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Stores or Warehouse Design and Operations: Assessing its Effectiveness, Case Study of Regional Medical Stores, Kumasi

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Abstract
Storing is an integral part of every logistics systems and plays a vital role in providing a desired level of customer service at the lowest possible cost. Storage and operations are linked in that, the producer or manufacturer sends the ordered products or items to the purchaser who receives and stores them and finally distributes or serves its customers. There is therefore the need for those units to operate together to serve the markets (various districts) to have value for money and customer satisfaction.More so, determining the size and number of warehouse facilities are interrelated decisions in that they have an inverse relationship; that is, as the number of warehouse increases, the average size of each warehouse decrease. The general trend is to have fewer, but larger warehouses in an organization's distribution system.In addition, one of the more important decisions facing logistics executives is how to determine the size and number of organization's warehouses. To this effect, where should these facilities be located? Finally, each warehouse must be laid out and designed properly in order to maximize efficiency and productivity.Warehouse stores all products, where these distribution centers (DC) hold minimum inventories and predominantly high-demand items (Stock, 1993). These warehouses handle most products in four cycles (receive, store, ship and pick). Warehousing is used for the storage of inventories during all phases of the logistics process. In simple terms, two basic types of inventory exist: (1). Raw materials, components, and parts (Physical supply); and (2). Finished goods (physical distribution) (Stock & Lambert, 2001). There also may be goods-in-process inventory, although in many firms such as the Regional Medical Store-Kumasi, goods-in-process constitute only a small portion of its total investment in inventories. The study examined the effectiveness of Stores or Warehouses design and operations. The objectives of the researchers were to examine how the RMS has effectively designed its stores and warehouse and how it operates.The research looks at the effectiveness of stores or warehouse design and its operations as a case study. This is a fact-finding study which seeks to find out the design of warehouses and the storage and distribution of products and materials at and between point of origin and point of consumption, and provides information to management on the status, conditions and disposition of items being stored (Lambert et al, 1998). The researchers used purposive random sampling technique. Data for the study were obtained from respondents using validated questionnaires. In all, 125 questionnaires were prepared and administered to a purposive sample of top management staff whose names were obtained from the Deputy Regional Manager and other worker (staff) of the Regional Medical Stores. Researchers used Statistical Package for Social Sciences (SPSS) software for the data analysis.
Keywords; Warehouse or Stores, Operations, Design, Distribution Center (DC), Inventory, Stock Control, Drugs and Non-drugs, Layout, Order

1. Introduction

Usually, products will be stored at some point prior to their final consumption. Depending on the particular conditions in effect within each market area, products may be stored at different points within the channel of distribution.

Due to differences in culture, technology, accepted practice, competition and others, warehousing requirements will likely vary across geographic regions of the world. For example, in Japan, Europe and elsewhere, the retail network is composed of a great number of small shops, each having little capacity for inventory storage.

In the past, warehouse layout and design have sometimes varied by the type of products being stored, availability of financial resources, level and type of competition, and customer needs. Additionally, there are various cost trade-offs between labor, equipment, space and information (Stock and Lambert, 2001).

According to Owens and Mann (1994), a good warehouse layout can (1) increase output, (2) improve product flow, (3) reduce costs, (4) improve service to customers, and (5) provide better employee working conditions. With an increasing interest in improving inventory turns and reducing time to market, the role of distribution increasingly focuses on filling orders rapidly and efficiently. Effective store management therefore involves a thorough understanding of the function of warehousing and storage of products (referred to as inventory) during all phases of the logistic process.

1.1 Stock Taking and Storage of Goods

Figure 1: A Store Keeper Taking Stock inside the Room whiles an Attendant is Seen Packing items into the Store.

