A Study On Inventory Management Practices In SME'S – A Case Study With Respect To SME's Of Shimoga District, Karnataka, India

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ABSTRACT

Inventory management is the major function of manufacturing companies. If a company manages its inventory inefficiently, it cannot achieve its objectives. Inventory-related costs play a vital role in manufacturing process. Efficient inventory management also impacts firm's profitability. Major decisions of manufacturing units are purely based on status of the inventory levels in the organization. Hence, an attempt is made, with the help of case study approach, to analyze the inventory management practices in Small and Medium Enterprises (SME's) of Shimoga district and to examine their impact on cost and profitability of the firm.

Keywords: SME's, Inventory Management, Cost, Profitability

INTRODUCTION

Inventory management is an important functional area for a manufacturing industry, particularly an SME, whose limited funds are often locked up in the form of inventory and essential planning for its utilization is necessary which otherwise impacts its profitability adversely. Inventory management decisions are comprehensive decisions which include major areas like determining the EOQ, classification of inventory and control of inventory. This paper limits itself to the study of inventory management practices in SMEs of Shimoga District, through a case study approach.

STATEMENT OF THE PROBLEM

For a manufacturing unit where the major component in the cost of production is inventory cost, efficient management of inventory becomes a key prerequisite to profitability. Major decisions of manufacturing units are purely based on status of the inventory levels of the organization. Hence, the paper identifies how to manage the inventory and what are its impact on cost and profitability of the firm.

REVIEW OF LITERATURE

Prakash et al (1995) state that categorizing the materials by using different inventory control technique like ABC analysis, VED analysis, FSN analysis are needed for proper control on inventory. These analyses help to manage inventory effectively and these techniques help to increase the profitability of a firm.

Silver et al, (1998) suggest that success of any organization depends on how it manages its inventory by reducing inventory costs like, holding cost, transportation cost, and management cost.

Anwaruddhin and Gulam Y S (2002) identify that ABC analysis helps to control the inventory related cost associated with spare parts of a service industry in India.

Islam And Yusuf (2002) identify that the optimum level of inventory helps to increase the efficiency of business. Inventory management helps to identify optimum number of units to be produced by reducing inventory related costs.

Dubey (2003) states that the success of an organization is depends on 4 major factors like,

volume of sales, changes in technology, seasonal changes and inventory policy of an organization.

Elgelly (2004) examines the relationship between inventory management and its profitability by using correlation and regression analysis and he found that inventory management techniques are more important to control inventory and it leads to profitability.

Ganesh and Taylor (2007) in their study identify that efficient inventory management will increase the firm's liquidity position, growth opportunities and returns to shareholders.

Chowdary and Amin (2008) in their study- "Inventory management practices in pharmaceutical companies listed in DSE" identify that among all the problems relating to financial management, inventory related costs play vital role in its business. Efficient inventory management contributes major part in its profitability.

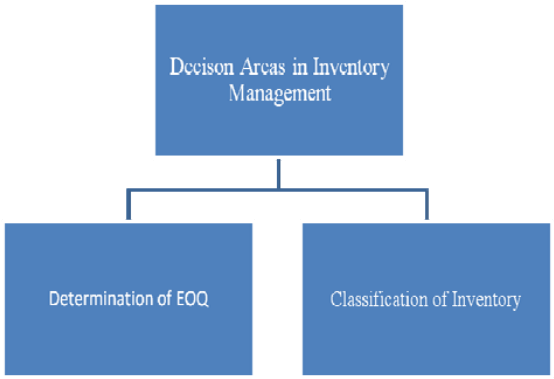
OBJECTIVES OF THE STUDY

- To study the inventory management practices at SME units of Shimoga District.
- To determine the Economic Order Quantity to be placed by the SME units
- To statistically examine if the company is ordering materials as per computed EOQ or not.
- To address the issue of classification of inventory by using ABC Analysis

SCOPE OF THE STUDY

The present study focuses on inventory management at a SME unit of Shimoga. Emphasis is given to following different aspects of inventory management in this study. An attempt has been made to address the following decision-making areas in Inventory Management from the point of view of the Company.

Figure No: 1



METHODOLOGY ADOPTED

Descriptive research is used in the study for analyzing inventory management practices in the SME unit of Shimoga. Descriptive research refers to type of research which describes the situation or phenomena; further, Case study approach is used to analyze the inventory management practices in SME unit.

Sources of Data

The information and data needed for the study is collected from both primary sources and secondary sources.

