

The Factors Effecting Inventory Management System in FMCG(Fast Moving Consumer Goods) Organization

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Declaration

This is to certify that this dissertation titled" **The Factors Effecting Inventory Management System in FMCG(Fast Moving Consumer Goods) Organization.**" is the result of partial fulfillment of Masters in Procurement and Supply Chain Management program, under the supervision of Dr. Kazi Maruful Islam, Associate Professor, Department of Development Studies, University of Dhaka . It has not been submitted elsewhere for any other degree or diploma.

Signature of the Supervisor:

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Abstract:

Supply chain management addresses the management of materials and information across the entire chain from suppliers to producers, distributors, retailers, and customers. In the past few decades, scholars gave ample attention about the impact of inventory on Supply Chain Management (SCM). Roughly speaking, research on supply chain management has been mainly focused on three major issues. One is the behavior of information flow; the second issue deals with inventory management; the third issue is orientated to planning and operations management.

In this paper the second issue, namely inventory management will be discussed. The author will follow the phases of classifying inventory; identify what factors effect inventory on supply chain.

In this paper, through interview and questionnaire a view on the overall inventory system of Transcom Beverages Ltd, Gazipur, Dhaka branch is obtained. Their ordering cost, public demand, EOQ and ROL are shown in this paper. In this case it is seen that there is a considerable amount of gap Between safety stock and ROL. This is one of the major issues of this inventory management system. Also some recommendations are given with respect to the factor that effects their inventory system.

Acknowledgement

I would like to use this opportunity and express my gratitude to all employees of the Transcom Beverage Ltd. for their support in performing this research. A special thanks to Mr. Amirul Islam, the Shipping Manager & Engineer Golam Kabir, the Technical Support Manager, who have made this study possible.

Moreover the author would like to thank the supervisor Dr. Kazi Maruful Islam, BIGD, and the rest of the personnel at Department of MPSM, BRAC University for all the help, guidance and patience.

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Trisha Chowdhury.
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Contents:	Page:
1. Introduction	1
1.1 Background.....	1
1.2 Problem Discussion.....	2
1.3 Problem Presentation.....	2
1.4 Key Research Questions.....	3
1.5 Relevance.....	3
1.6 Delimitations and Limitations.....	3
2. Methodology.....	4
2.1 What is case study?.....	4
2.2 When to use case study?.....	4
2.3 Case Study Research.....	5
2.4 Research Design.....	5
2.5 Case Study Design.....	6
2.6 Data Collection.....	6
2.7 Research Method Selection.....	7
3. Theoretical Framework.....	8
3.1 Definition of key components.....	8
3.2 Reasons for holding inventory.....	8
3.3 Categories of Inventory.....	9
3.4 Types of Inventory /Stock.....	9
3.5 Inventory management conditions.....	9
3.6 Symptoms of Poor Inventory Management.....	10
3.7 Ways to reduce inventory levels.....	11
3.8 Inventory Management System/Analysis.....	11

4. Empirical Findings.....	12
4.1 Profile of the Organization.....	13
4.2 Products.....	14
4.3 Warehouse and storage.....	14
4.3 Procedure.....	16
4.3.1 Raw Materials.....	16
4.3.1.a. Raw Materials Storage.....	16
4.3.2Finished Product Warehouse.....	19
4.3.3Technical Store.....	22
5. Analysis.....	24
5.1 Classifying inventory.....	24
5.2 Identify cost factors.....	24
5.3 Assess cost components.....	26
5.3.1 Ordering cost factor.....	26
5.4 Calculation of EOQ & ROL.....	26
5.4 Research analysis.....	28
6. Conclusion.....	30
6.1 Management.....	30
6.2 Shortage of this thesis.....	31
7. Recommendation.....	32
8. References.....	34
9. Appendix.....	35

Introduction

This chapter includes the background of the problem addressed in this study, fenced by purpose of the project and its relevance. Reader can get a holistic view of this thesis.

1.1 Background

Procurement and inventory management form the interfaces in today's supply chains of industrial goods. As the global division of work is still increasing in all industries in order to improve speed, process integration and customer satisfaction there is a growing need for a modern sourcing system.

Procurement and Inventory Management are critical to production companies as well as to service companies, as spending in procurement is often one of the biggest parts of the company's budget. Procurement and inventory management ensure the availability of all supply categories for operations and infrastructure. Both are networked with the other functional areas making and delivering the products.

The aim of acting people in these value chains is a precise synchronization of purchases and inventories with sales and customer demand to deliver high service levels. Therefore there is a strong demand for the knowledge about managing supply and demand. This means knowledge about strategies, concepts, processes, methods and technical systems in the areas of procurement and inventory management.

Roughly speaking, research on supply chain management has been mainly focused on three major issues. One is the behavior of information flow through a supply chain.

The second issue deals with inventory management, which regards a supply chain as a multiechelon inventory system. The third issue is orientated to planning and operations management of a supply chain based on queuing systems.

In this paper the second issue, namely inventory management will be discussed.

1.2 Problem Discussion

Inventory can range from raw materials, cash, finished goods, etc. Effective inventory management will optimize the supply chain, eliminate cash flow and reduce the possibility of occurrence on inventory shortage caused by variable orders.

Consequently, it is of utmost importance to optimize inventory management to satisfy the company's strategy goal.

Lee et al. (1997) describes a problem frequently encountered in supply chains, called the bullwhip effect: demand variability increases as one move up the supply chain.

This distorted information throughout the supply chain can lead to inefficiencies: excessive inventory investment, poor customer service, lost revenues, misguided capacity plans, ineffective transportation and missed production schedules (Lee et al., 1997a).

1.3 Problem Presentation

Managing a company's inventory is such an important part of most businesses. Without a proper management system in place, long-term profits can be affected, as more inefficiencies are likely to occur.

Here are a few of the most **common inefficiencies** that are caused by improper inventory management:

- Inaccurate quantities
- Inaccurate identification of items
- Inability to fulfill orders efficiently
- Overstocking (excess inventory) or lack of inventory
- Improper use of spreadsheets to track inventory, which leads to inaccuracies

Unfortunately many companies and organizations in Bangladesh are not aware of this.

The purpose of my research is to find out the factors that effect inventory management system in FMCG organization .

1.4 Key Research Question:

This dissertation aims at finding answers of the following research questions:

1. What is the existing operational procedure of the inventory management system of the organization?
2. What are the problems faced with current system of the inventory management system?
3. What factors effect the inventory management system?

1.5 Relevance

The relevance of this research is shown together with a motivation of why it is important to do research within the area of inventory management. This study is both theoretically and practically relevant because it involves a working procedure of how to be effective within inventory management. According to the optimization of inventory management, production manager can easily coordinate other department so as to improve supply chain to enhance the competition of the firms.