Source: Authors' Field Survey, 2015

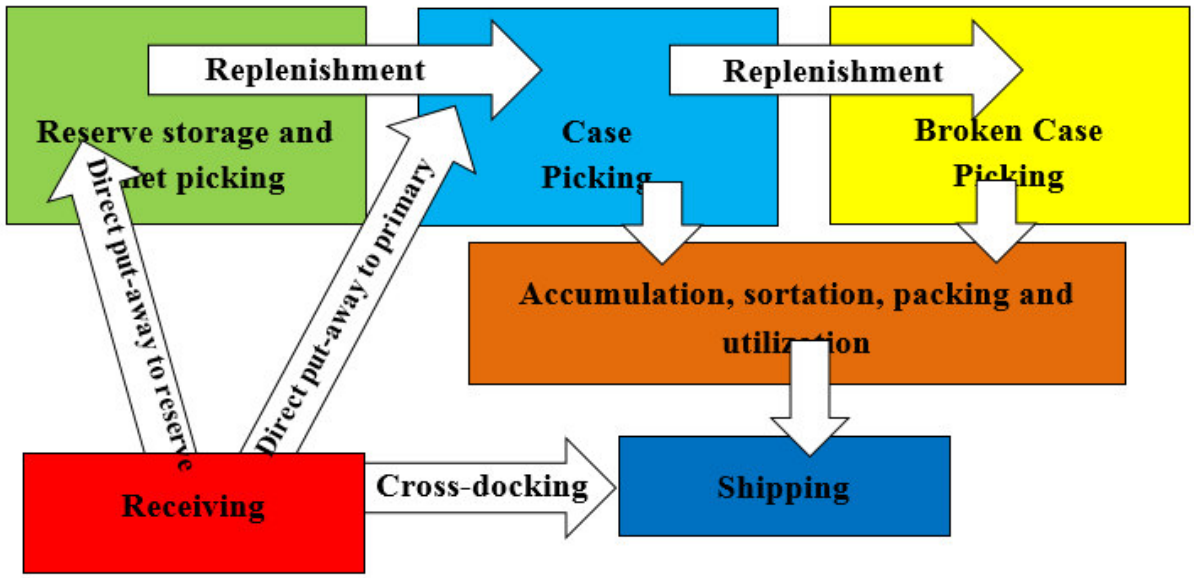
According to Lambert et al. (1998), more than 75,000 warehouse facilities exist worldwide, including state of the art, professionally managed warehouses, as well as company stockrooms and self-store facilities. The big question is that, in the operations of the Regional Medical Stores in Ashanti, why should they have inventories?

Lambert et al. (1998), were of the view that, traditionally, the storage of products has occurred for one or more of the following reasons:

1. To achieve transportation economies
2. To achieve production economies.
3. To take advantage of quantity purchase discounts and forward bays.
4. To maintain a source of supply.
5. To overcome the time and space differentials that exist between producer and consumers.
6. To support the firm's customer service policy.
7. To support the just-in-time (JIT) program of suppliers and customers.
8. To accomplish least total cost logistics commensurate with a desired level of customer service.
9. To meet changing market conditions (e.g. seasonality, demand fluctuations, competition).

1.2 Warehouse functions and floors

Figure 2: Typical Warehouse functions and floors



Source: **Tompkins et al., 1996**

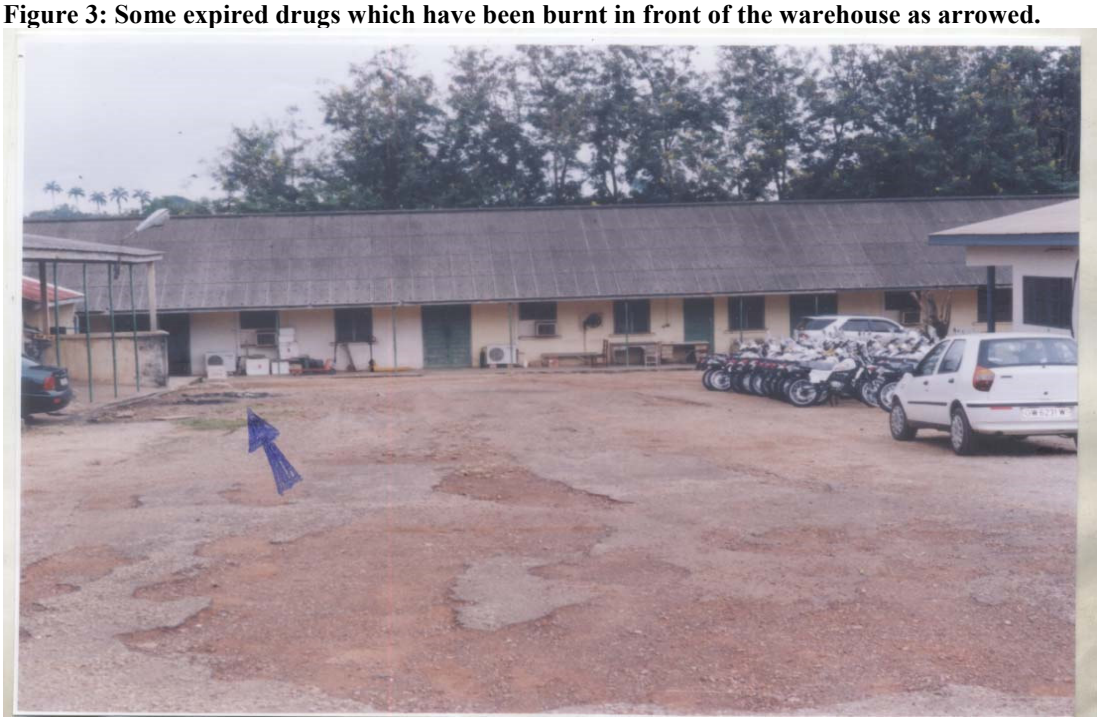
Warehousing serves an important role in a firm's logistics system. In combination with other activities, it provides the firm's customers with acceptable service level. The Materials Handling Institute, an industry trade association for manufactures of materials handling equipment and systems, has estimated that, "the hardware and software used to move, store, control, contain, and unitize materials in factories and warehouses exceeds $50 billion annually. Much of the growth in size and variety of the market is fueled by major changes in the requirements of warehouse and distribution operations (e.g. reduced order cycle times, reduced inventory levels, reduced order sizes (Frazelle and Apple Jr, 1994).