Primary data:

The data is collected for computation of Economic Order Quantity to be placed, to analyze different issues of inventory management like ABC analysis, -by using personal interview method with the financial manager at SME unit.

Secondary data:

The information required for determining different inventory management aspects and their activity was obtained from Raw materials statements, profit and loss account and balance sheet of the SME unit of Shimoga.

DATA ANALYSIS AND INTERPRETATION

Raw Materials purchased during the year 2016-17 by SME Unit:

Table No: 1 (Amount in Rs.)

SL. NO.	RAW MATERIALS	UNITS IN KGS	COST PER KG	TOTAL COST
1	MS SCRAP	804912	32.24	25950360
2	MS AND SS SCRAP (SG)	24000	170.4	4089624
3	S.S. 317 SCRAP	18372	242.05	4446948
4	S.S. 316 SCRAP	18000	215	3870000
5	FERROSILICO MANGANESE	16740	67	1121580
6	HC FERRO CHROME	9744	79.44	774060
7	FERRO SILICON	6612	75.19	497160
8	IRON OXIDE	4104	0.9	3696
9	IRON FLAKES	3300	63	207900
10	S.S. 304 SCRAP	2400	160	384000
11	S.S. 410 SCRAP	2400	55	132000
12	CALCIUM SILICIDE	1524	174.39	265776
13	PURE CHROME	1200	655	786000
14	FERRO MOLY	1044	955	1028340
15	PET COKE	936	47.21	36984
16	ALUMINIUM SCRAP	768	184.72	141864
17	SELENIUM	180	5605	1008900
18	MAGNESIUM INGOT	120	252.5	30300
19	FERRO VANADIU M	84	120	10080
20	PURE NICKEL CATHODS	48	1186.75	56964
21	LC FERRO CHROME	36	165.33	5952
Total		**9,16,524**		**44848488**

Source: Company Records

The Company has purchased 9,16,524 Kgs of raw materials during the year 2016-17. They purchase raw materials on the basis of quantity of items required by their customer. The company is following the First In First Out method of inventory to sell the items.

Objective 1: To determine an Economic Order Quantity (EOQ) to be placed by SME unit,

Economic Order Quantity = $\sqrt{\frac{2AB}{C}}$

A= Annual Demand= 14, 47,143 KGS
B= Buying Cost per Order=Rs 57,283
C= Carrying Cost per KG= Rs.0.35

Economic Order Quantity = $\sqrt{\frac{2*14,47,143*57,283}{0.35}}$

Economic Order Quantity= $\sqrt{4,73,69,53,85,537}$

Economic Order Quantity (EOQ) = 6,88,255 Kgs

The company should place an order of 6,88,255 Kgs to minimize the total cost of inventory.
It can be explained with the help of tabular analysis of alternative order sizes to find out whether optimal order quantity reduces the total cost of inventory or not.

TABULAR ANALYSIS OF ALTERNATIVE ORDER SIZES

ANNUAL DEMAND 14,47,143 Kgs

Table No: 1.2

PARTICULARS	550000 (KGS)	600000 (KGS)	688255 (KGS)	725000 (KGS)	775000 (KGS)
Size of the order (Q)	550000	600000	688255	725000	775000
Number of orders (A/Q)	2.63	2.41	2.1	2.00	1.87
Buying cost per order (B)	57283	57283	57283	57283	57283
Total Buying cost (A/Q*B)	**150654**	**138052**	**120294**	**114568**	**107119**
Average Inventory (Q/2)	275000	300000	344128	362500	387500
Carrying cost per Kgs (C)	0.35	0.35	0.35	0.35	0.35
Total Carrying cost (Q/2*C)	**96250**	**105000**	**120445**	**126875**	**135625**
Purchase cost per Kgs (PP)	47.833	47.833	47.833	47.833	47.833
Purchase cost (PP*AD)	**69221191**	**69221191**	**69221191**	**69221191**	**69221191**
Total Costs [(A/Q*B) + (Q/2*C)+ (PP*AD)]	**69468095**	**69464243**	**69461930**	**69462632**	**69463935**