1.6 Delimitations and Limitations

The study will be carried from the supply chain perspective; however the study area will be limited within the case study ; Transcom Beverages Ltd . The case company has no concrete method to calculate the inventory. That means lack of information gathering. But the author can bring something different inspiration to other research according to the conduction of hermeneutic scientific perspective.

2. Methodology

In this chapter we will discuss the methodology used for this research i.e. "case study" . After giving a theoretical demonstration of each part of the methodology, we will explain how we used these approaches to generate our project with our motivation.

One crucial factor in any scholarly research is the theoretical perspective that will inform that research. The perspective will affect the kind of information gathered, the way it is interpreted, and the ultimate answers that the research will uncover.

2.1 What is case study?

Case study as a research strategy often emerges as an obvious option for students and other new researchers who are seeking to undertake a modest scale research project based on their workplace or the comparison of a limited number of organisations. The most challenging aspect of the application of case study research in this context is to lift the investigation from a descriptive account of „what happens“ to a piece of research that can lay claim to being a worthwhile, if modest addition to knowledge.

2.2 When to use case study?

Case studies as a research method or strategy have traditionally been viewed as lacking rigor and objectivity when compared with other social research methods. This is one of the major reasons for being extra careful to articulate research design, and implementation. On the other hand, despite this skepticism about case studies, they are widely used because they may offer insights that might not be achieved with other approaches. Case studies have often been viewed as a useful tool for the preliminary, exploratory stage of a research project, as a basis for the development of the „more structured“ tools that are necessary in surveys and experiments.

The first stage is to decide whether case studies can be useful for a specific kind of investigation.

There are three factors that determine the best research methodology:

- The types of questions to be answered
- The extent of control over behavioral events and
- The degree of focus on contemporary as opposed to historical events.

Strategy	Form of research question
Experiment	How, why
Survey	Who, what, where, howmany, how much
Archival analysis	Who, what, where, how many, how much
History	How, why
Case study	How, why

Figure 1: Choosing a research strategy

In summary then, case study research is useful when:

"A how or why question is being asked about a contemporary set of events over which the investigator has little or no control. "(Yin,1994)

2.3 Case Study Research

Yin (1994) defines a case study thus:

A case study is an empirical inquiry that:

- Investigates a contemporary phenomena within its real life context, especially when
- The boundaries between phenomenon and context are not clearly evident.

This statement emphasizes that an important strength of case studies is the ability to undertake an investigation into a phenomenon in its context; it is not necessary to replicate the phenomenon in a laboratory or experimental setting in order to better understand the phenomena. Thus case studies are a valuable way of looking at the world around us.

2.4 Research Design

A research design has the following components:

- The study's questions
- The study's propositions
- The study's units of analysis
- The logic linking the data to the propositions
- The criteria for interpreting findings.

2.5 Case Study Design

Tests	Case Study tactic	Phase of research in which tactic occurs
Construct validity	Use multiple sources of evidence Establish chain of evidence Have key informants review draft case study report	Data collection Data collection Composition
Internal validity	Do pattern matching Do explanation building Do time series analysis	Data analysis Data analysis Data analysis
External validity	Use replication logic in multiple case studies Use case study protocol Develop case study database	Research design Data collection Data collection
Reliability	Develop case study database	Data collection

Figure 2: Checking Case Study Design

	Single case designs	Multiple case designs
Holistic (single unit of analysis)	Type 1	Type 3
Embedded (multiple units of analysis)	Type 2	Type 4

Figure 3: Case Study Design

2.6 Data Collection

Data collection, in this project, is guided by case study protocol. This includes the following sections:

1. Interviewing the Managers of the company to understand the standard procedure of their inventory system.
2. Interviewing the line-in-charge and relevant discussion.
3. Gathering data from the annual report of the company.
4. Visiting the company and observing the procedure of work.

2.7 Research Method Selection

The selected research strategy is "Case Study". The selected case design is "Holistic Single Case Design".

This project suits better with case study; as the main concern with the project is "how and why?" Hence, case study is a good method for this process. As Trancom Beverage limited is a vast organization and one of the leading companies of beverage market in Bangladesh, a case study on the basis of their inventory management system will give insights of what are the factors that effect the inventory management system.

3. Theoretical Framework

This chapter describes relevant research theories that are used to accomplish the analysis of this research.

3.1 Definition of key components

Inventory:

Inventory is the stock of any item or resource used in an organization.

Inventory management system:

Inventory Management is **“making sure that items are available when customers call for it, but not too much stock so that inventory turnover goals are met”**

- Juhi Gonzales, Inventory Management and Systems Consulting(1999)

Inventory Management is **“the art and science of managing to have the RIGHT PRODUCT, at the RIGHT TIME and PLACE, in exactly the RIGHT AMOUNT, at the BEST POSSIBLE PRICE”**.

-Hilton, Ronald W., Managerial Accounting. McGraw-Hill, Inc (1994)

3.2 Reasons for holding inventory

- Inventory balances supply and demand
- Inventory acts as a buffer between critical supply chain interfaces
- Supplier - Procurement
- Procurement - Production
- Production - Marketing
- Marketing - Distribution
- Distribution - Intermediary
- Intermediary - User
- Inventory allows for economies of scale in

-Purchasing

-Transportation

-Manufacturing

Inventory acts as a buffer between supply and demand fluctuations and irons out supply chain system failures. The smoother the supply chain operates, the better is the forecasting, the lesser inventory to hold.

3.3 Categories of Inventory

- Raw material inventory
- Work-in-progress inventory
- Finished goods inventory

3.4 Types of Inventory /Stock

- Cycle stock
- In-transit stock
- Safety or buffer stock
- Speculative stock
- Seasonal stock
- Dead stock

If demand and lead time is constant, only cycle stock is necessary. In-transit inventory is usually accounted for on the place of shipment as it is not available at the destination. In-transit stock can be reduced through faster modes of transportation. Safety or buffer stock is a result of uncertainty of demand and lead time. Speculative stock is inventory held for reasons other than satisfying current demand, often acquired to reach economies of scale or to generate seasonal stock. Dead stock includes items for which no demand has been registered and may become obsolete.