2 Methodology

The study looks at the effectiveness of Stores or Warehouse design and its operations as a case study. It is a fact-finding study which seeks to find out the design of warehouses and the storage and distribution of products and materials at and between point of origin and point of consumption, and provides information to management on the status, condition and disposition of items being stored (Lambert et al, 1998).

2.1 How Expired Drugs Are Disposed

Figure 3: Some expired drugs which have been burnt in front of the warehouse as arrowed.



Source: **Authors' Field Survey, 2015**

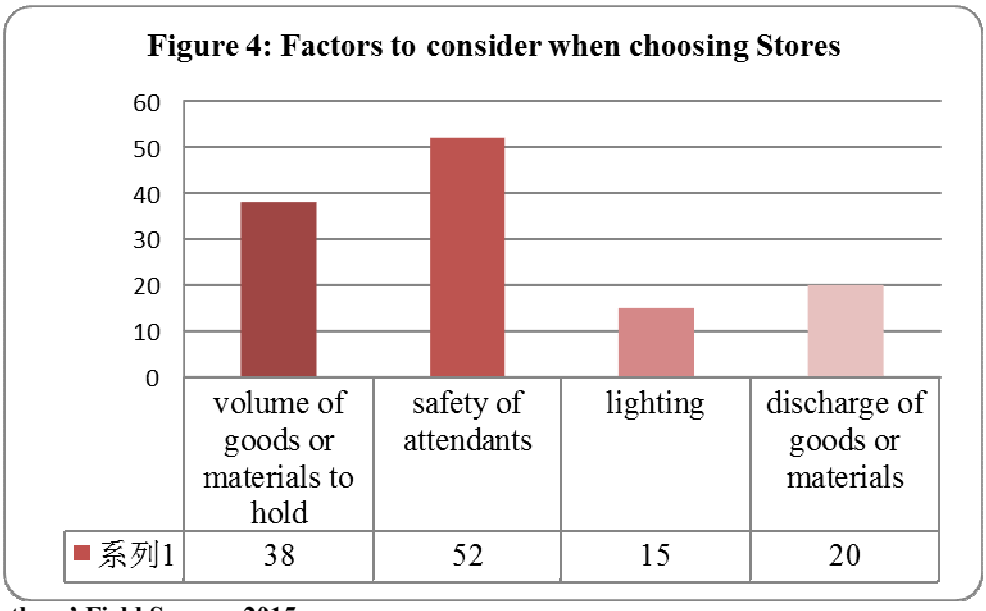
The researchers used purposive random sampling technique. Data for the study were obtained from respondents using validated questionnaire. In all, 125 questionnaires were prepared and administered to a purposive sample of top management staff whose names were obtained from the Deputy Regional Manager and other Staff from the Regional Medical Stores, Ashanti.

Researchers used Statistical Package for Social Science s (SPSS) software for the data analyses.

3. FINDINGS AND DISCUSSSIONS

3.1 Factors to consider when choosing stores

Lambert et al, (1998) mentioned seven (7) things that need to be considered in effective operations in the management of facilities which has store design as one of them and these are volume of goods or materials to hold, safety of attendants, lighting, discharge or release of the goods or materials amongst the list. In this direction, researchers sought to find out the factors that the RMS consider when choosing or designing stores or warehouse.