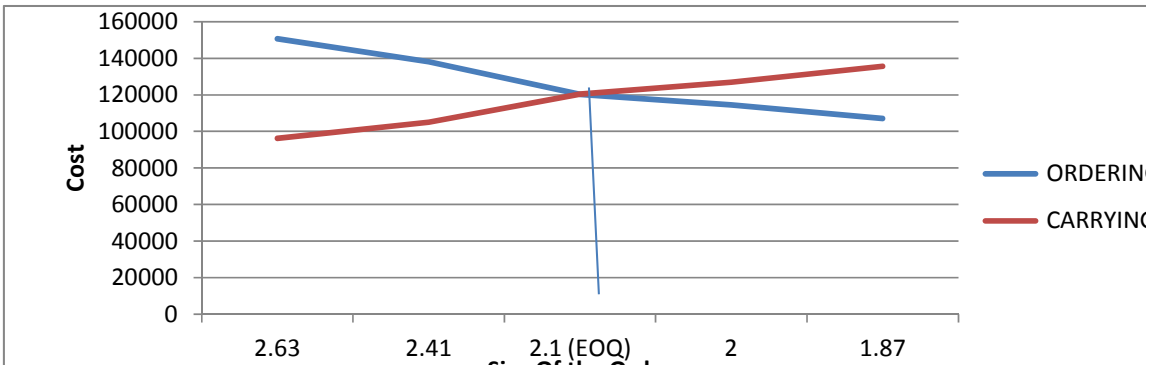
Source: Company Records

Table No: 1.3 Calculation of Extra Costs:

Particulars	550000 Units	600000 Units	688255 Units (EOQ)	725000 Units	775000 Units
Total Cost (A)	69468095	69464243	69461930	69462632	69463935
Total Cost for EOQ Units (B)	69461930	69461930	69461930	69461930	69461930
Extra Cost (A-B)	6155	2313	0	702	2005

Source: Company Records

Graph No: 1



Source: Table No-1.2

INTERPRETATION

Economic Order Quantity, as a technique of inventory control, helps to identify optimum number of units to be placed in order to reduce the ordering cost and holding costs. EOQ is the size of the material which is economically feasible. Normally EOQ is a point at which holding cost is equal to buying cost. It is the quantity of material which minimizes the total cost. Economic order quantity is also called as Standard Order Quantity.

In the above graph and table it can be observed that carrying cost of material is increasing from Rs. 96,250 to Rs.1,35,625 as the size of the order is decreasing from 2.63 to 1.87, because the firm keeps more items. Buying cost is decreasing from Rs 1,50,654 to Rs 1,07,119 as the size of order is decreasing from 2.63 to 1.87. And trade-off between ordering cost and holding cost is the point which reduces the total cost of inventory at Rs 6, 91, 64,930 and this size of the order is considered as most economical order quantity.

So for as the control aspect is concerned, the company should place an order as per Economic Order Quantity. As it reduces the Holding cost of an item and buying cost of an item it will have positive impact on total cost of inventory and profit of an organization.

It is to be noted that, Allocation of total cost of inventory line in this diagram is not displayed as holding cost and buying cost is less than 1.5 lakh but in case of total cost of inventory, it is more than Rs.6 crore; hence the point at which holding cost and buying cost is crossed, it minimizes the total cost of inventory.

Objective 2: To statistically examine if the company is ordering materials as per computed EOQ or not.

CHI-SQUARE TEST:

H_0: there is significant difference between computed EOQ and Purchases made by the company

H_1: there is no significant difference between computed EOQ and Purchases made by the company

Total Raw Materials in Units:

Table No: 1.4

Years	Annual Demand	Ordering Cost (Rs.)	Storage Cost (Rs.)	EOQ (O)	Expected Purchases (E)	O-E^2/E
2015	1447143	57283	0.35	688255	548649	35523
2014	916524	54555	0.35	534527	548649	363.49
2013	880345	51957	0.35	511245	548649	2550
2012	928583	49483	0.35	512412	548649	2393.37
2011	916524	47127	0.35	496807	548649	4898.73
			Chi Square Value			**45728.59**
			Chi square Table Value			**9.488**
			Decision			**Rejected**

Source: Company Records

Interpretation:

It can be observed from the above chi-square tables that, the chi-square value obtained is 45728.59. This value is much more than the chi-square table value, i,e., 9.488. So null hypothesis is accepted and alternative hypothesis is rejected hence, there is a significant difference between observed frequency (O) and Expected frequency (E). In other words, there is significant difference between computed actual EOQ and Purchases made by the company.