3.5 Inventory management conditions

- Certainty
- Uncertainty

The following are the principal assumptions of the simple EOQ model:

- A continuous, constant, and known demand rate and lead time
- The satisfaction of all demand
- No inventory in transit and one item of inventory
- No limit on capital availability and infinite planning horizon
- Price and cost are independent of order quantity or time

The EOQ in units can be calculated using the following formula:

$$EOQ = \sqrt{(2 * A * D / C * V)}$$

Where

A = the ordering cost per order

D = annual demand or usage of product (number of units)

C = annual inventory carrying cost (as a percentage of product cost)

V = average cost of one unit of inventory

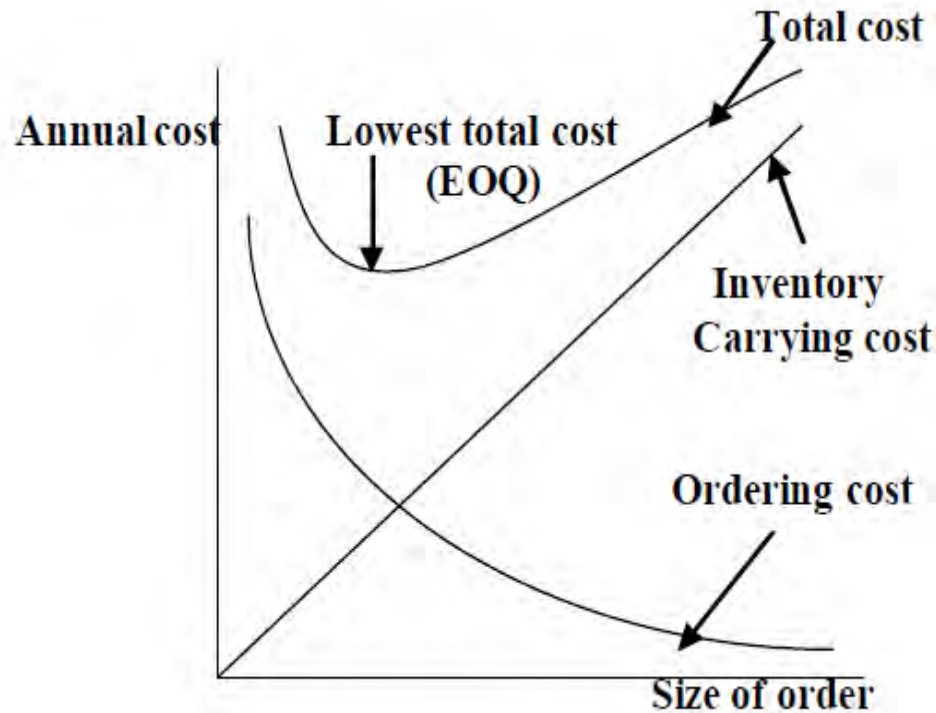


Figure 4 : Cost required to determine the Most Economical Order Quantity

This formula can be adjusted for volume discounts and incremental replenishment, as well as other conditions.

3.6 Symptoms of Poor Inventory Management

- Increasing number of backorders
- Increasing cancelled orders
- Increasing numbers of returns
- High customer turnover rate
- Large number of obsolete items
- Periodic lack of storage space

There is a problem if backorders continue to increase and at the same time there is increase in cancel orders. Reverse logistics may be tasking as well as the number of turns increase and the organization end up losing customers, while accumulating obsolete items which among other things may lead to lack of storage space.

3.7 Ways to reduce inventory levels

- Lead-time analysis
- delivery -time analysis
- Eliminate low turnover items
- Analysis of package size
- Analysis of discount structure
- Examine returned goods procedures
- Measurement of fill rate by stock-keeping unit(BDT)
- Analysis of customer demand
- Improve forecasting
- Improve Electronic data interchange with vendors/suppliers

The above mentioned ways to reduce inventory levels should be part of a system approach to improve inventory management system.

3.8 Inventory Management System/Analysis

- ABC analysis
- Forecasting
- Advanced Order Processing System
- Enterprise Resource Planning(ERP)
- Electronic data Interchange(EDI)
- Knowledge Management(KM) systems
- Vendor-Managed Inventory(VMI)

ABC analysis is a tool to classify items according to their relative importance/profitability(like category A items are more important than category B items and so on). A distribution by value usually forms the basis of an ABC analysis. Better sales forecasting and advanced order processing systems as part of a larger marketing plan will reduce inventory. ERP system such as SAP will eliminate stovepipes and information sharing along with a company KM system. Top management may see VMI as a way to outsource the inventory problem. But one has to be careful as it requires a high degree of transparency and integration between the partners.

4. Empirical Findings

This chapter deals with the company's presentation and research tools. All relevant empirical data needed for analysis is presented here.

4.1 Profile of the Organization:

Transcom Limited is a Bangladeshi business conglomerate. The businesses under this group include Beverage, Pharmaceuticals, Newspaper, Radio channel, Electronics, Foods etc. This group employs more than 10000 people. Transcom Group is one of the oldest and biggest companies in Bangladesh. Their operation in Bangladesh initially started in 1885 as a tea plantation company.

Their aspect of business includes the following:

1. Transcom Beverages Limited(7UP, Merinda, Sprite, Aquafina water, etc.)
2. Prothom Alo (Leading newspaper in Bangladesh)
3. The Daily Star
4. ABC Radio
5. Transcom Foods Limited
6. Transcom Electronics Limited
7. Transcom Cables Limited
8. Eskayef Bangladesh Limited
9. Bangladesh Electrical Industries Ltd.
10. Bangladesh Lamps Ltd.(BLL)
11. Bangladesh Lamps Limited (BLL).It is enlisted as Engineering Firm in the Dhaka stock exchange .
12. Tea Holdings Limited
13. Transcom Distribution Co. Ltd.
14. Saphtahik 2000
15. Anondodhara
16. Transcraft Limited
17. Transfin Trading Limited
18. Trinco Limited
19. Transcom Mobile Ltd.

The industry of research is "Transcom Beverages Ltd.

4.2 Products:

The company is the exclusive PepsiCo Franchisee for Bangladesh. TBL owns and operates modern plants in Dhaka and Chittagong for bottling the renowned soft drink brands:

Pepsi, Pepsi Diet, 7Up, 7Up Light, Mirinda, Slice, Mountain Dew and Aquafina drinking water.

Their objective is to deliver sustained growth in Bangladesh and move towards dominant Beverage Company, delighting & nourishing every Bangladeshi, by best meeting their everyday beverages needs & stakeholders by delivering performance with purpose, through talented people.

4.3 Warehouse and storage:

There are two kinds of warehouse in this organization. They are:

1. Raw material warehouse.
2. Finished product warehouse.

There is only one storage in this organization. That is:

1. Technical store.



Figure 5: Raw materials warehouse,



Figure 6: Finished product warehouse



Figure 7: Technical store.

4.3 Procedure:

This section will cover step by step procedure of how goods and products are stored in the warehouse.