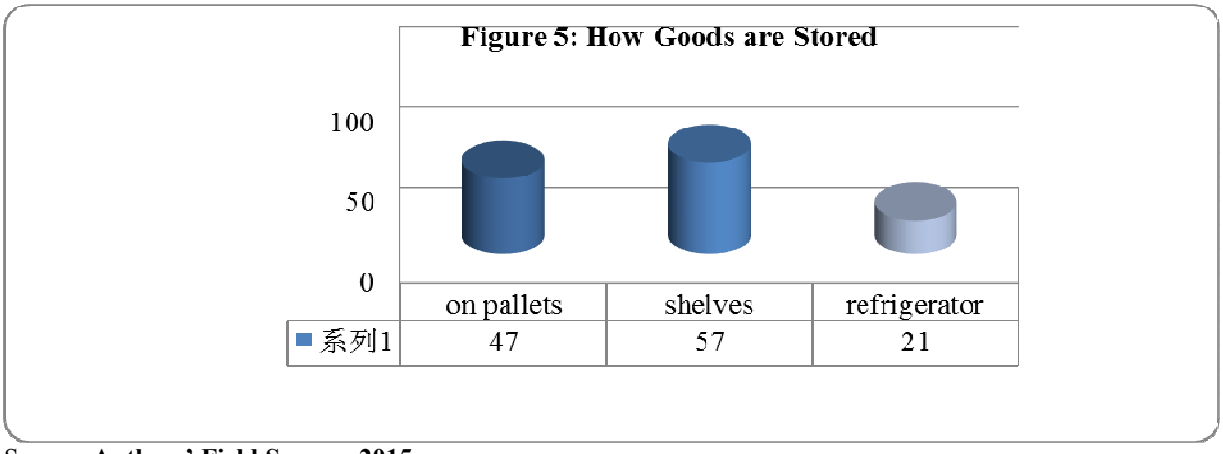


Source: **Authors' Field Survey, 2015**

The figure above indicates the factors to consider when choosing or designing a store or warehouse. The data indicated that all the four factors are very important to consider by managers and staff of the RMS working in the stores or warehouses. The most important factor observed from the analysis is the safety of the attendants which represented 42% followed by the volume of goods/materials to hold which is also represented by 30%. The least important factor to consider in stores design and operations is lighting, representing 12% whiles discharge of goods or materials represented 16%.

3.2 How Goods are Stored.

Stores had three basic functions namely; movement, storage and information transfer (Tompkins et al, 1996). This they argued would make the products or materials maintain their potency and efficacy before they get to consumers.



Source: **Authors' Field Survey, 2015**

As can be seen in the figure above, another critical issue to consider in stores design and operations is storage. Figure five above shows different means of storage in design and operations. Majority of the respondents store their goods on shelves which is represented by 46%. The least means of storage expressed by the respondents was through refrigeration represented by 17%. Notwithstanding that fact other means of storage include pallets, represented by 37%.

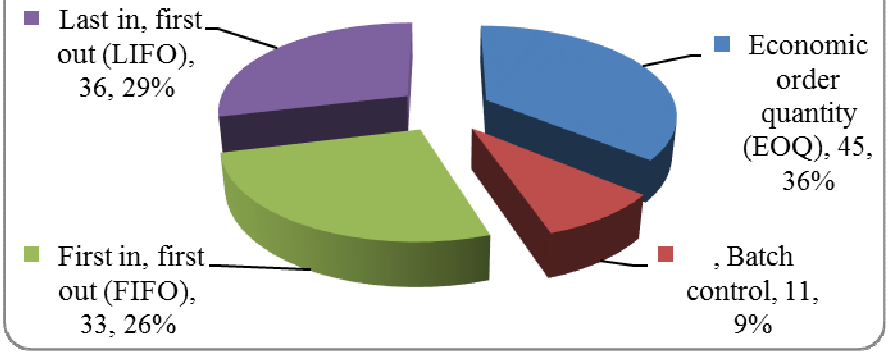
3.3 Stock Control Techniques

There are so many techniques of stock control used by management of stores but respondents were unfamiliar with these few mentioned as Last In, First Out (LIFO), Economic Order Quantity (EOQ), First In, First Out (FIFO) and Batch Control. The technique used by management of stores is the EOQ which was approved by 45 respondents out of the total of 125 respondents representing 36%. Batch control is the technique used by few

people represented by 9%, as shown in the figure below.

According to Ballard (2000), stock control is a prominent feature in most organizations and this is to make sure that what they have in place does not run out of order so that they can meet prompt supplies or demand. From figure 6 below, there are so many techniques of stock control used by man.