1. MS Scrap:

Table No: 1.5

Years	Annual Demand	Ordering Cost	Storage Cost	EOQ (O)	Expected Purchases (E)	O-E^2/E
2015	1270913	57283	0.35	644988	514158	33290
2014	804912	54555	0.35	500924	514158	340.63
2013	773139	51957	0.35	479106	514158	2389.62
2012	815503	49483	0.35	480199	514158	2242.92
2011	804912	47127	0.35	465575	514158	4590.62
			Chi Square Value			**42853.79**
			Chi square Table Value			**9.488**
			Decision			**Rejected**

Source: Company Records

INTERPRETATION:

It can be observed from the above chi-square tables that, the chi-square values obtained is 42853.79. This value is much more than the chi-square table values i,e 9.488. So null hypothesis is accepted and alternative hypothesis is rejected hence, there is a significant difference between observed frequency (O) and Expected frequency (E). In other words, there is significant difference between computed actual EOQ and Purchases made by the company.

2. RAW MATERIALS IN VALUE:

H_0: there is significant difference between total value of raw material and trend value of raw material

H_1: there is no significant difference between total value of raw material and trend value of raw material

Refer: Table No: 1.6

INTERPRETATION:

It can be observed from the above chi-square tables that, the chi-square value obtained is 95176015. This value is much more than the chi-square table values i,e 0.35. So null hypothesis is accepted and alternative hypothesis is rejected hence, there is a significant difference between Observed frequency (O) and Expected frequency (E). In other words, there is significant difference between total values of raw materials and trend values of raw materials.

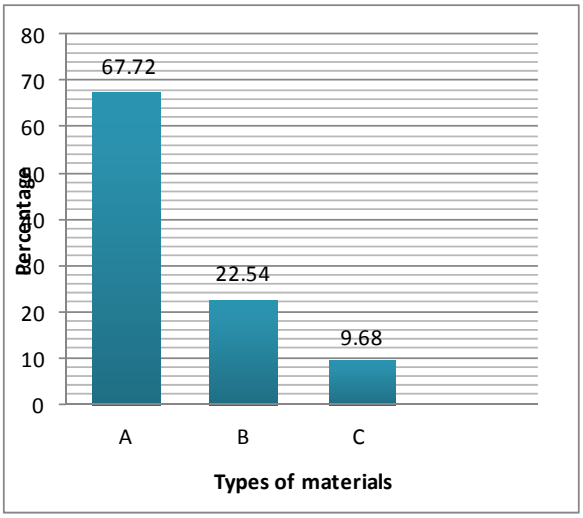
Objective: 3

To address the issue of classification of inventory by using ABC Analysis:

A. ABC ANALYSIS (Always Better Control)

Refer Table No: 1.7 and Graph No: 1.2

Type of Materials	Total Cost(%)
A	67.78
B	22.54
C	9.68



Source: Table No-1.7

Interpretation:

ABC analysis as a technique of inventory control that identifies the fact that equal level of control is not required for all types of inventory

maintained by the organization. It is basically a method of selective control.

Under ABC analysis, inventories are classified into 3 categories A, B and C on the basis of total cost of inventory. Category A consists of those inventory which constitute highest value, category B constitutes medium value and C category constitutes least value materials.

In the above table and graph it can be observed that two items of inventory constitute for 67.78% of total cost of inventory hence it is classified as A category, Four items of inventory constitutes for 22.54% of total cost of inventory hence it is classified as B category and remaining fifteen items of inventory is classified as C category it constitutes 9.68% of total cost of inventory.

As for the control aspect is concerned the company has to exert greater control on category A materials, medium level of control on category B materials and it can exert least control on C category materials on the basis of total cost of inventory and also same percentage of control of A category materials, B category materials and C category materials on the basis of number of units.

FINDINGS:

1. This is determined from the computation of EOQ that the Company's optimum annual requirement of raw materials is 14,47,143 kgs (1447.14 Tonnes) for the year 2016-17.
2. The Company has to place 2.1 orders (6,88,285 kgs/order) of raw materials to minimize its total cost of inventory of the company as per EOQ model.
3. It is noted that the chi-square tables for Total raw materials in units, the chi-square values obtained is 45728.59 there is significant difference between computed actual EOQ and Purchases made by the company.
4. It is observed that the chi-square table for MS Scrap that, the chi-square values obtained is 42853.79 there is significant difference between computed actual EOQ and Purchases made by the company.
5. In ABC analysis, materials are classified into 3 classification, of the 21 items of inventory 2 items of inventory is classified as A category material, 4 items of inventory is classified as B category material and 15 items are classified as C Category material.
6. Effective Inventory management plays a major role in the operational efficiency and profitability of the company as proved by the relationship between inventory, sales and profitability of the firm.

