raise such consciousness to the owners and operators of the business while information media such as radio, news papers and televisions can be used in raising awareness of the public. The few business entities which do apply the tools can be used as resource persons in ensuring that their colleagues learn from their experiences. This can be achieved through group discussions that can be facilitated by government or non-government organizations.

7.2 Recommendations

This section is devoted to some recommendations which when implemented can foster the application of inventory management techniques in managing inventories and business in general. The recommendations are made to business owners, Business community and to the government.

7.2.1 Recommendations to Business Owners

- a) There is need for business owners to employ people who are trainable. This can help to train them on how to use computer based program to manage inventories effectively and efficiently.
- b) It is high time for business operators to think using computers in their business operations in general, inventory management being one of them. Computers with reduced prices are readily available in the market. We cannot manufacture them, but we train ourselves to at least use them.
- c) There are few firms in Tanzania which use properly inventory management techniques in their business operations. There is need for other firms to learn from the experiences of such firms for emulation.

7.2.2 Business Community

Business community particularly those dealing with trading of computer based software need to know that there are tools which help in managing inventories. They are being advised to make available at competitive price and also promote facilities such as computers and required software for management of inventories.

7.2.3 Recommendations to the Government

- a) Government through its higher learning institutions or otherwise needs to increase awareness to the business community on the use of various operations management techniques especially the inventory management tools. This will have positive implication to the government on the side of increasing its revenues through successful operations and growth of business firms.
- b) Again, the government through its good institutions is advised to organize tailor made training program to the prospective users of the inventory management tools in order for them to get awareness, familiarization and application knowledge of the techniques.

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