4.3.1 Raw Materials:

Raw materials include not only raw materials of beverages, but also raw materials for producing bottles for the beverages. So raw materials include - sugar, beverage formulae, preform (for bottles)

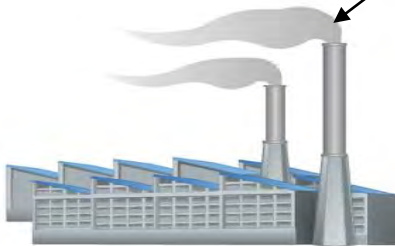
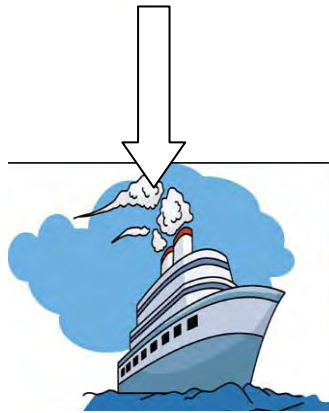
Raw materials are imported from countries like Ireland, India , Pakistan, China etc via water ways. Containers reach Chittagong sea port. From there raw materials are distributed to Chittagong and Dhaka plant.

There is separate warehouse for raw materials, as mentioned earlier. Materials are stored there.

4.3.1.a. Raw Materials Storage

Types of racking:

1. **Fixed pallet racking** : This is constructed of a strong frame usually made of steel with shelving of the same material.
2. **Drive-in and drive-through racking**: These are pallet-based racking systems that allow access for forklift trucks.
3. **High-rack and narrow-aisle racking**: Designed to maximize space, the racking utilizes the full height of the warehouse with aisles placed as close as possible to each other to allow access by either manually driven or computer-controlled forklifts.



Chittagong Factory



Dhaka Factory

Figure 8: Importing raw materials.



Figure 9: Fixed pallet racking



Figure 10: Drive-in & drive through racking



Figure 11: High rack & narrow aisle racking

4.3.2 Finished Product Warehouse

The main products of Transcom beverage are: Pepsi, 7Up, Mirinda, Slice, Mountain Dew, Pepsi Diet, 7UpLight and Aquafina water.

From the factory, after production, products are taken and kept in the warehouse. There are separate sections for separate products.

For Aquafina drinking water, the products need to settle down for 24 hours before they are ready for use or distribution. The products that are not ready for use or distribution yet, are given a red tag mark. (Figure 14(b))

From the warehouse, products are carried via truck and thus distributed throughout the country.

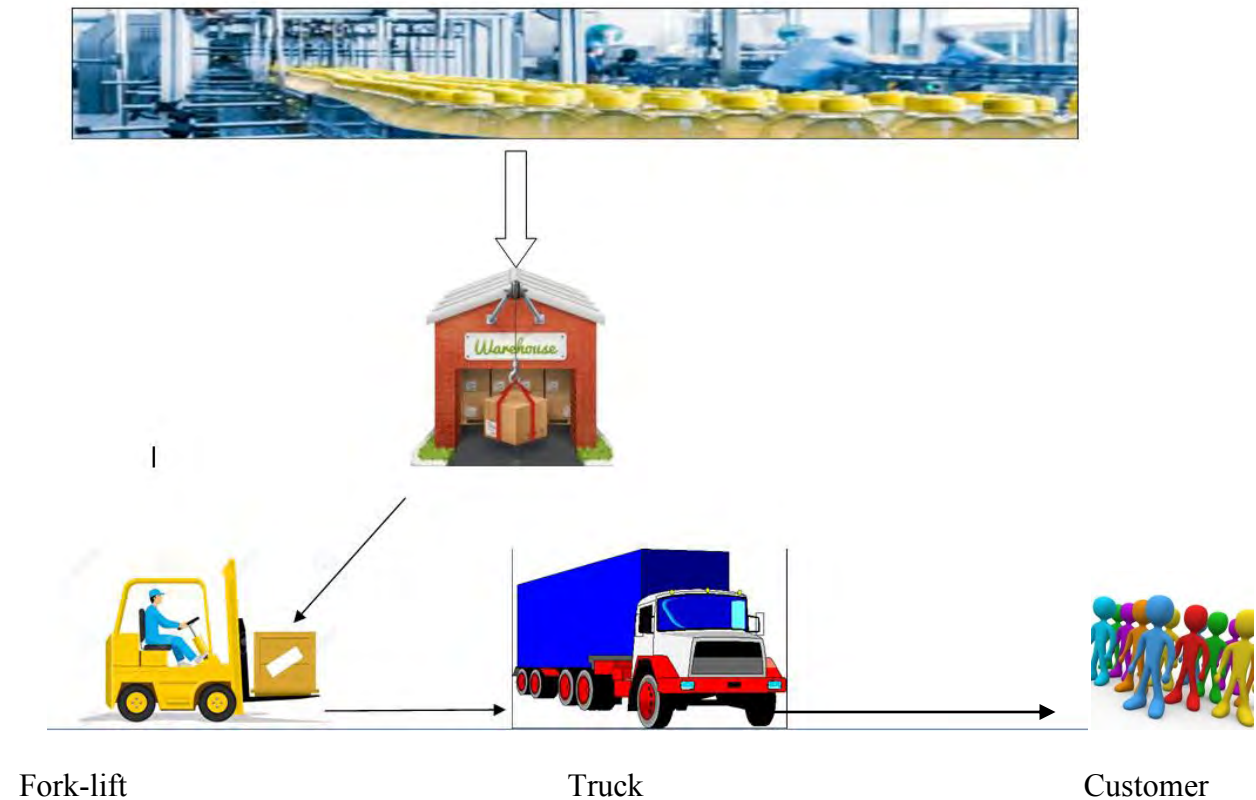


Figure 12: Transferring finished products.



Figure (13-a)



Figure (13-b)

Figure 13-a, 13-b: Warehouse for beverages.



Figure 14(a)



Figure 14(b)



Figure 14(c)

Figure 14-a, 14-b, 14-c: Warehouse for Aquafina drinking water

4.3.3 Technical Store

The items that are kept in technical store are: Local and foreign spare parts of machineries, oil, Mobil , grease etc. The foreign items are imported from different countries mainly via air-ways and sometimes via water-ways.