CONCLUSION:

Inventory management is the major task for each and every manufacturing company. If a company manages inventory by using different techniques of inventory, definitely it increases the operational efficiency. Management of inventory is easy if the company adopts different techniques for this purpose. Good management and effective control of inventory help the company increase the production and sales, as well as improve the liquidity position and profitability of the business also.

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Table No: 1.6

Sl. No.		Raw Material	Total Value (O)	Trend Values (E)	O-E	O-E^2/E
1	-10	MS SCRAP	25950360	4678519.1	21271841	96716761
2	-9	ALUMUNIUM SCRAP	141864	4424231.4	-4282367	4145052
3	-8	CALCIUM SILICIDE	265776	4169943.8	-3904168	3655331
4	-7	FERRO CHROME	786000	3915656.1	-3129656	2501432
5	-6	FERRO MOLY	1028340	3661368.4	-2633028	1893510
6	-5	FERRO SILICON	497160	3407080.7	-2909921	2485306
7	-4	FERRO VANDIUM	10080	3152793.0	-3142713	3132665
8	-3	HC FERRO CHROME	774060	2898505.3	-2124445	1557102
9	-2	IRON OXIDE	3696	2644217.7	-2640522	2636831
10	-1	LC FERRO CHROME	5952	2389930.0	-2383978	2378041
11	0	PET COKE	36984	2135642.3	-2098658	2062315
12	1	SELENIUM	1008900	1881354.6	-872455	404590
13	2	S.S. 316 SCRAP	3870000	1627066.9	2242933	3091913
14	3	S.S. 410 SCRAP	132000	1372779.2	-1240779	1121472
15	4	S.S. 304 SCRAP	384000	1118491.6	-734492	482326
16	5	S.S SCRAP 317L	4446948	864203.9	3582744	14853041
17	6	IRON FLAKES	207900	609916.2	-402016	264982
18	7	FERRO SILICO MANGANESE	1121580	355628.5	765951.5	1649704
19	8	PURE NICKEL CATHODES 4*4	56964	101340.8	-44376.8	19432
20	9	MAGNESIUM INGOT	30300	-152946.9	183246.9	-219550
21	10	MS AND SS SCRAP (SG)	4089624	-407234.5	4496859	-49656241
TOTAL			**44848488**	**44848488**	**Chi square Value**	**95176015**
			SLOPE	**-254287.7**	**Chi square Table Value**	**0.35**
			INTERCEPT	**2135642.2**	**Decision**	**Rejected**

Source: Company Records

Table No: 1.7

Rank	Raw Materials	Units in KGS	%of Total Units	Cumulative %	Unit Price	Total Cost	%of total cost	Cumulative %
1	MS SCRAP	804912	87.822		32.24	25950360	57.86	
2	S.S.317 SCRAP	18372	2.005	**89.827**	242.05	4446948	9.92	**67.78**
3	MS AND SS SCRAPS (SG)	24000	2.619		170.4	4089624	9.12	
4	S.S.316 SCRAP	18000	1.964		215	3870000	8.63	
5	FERRO SILICO MANGANESE	16740	1.826	**6.523**	67	1121580	2.50	**22.54**
6	FERRO MOLY	1044	0.114		955	1028340	2.29	
7	SELENIUM	180	0.020		5605	1008900	2.25	
8	PURE CHROME	1200	0.131		655	786000	1.75	
9	HC FERRO CHROME	9744	1.063		79.44	774060	1.73	
10	FERRO SILICON	6612	0.721		75.19	497160	1.11	
11	S.S. 304 SCRAP	2400	0.262		160	384000	0.86	
12	CALCIUM SILICIDE	1524	0.166		174.39	265776	0.59	
13	IRON FLAKES	3300	0.360	**3.65**	63	207900	0.46	**9.68**
14	ALUMINIUM SCRAP	768	0.084		184.72	141864	0.32	
15	S.S. 410 SCRAP	2400	0.262		55	132000	0.29	
16	PURE NICKEL CATHODES	48	0.005		1186.75	56964	0.13	
17	PET COKE	936	0.102		47.21	36984	0.08	
18	MAGNESIUM INGOT	120	0.013		252.5	30300	0.07	
19	FERRO VANADIUM	84	0.009		120	10080	0.02	
20	LC FERRO CHROME	36	0.004		165.33	5952	0.01	
21	IRON OXIDE	4104	0.448		0.9	3696	0.01	
TOTAL		**916524**	**100**	**100**		**44848488**	**100**	**100**

Source: Company Records