Figure 6: Stock Control Techniques



Source: **Authors' Field Survey, 2015**

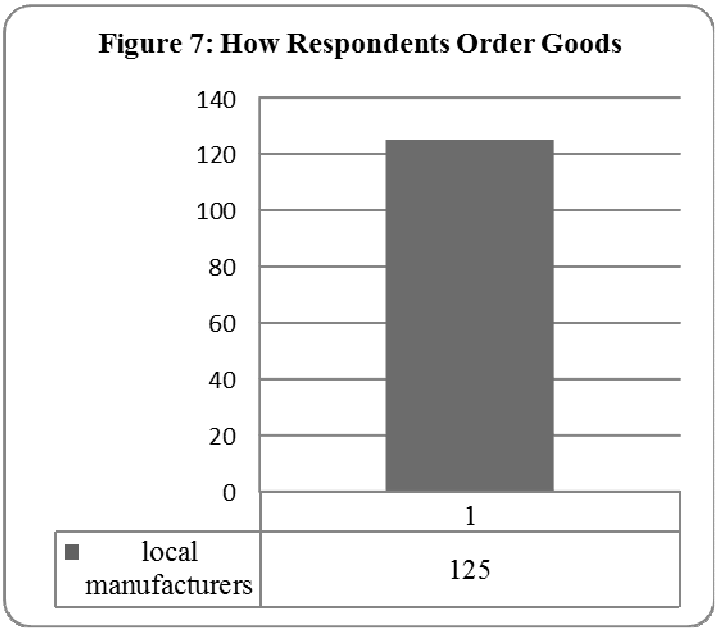
Baily et al. (1995), defines EOQ as the quantity that results in the lowest total of variable cost. This he meant, the more materials one holds, the more cost you incur and hence increasing the total cost and since it will be the firm's policy to hold economic stock, the economic quantity must be bought.

According to Lysons (1996), EOQ is the size of order that minimizes the total cost of acquiring and holding stock. This, Lysons did by Splitting the variable cost into two (acquisition and holding cost) but in all, they both realized that, the quantity of materials to buy will need good ordering policies.

According Section 47(2) of the Public Procurement Act (2003), Act 663, notices are to be placed in a wide circulation newspaper for tenderers (suppliers) to bid. The researchers observed that, All the respondents confirmed that, in order to meet operational requirements, they ordered goods by making a list of required items where the procurement officer receives and open tender through National Competitive Tendering (NCT) or International Competitive Tendering (ICT) depending on the type of Goods or materials to be ordered as seen in the table below.

3.4 How to Order Goods

Figure 7: How Respondents Order Goods



Source: **Authors' Field Survey, 2015**

Goods that the Regional Medical Stores (RMS) procured were; Drugs (Medicine) and Non-Drug (materials) through the Central Medical Stores (CMS), National Competitive Tendering (NCT) and International Competitive Tendering (ICT).

According to the World Bank (2002), Procurement must be done in the standardized procurement

procedures and tender documents with a verifiable independent control system to bring about Value for Money thereby preventing corruption. This the RMS did with perfection.

4. CONCLUSION

The study showed the design of warehouses is crucial in the storage and distribution of products and materials at and between point of origin and point of consumption. It was discovered that, though there were not enough engineers at the RMS to fall on to give the type of stores or warehouse to choose from, the managers and staff were able to see safety of attendants, how to discharge goods or materials at their bay and stores, lighting and volume of goods as key issues to consider when choosing a particular store or warehouse.

In stores design and operations, storage plays a critical role. The type of products or materials stored in a warehouse could determine the life span of such items. The storage of some drugs should be refrigerated whiles non-drugs could be stored in the bays or warehouses.

It was detected that majority of the goods (46%) were stored on shelves in the warehouse whiles the few (17%) were stored in refrigerators with the remaining non-drug items (37%) stored on pallets as other means of storage. Ordering of Goods had a significant influence in the design and storage of items which eventually leads to the distribution of both drugs and non-drugs products. The RMS procured their items from the Central Medical Stores (CMS). The Procurement Officer does this by opening tenders through NCT and ICT. According to section 47 (2) of Act 663, notices are to be placed to make supplies competitive and have Value for Money for the RMS.

5. RECOMMENDATION

It is recommended that the Regional Medical Store, Kumasi would make frantic efforts to have additional refrigerators to store the drugs at the well-approved temperature standards and adhere strictly to best storage principles. This will prevent the reduced potency of the drugs and also help reduce the disposal of such drugs because of spoilage (as seen in figure 3). The manufactures emphasizes on the storage of drugs at required temperatures and if not followed makes the drugs ineffective when consumed.

Also, the Regional; Medical Store, Kumasi must collaborate with the Ghana Health Service to train the store attendants on the proper Stock Control Techniques, materials and goods handling as well as storage of goods and materials in the stores. This will help store attendants/keepers to properly place in-bound materials (drugs and non-drugs) within the stores to maintain its efficacy. It will also help the attendants handle various items with care to prevent spillage of liquid contents.

The researchers also recommend that, the Procurement Officer should do well to purchase all materials by the provisions stated in the Public Procurement Act (2003), Act 663.

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