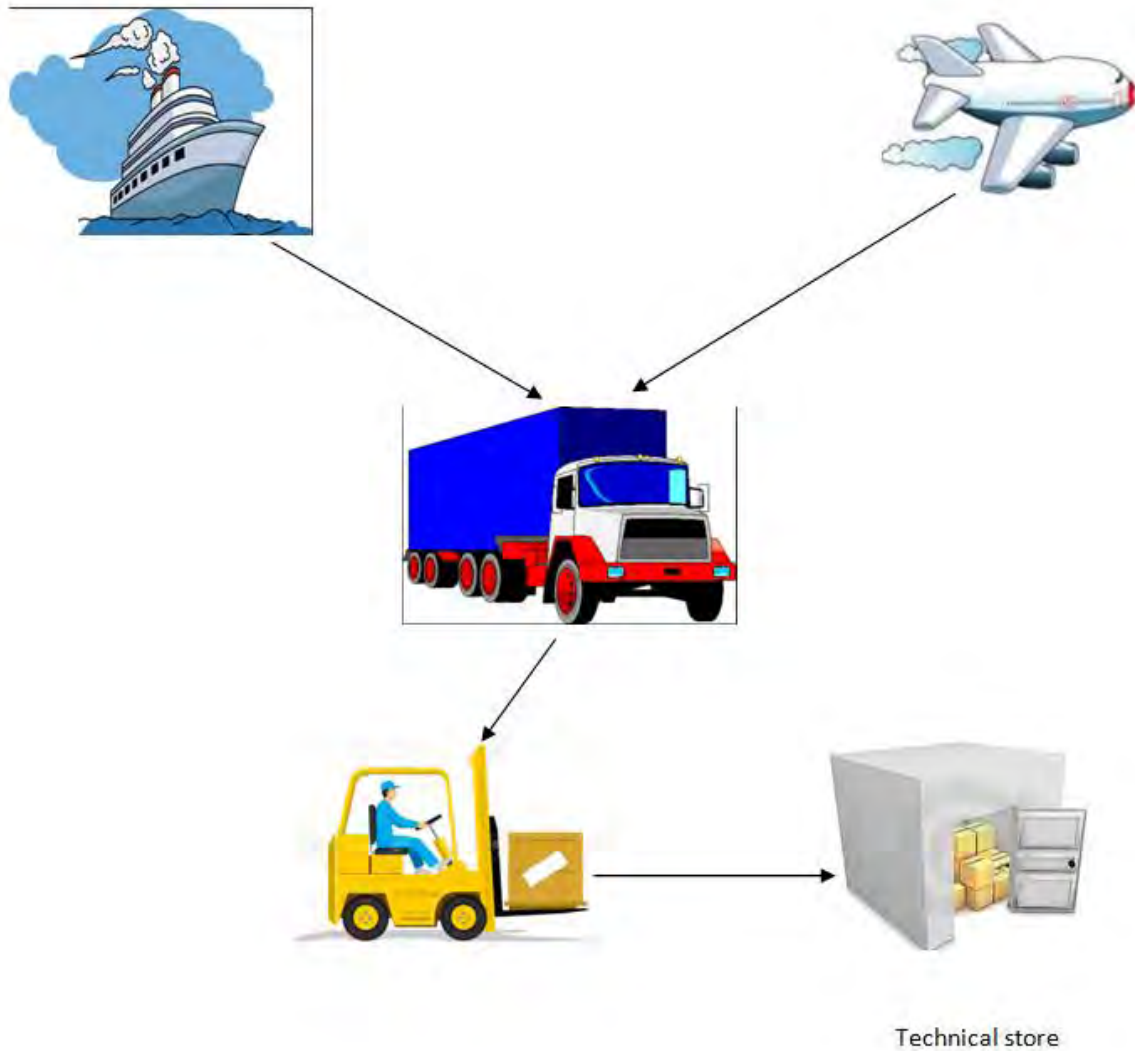


Figure 15: Acquiring technical materials.



Figure 16(a)



Figure 16(b)



Figure 16(c)

Figure 16-a, 16-b, 16-c: Technical store

5. Analysis

This chapter illustrates cost factors, shows the questionnaire and analysis on the factors affecting the inventory management system.

5.1 Classifying inventory

Multiple product lines and inventory control require companies to focus upon more important inventory items and to utilize more sophisticated and effective approaches to inventory management. Inventory classification is usually a first step toward efficient inventory management.

Though there are no specific system or classifications for raw material and technical store, the finished products warehouse follow FIFO system.

The first in, first out (FIFO) method of inventory valuation is a cost flow assumption that the first goods purchased are also the first goods sold. In most companies, this assumption closely matches the actual flow of goods, and so is considered the most theoretically correct inventory valuation method. The FIFO flow concept is a logical one for a business to follow, since selling off the oldest goods first reduces the risk of obsolescence.

Under the FIFO method, the earliest goods purchased are the first ones removed from the inventory account. This results in the remaining items in inventory being accounted for at the most recently incurred costs, so that the inventory asset recorded on the balance sheet contains costs quite close to the most recent costs that could be obtained in the marketplace. Conversely, this method also results in older historical costs being matched against current revenues and recorded in the cost of goods sold; this means that the gross margin does not necessarily reflect a proper matching of revenues and costs. For example, in an inflationary environment, current-cost revenue dollars will be matched against older and lower-cost inventory items, which yields the highest possible gross margin.

5.2 Identify cost factors:

Inventory cost can be divided into carrying cost and order cost. In order to give a holistic view of the factors and elements of carrying cost, a CauseEffect diagram is used as following:

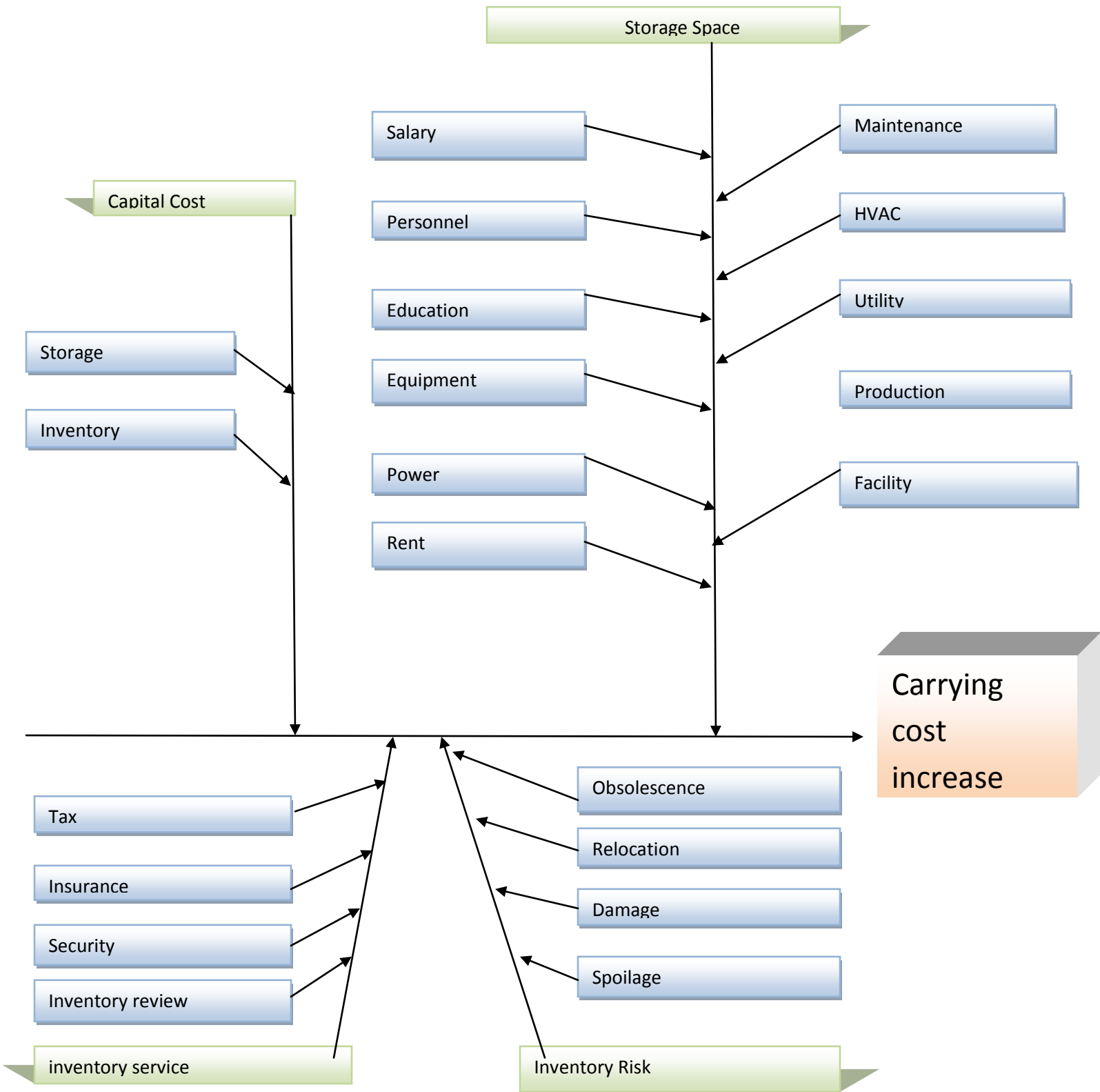


Figure 17: Cause Effect diagram of carrying cost effect

5.3 Assess cost components

5.3.1 Ordering cost factor:

The following ordering cost components were provided by Mr Amirul Islam, the Shipping Manager of TBL, Gazipur factory , from the record book of 2014.

Procurement: As mentioned in theory part, production should be ensured with continuous material supply. The company uses 6-8 suppliers when it comes to product deliveries; hence, the supplier resources never short. They sign contract with supplier for a period of 1-3 years.

The personnel at Transcom Beverages Ltd. spend 3 hours each week on this aspect, and each hour costs approximately 2000 BDT. Production is performed 50 weeks yearly. This gives a total procurement cost of 300,000 BDT ($= 2000*50*3$)

Material handling: It takes approximately 20 minutes to move 3 trucks of raw material from the loading dock to the storage space. Each hour cost 200 BDT. According to the shipping manager of TBL material handling cost is about 90,000 BDT.

Payment: The personnel at TBL devote about 2 hours each week for raw material payment, and each hour costs approximately 200 BDT. Production is running 50 weeks yearly as well. This gives a total payment cost of 20,000 BDT. ($= 2*200*50$)

Total ordering: Hence, the total ordering cost is namely 410,000 BDT. The company order times are 617. Consequently, each ordering costs 665 BDT.

Inventory review is performed both weekly (48 weeks) and monthly (12 months). The monthly review requires 5 hours to a cost of 300 BDT each hour. The weekly review takes about half an hour, to a cost of 200 BDT per hour. The cost for inventory review is thus 22,800 BDT ($5*300*12 + 0.5*200*48$). The total cost of inventory service is 27,800 BDT

5.4 Calculation of EOQ & ROL

To be able to make the calculations the following figures were obtained from the case company from the journal of 2014:

Ordering cost	665 BDT
Annual demand	50,00,000 cases(1case =24 bottles)
Total inventory	20,000,000 BDT
Inventory value	21,000 BDT

To find the inventory carrying cost the relevant figures where gathered from TBL journal:

Mean inventory value	8,000,000 BDT
Handling equipment	160,000 BDT
Personnel stores	100,000 BDT
Storage space	720,000 BDT
Inventory service	27,800 BDT
Total =	9,007,800 BDT

This gives the following values:

A = ordering cost (BDT per order) = 665 BDT

D = annual demand = 50,00,000 cases(1case =24 bottles)

C = annual inventory carrying cost = 9,007,800/20,000,000 = 0.45 = 45%

V = average value of one unit of inventory = 21,000 BDT

When put in the formula the result is as following:

$$EOQ = \sqrt{2 * (A * D / C * V)} \approx 839 \text{ units per order}$$

Calculations for ROL

The formulae used:

$$X = D * L$$

$$\sigma^2 = L (\sigma D)^2 + D^2 (\sigma LT)^2$$

Where

X = mean (average) demand during lead time

σ = standard deviation of demand during lead time

L = mean (average) of lead time length

σLT = standard deviation of lead time length

D = mean (average) daily demand

σD = standard deviation of daily demand

The necessary figures were obtained from the company:

Average demand/day	13700 cases
Demand variation	240 cases
Average supplier lead-time	2 days
Lead-time variation	12 days
Safety stock	10000 cases

This gives the following values:

$$X = D * L = 13700 * 2 = 27400 \text{ cases}$$

$$\sigma \approx 1445$$

The reorder point for the 3 σ (99.87%) service level was 31735cases. (27400 + 3*1445)

5.4 Research analysis:

From the calculations

It can be seen that there is a considerable amount of gap between safety stock and reorder point. While reducing safety stock, they may have reduced inventory cost but this has negative effect on customer service level.

From research questions and interview some of the factors that effect TBL's inventory system are obtained. They are discussed below

Inventory Management

The company takes steps to minimize inventory losses stemming from theft and spoilage by "cycle counting." In this procedure, they physically count a portion of inventory every day until they survey the entire lot and then start over again. The quicker they become aware of problems, the sooner they can take corrective action.

Goals of the organization

The company's sales goals and customer service objectives are internal controls that they direct. For example, if they promise same-day delivery, their inventory management must have the product on hand to meet customer demands. Economic downturns, poor real estate markets or local competition are external controls over which they often have no recourse.

Responsibility of staff

According to the factory manager of TBL, Gazipur factory, Mr Samsul Alam, as a business owner, the company has the ultimate responsibility to oversee inventory and ensure orders are placed appropriately and regular audits are performed. While they may hire managers and accountants to oversee the process, their primary overseeing duties are the only internal control they can count on. Employees typically don't have the same stake in the business as the company does and may not keep a close eye on inventory.

Availability of suppliers

One of the most frustrating external factors for business owners is an unpredictable or unreliable supplier. Product suppliers who deliver poor-quality merchandise also can throw unexpected snags into inventory supply chain, says the factory manager Mr. Samsul Alam.

Unskilled Labor and Staff:

Inventory operations management is a process-oriented operation. Every task and action required to be carried out by the operatives will impact the inventory as well as the delivery lead times and other parameters.

But in TBL there are no provisions for orientation of staff or training personnel. Operatives who are carrying out the task should know why and what is required to be done. They should also know the consequences of not following the process.

Mr. Amirul Islam, the Shipping Manager of TBL, Gazipur branch, says that unskilled labours are frustrating and often slows down the distribution process

Economic Environment

A slow economy can put a damper on sales, which means the company needs to run a tight ship - acquiring only the amount of inventory they are likely to sell in a reasonably short period of time. According to GM of sales department of TBL, Mr. Asrar Alam, this happens during winter season, as sales of beverages relatively go down in winter. If interest rates are high, the company might find it too costly to finance as much inventory as they would like.

Market Environment

The public can have fickle buying habits, meaning today's hot item might be passé tomorrow. According to Marketing manager of TBL, Mr. Arifur Rahman, when the price of obsolete inventory falls below acquisition costs, specially during off-peak seasons, generally accepted accounting principles calls to mark down inventory to the lower of cost or market. They try to increase their COGS and thus reduce taxable income. Other external factor for goods include government recalls and product bans, international boycotts, technological improvements, tariffs and bad publicity.

6. Conclusion:

Due to the effective inventory management, procurement goal can be achieved quickly. As we know, inventory is the joint of the whole supply chain. When optimized the inventory management, upstream activities will run effectively meanwhile downstream activities will go ahead without any stoppage.

6.1 Management :

In this case study, it is seen the inventory management system has two Managers.

Raw materials department is handled by Mr Dipon, the Raw materials in-charge. Finished goods are handled by Mr. Fokuruddin, the finished good in-charge. Both of them report to Mr Amirul Islam, the Shipping Manager. Technical materials department is handled by Tanvin Hossain, the store in-charge. Engineer Golam Kobir, the Technical Support Manager oversees this section. Though part of the same department, there are two different reporting Managers. The sections are made as technical and non-technical. This distributes the load of work.

So the hierarchy of the inventory management goes as follows:

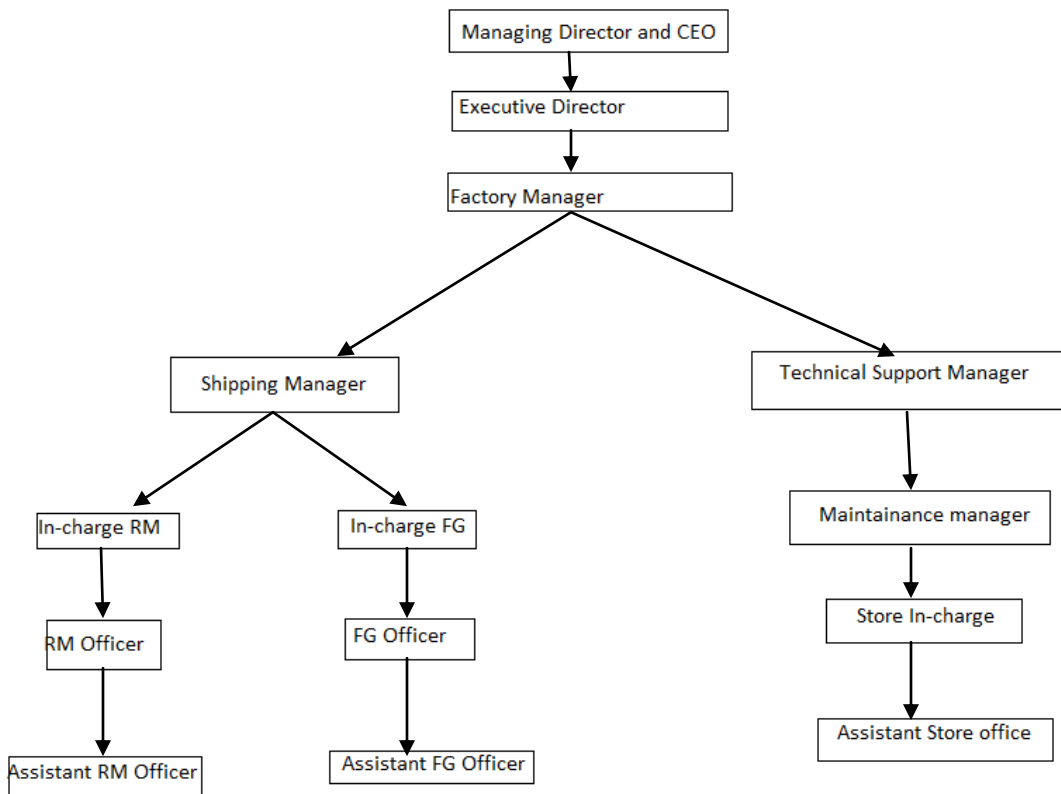


Figure 18: Hierarchy of Inventory Management system.

6.2 Shortage of this thesis

Apparently, there is no perfect work. Therefore, a discussion of some aspects that could have been done better in this research is necessary:

- During the interview the author just visits 3 departments of the case company. If it is possible, more departments, more better. The author comes to this conclusion when the project needs more information.
- Within a case study however, this is often a utopia. The author has both a pre-understanding and to some extent preconceived ideas, and therefore the backgrounds most likely have affected this research. But this will give a different perspective for further study.
- Statistical data and comparison with other related companies would have helped to go deeper and make more constructive research. However for lack of data and time, that was not possible

7. Recommendation:

In this section recommendation is given on the factors that effect inventory management system.

Reduce gap between safety stock & ROL

A balance between safety stock and ROL gives good customer service. It is important for reaching customer service level.

Adapting to Economic Environment

During times of high inflation, adapting to last-in, first-out costing, so that the cost of goods sold reflects the most recent and highest prices, thereby minimizing taxable income.

Adapting to Market Environment

In this case, they might find it beneficial to establish fixed-rate lines of credit when interest rates are low.

Acknowledging Responsibility

Many factors affect inventory management, including the quality of supervisory and operations personnel, counting and auditing procedures, security precautions and relationships with suppliers. A business owner must assume responsibility for all these factors and ensure operations are as foolproof as possible.

Fixing Goals

Flexibility to deal with market ups and downs should be an integral part of their company goals to bend pricing rules, offer discounts or sit on their inventory when shifts in consumer buying habits occur.

Increase sense of Responsibility in staff

As an external factor, they have some control over their fate, however. they can reward employees who maintain inventory controls set in place and remove those who continually make bad inventory decisions.

Using multi-sourcing

Understanding suppliers' lead-time requirements can help maintain sufficient inventory. Finding and utilizing backup suppliers is an internal decision that also can cover inventory shortages. Joining a bulk-purchasing group places some of their inventory control in the hands of others, but may prove to be worthwhile.

Provide Training to the Staffs:

Knowledge of what one is required to do and the effect of the action should be known to the operatives who are on the shop floor. For Example: If an operative is given a put away task, he should know how and where he should put away the pallet, how to scan the pallet ID and confirm it back to the system. Besides he should also know the impact of not completing any of these actions or doing something wrong. The impact his action will have on the system as well as physical inventory should be clear to the operative.

The operatives should be trained on the entire process and understand why and what he is doing.

Having positive Attitude:

Maintaining inventory accuracy must be an integral part of the attitude of the organization. Like quality, customer service, and plant safety, accuracy must be promoted throughout the organization as everyone's responsibility. This attitude must start at the top levels

Dedicate positions for managing inventory:

They should have control of which employees are affecting their inventory. This is especially true in manufacturing operations where the priorities of machine operators and production supervisors are meeting the production schedule, keeping the machines running, and ensuring the quality of the product being produced. Inventory accuracy will never be a primary responsibility of these types of positions. Once they come to this realization it is easy to see the benefits of putting inventory and material handling responsibilities in the hands of people whose primary responsibility is inventory.

Process data accurately

The more they know about how their specific inventory system works, the more successful they will be in optimizing its features.

The only way to determine the source and correct problems is to have a thorough understanding of how the system is set up and how information is processed and data is stored. The bigger advantage to acquiring a high level of system knowledge lies in the amount of information they will be able to extract from the system.

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9. Appendix

Appendix 1:

List of figures

Figure 1: Choosing a research strategy

Figure 2: Checking Case Study Design

Figure 3: Case Study Design

Figure 4 : Cost required to determine the Most Economical Order Quantity

Figure 5: Raw materials warehouse

Figure 6: Finished product warehouse

Figure 7: Technical store

Figure 8: Importing raw materials

Figure 9: Fixed pallet racking

Figure 10: Drive-in & drive through racking

Figure 11: High rack & narrow aisle racking

Figure 12: Transferring finished products

Figure 13-a, 13-b: Warehouse for beverages

Figure 14-a, 14-b, 14-c: Warehouse for Aquafina drinking water

Figure 15: Acquiring technical materials

Figure 16-a, 16-b, 16-c: Technical store

Figure 17: Cause Effect diagram of carrying cost effect

Figure 18: Hierarchy of Inventory Management system.

Appendix 2:

Questionnaire:

Questions for Managers:

1. What kind of Inventory management system exists in the organization?

a. Periodic inventory system ()

The Inventory account is commonly updated or adjusted only once—at the end of the year. During the year the Inventory account will likely show only the cost of inventory at the end of the previous year.

b. Perpetual inventory system (√)

Under this system the Inventory account is continuously updated.

2. What tools/systems are used ?

a. Pen and paper (√)

b. Software tools()

Specify the name:

c. Others()

Specify:

3. How efficient is that?

Score from 1-5, 1 being lowest and 5 being highest.

(2)

4. How is the collaboration between other departments and inventory department maintained?

Good understanding

5. a. In the prevailing system, was there any incident where the real balances of your products differ from those calculated?

Yes

b. If yes, according to you, what part of your inventory management is responsible for it?

Negligence in record keeping.

c. What are the reasons of this failure?

Negligence

d. What steps are taken to prevent this?

Step1: Warning, Step 2: Counseling, Step 3: Show cause, Step4: Termination

6. How recruitment is done in inventory sector?

Internal recruitment

7. Is there any training arrangement for the personnel?

No

8. What are the major factors that affect your inventory management system:

Economic environment, Market environment, Inventory management, Goals, Responsibility, Availability, Unskilled labour and staff.

9. Are you satisfied with the prevailing system?

No

10. What are the major challenges?

Matching the inventory management system to the type of product and keeping accurate data.

- **Lead-times**
- **Inventory levels – they need to be accurate**
- **Maintaining accurate data**

11. What improvements are to be made?

- **Data management should be accurate.**
- **More secured system should be introduced,**
- **Staff-training should be introduced**

Questions for Executives:

1. What kind of Inventory management system exists in the organization?

a. Periodic inventory system ()

The Inventory account is commonly updated or adjusted only once—at the end of the year. During the year the Inventory account will likely show only the cost of inventory at the end of the previous year.

- b. Perpetual inventory system (√)

Under this system the Inventory account is continuously updated.

2. What tools/systems are used ?

- a. Pen and paper (√)
b. Software tools()

Specify the name:

- c. Others()

Specify:

3. How inventory system tracks inventory operation?

Through requisition slip

4. What is the system of editing item description and prices?

Product prices cannot be changed, once printed. It does not change. For raw materials and technical materials, separate records are maintained yearly. Foreign materials(parts) records are rarely edited. For local parts, if changes take place, new records are made in new entry.

5. How effective are the bar code labeling?

Bar code has no function in inventory. It is used by the customers with the help of bar code scanner, for information of the product like: price, manufacturing date, expiry date, batch no, factory code.

6. How do you determine where a product lies in the warehouse?

For products, journal has rack numbers of products. Same for raw materials and technical materials. But all has their separate journal.

- 7.a. Do you have more than one warehouse?

One for each factory(Dhaka, Chittagong)

- b. If so, how do you track movement of products in between warehouses?

For factory to factory movement tracking is done via chalan

8. a. How do you track manufacturing operations?

Manufacturing operations are tracked via batch number .It also contains date.

b. How is the balance maintained?

Sales department gives the target market demand. Then according to that products are produced.

c. How does the system increase quantity of finished product and decrease quantity of components in warehouses?

FIFO

9. In the prevailing system, was there any incident where the real balances of your products differ from those calculated?

Yes

10. The reorder point is a level of inventory when an order should be made with suppliers to bring the inventory up to target quantity. You should avoid reducing of quantity for important in your business goods below a certain level. Can your inventory system to help you with this?

√ a. yes

b. no

But the procedure is time consuming

11. What are the procedures of your sales order?

PSR(product service representatives) visit market every day, collect order from shop owners, retailers and send that order to sales department. Sales department then sends the order to the factory.

12. Return Merchandise Authorization(RMA) is a transaction whereby the recipient of a product arranges to return goods to the supplier to have the product repaired or replaced or in order to receive a refund or credit for another product from the same retailer or corporation within the product's warranty period.

Do you have RMA provisions?

Yes

13. Are you satisfied with the prevailing system?

No

14. What are the major challenges?

- **Matching the inventory management system to the type of product and keeping accurate data.**
- **Lead-times**
- **Inventory levels – they need to be accurate**
- **Maintaining accurate data**

15. What improvements are to be made?

- **Maintain accuracy in data.**
- **Training staff .**
- **Avoid negligence.**

Questions for blue collar employees.

1. What knowledge do you had about inventory management system prior this job?

None

2. Were you provided any special training on inventory management system?

No

3. What major challenges are faced in daily basis?

Mainly high physical labour.

4. Is the man power sufficient for doing the duties?

Yes.