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# **Inventory Management: A Comparative Study of Selected Paper Companies**

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Abstract: Inventory measured in terms of money, constitutes an important element in the working capital of most business firms except financial ones. Their size and rate of turnover, therefore, influences greatly the size and rate of turnover of working capital and through them, the income and profit of a business. Thus, inventory management is having considerable significance to all business firms. This research paper is mainly based on the secondary data like as annual reports of 10 companies. Its main objectives are to evaluate the liquidity position of the paper companies. For use ratio analysis for accounting tools and statistical tools for getting results like as average, S.D. C.V. Maximum and Minimum and used One way ANOVA test. Mainly included three ratios in this research paper.

Keywords: S.D., C.V., ANOVA, Turnover, Inventory.

#### I. INTRODUCTION

Thus, the aim of inventory management should be avoid excessive and inadequate levels of inventories and to maintain sufficient inventory for smooth production and sales operations. Efforts should be made to place an order duly with the right sources to acquire the right quantity at the right price and quality. An effective management should.

- Ensure a continuous supply to materials to facilitate uninterrupted production.
- Maintain sufficient stock of raw materials in period of short supply and anticipate price changes.
- Maintain sufficient finished goods inventory for smooth sales operation and efficient customer service.
- Minimise the carrying costs and time.
- Control investment in inventories and keep it at an optimum level.

#### II. **MEANING OF INVENTORY MANAGEMENT**

# L. R. Haward observed that

"The proper management and control of inventory not only solves the acute problem of liquidity but also increases annuals profits and causes substantial reduction in the working capital of the firm".

Inventory form a link between production and sale of a product. Therefore, it is essential to have a sufficient level of investment in inventories.

# D. Schall Lowerence and W. Haley Charles rightly remark,

"Managing the level of investment in inventory is like maintaining the level of water in a bath-tub with an open drain. The water is flowing out continuously. If water is let in too slowly, the tub is soon empty. If water is too fast, the tub overflows. Like the water in the tub, the particular items of inventories keep problems but the level may stay the same. The basic financial problems are to determine the proper level of investment in inventories and to decide how much inventory must be acquired during each period to maintain that level."

#### III. **TITLE OF THE PROBLEM**

# "Inventory Management: A Comparative Study of Selected Paper Companies in India"

#### IV. **OBJECTIVES OF INVENTORY MANAGEMENT**

The objective of inventory management consists of two counter-balancing parts:

- 1. To meet a demand the firm's investment in inventory and
- 2. To meet a demand for the product by efficiently organising the firm's production and sales operations.



# V. REVIEW OF LITERATURE

### Dr. Suraj Narain Mathur

He has done his Ph.D. on "Working capital management of cement industries in India- a comparative analysis of selected units" In this study profile of the cement industries in India, analysis of cash and liquidity management accounts receivables management, inventory management and control, conclusion, suggestions and recommendations.

# Dr. J. R. Patel

He has done his Ph.D. on "A study of working capital management in cement industries in India" In this study profile of the cement industries in India, conceptual framework of working capital management, profile of cement industries in India, analysis of working capital management, inventory management – analysis, receivables management – analysis, cash management – analysis, findings and suggestions.

# VI. TESTING OF HYPOTHESES

Statistics which helps to the researcher in arriving at the creation for such decisions is known as testing hypothesis. The theory of testing hypothesis was established by J. Neyman and E. S. Pearson and employs statistical techniques to arrive at decision in certain situations where there is fixed in advance.

Below explain certain basically idea related with the testing hypothesis

# Statistical Hypothesis:-

*Simple and Composite:* - A statistical hypothesis is some assumption or statement, which may or may not be true, about a population or equivalently about the probability distribution characterising the given population, which researcher want to test on the basis of the evidence from the random sample. If the hypothesis is completely specific the population, then it is known as simple hypothesis, otherwise it is known as composite hypothesis.

### Null Hypothesis

The ransom selection of the samples from the given population makes the tests of significance valid for the researchers. For applying any test of significance researcher first set up a null hypothesis.

In the word of Professor **R. A. Fisher** "null hypothesis is the hypothesis which is tested for possible rejection under the assumption that is true". It is usually denoted by  $H_0$ .

For the analysis of the working capital trends of selected paper companies in following null hypotheses will be tested:

### Ho: Null Hypothesis

- There is no significant difference in Inventory to working capital ratio of selected paper companies of India.
- > There is no significant difference in Inventory (stock) turnover ratio of selected paper companies of India.

### H1: Alternative Hypothesis

- > There is significant difference in Inventory to working capital ratio of selected paper companies of India.
- > There is significant difference in Inventory (stock) turnover ratio of selected paper companies of India.

### VII. RESEARCH METHODOLOGY

The study was preliminary based on the published accounts and annual report of all the selected paper companies under review. Out of which selected companies were in the public sector and private sector.

### **Period of the Study:**

The present study was undertaken by the researcher for the period of seven (7) Accounting years from 2005-2006 to 2011-12. The researcher had selected the base year 2005-2006 because this year was normal for the present research of analysis and evaluation.

# Sample of the Study:

By the researcher following companies were had been selected for the purpose of the present research.

- 1. International Andhra Pradesh Paper Mills Limited
- 2. Ballarpur Paper Mills Limited
- 3. JK Paper Mills Limited
- 4. Orient Paper and Industries Limited
- 5. Seshasayee Paper and Boards Limited
- 6. Sirpur Paper Mills Limited
- 7. South India Paper Mills Limited
- 8. Star Paper Mills Limited
- 9. T. N. Newsprint Paper Mills Limited
- 10. West Coast Paper Mill



# Method of Data Collection:

The main source of data used for the study was secondary drown from the annual profit and loss account and balance sheet figures as found in the annual reports of the selected paper companies. The selected data was complemented through selected paper companies web site and capital line software.

#### Methods of Analysis and Interpretation of Data:

In order to analyze the present research work on "INVENTORY MANAGEMENT A COMPARATIVE STUDY OF SELECTED PAPER COMPANIES IN INDIA" various techniques of financial management like as ratio analysis and various statistical techniques used by the researcher as under:-

#### **Accounting Techniques**

Ratio Analysis

#### **Statistical Techniques**

- Arithmetic Mean
- The Standard Deviation:
- Co-Efficient of Variation:
- One-way Analysis of Variance Test (ANOVA)

### VIII. DATA ANALYSIS

## 1. Inventory to Working Capital Ratio:

#### Meaning:

This Ratio establishes a relationship between inventory and working capital.

#### **Objective:**

The objective of computing this ratio is to measure the amount of working capital invested din inventory.

#### **Components:**

- 1. Inventory: It refers to raw material, semi finished good and finished goods.
- 2. Working Capital = current assets- current liabilities.

### **Computation and interpretations:**

This ratio is computed by dividing the inventory and working Capital or net current Assets. This ratio is usually express as a pure ratio e.g. 3:1. In the form of a formula, this ratio may be express as follows:

# Inventory to working Capital = Working Capital

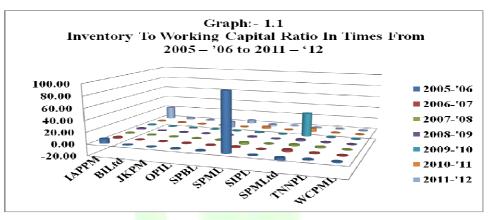
This ratio indicates that inventory should not over the working capital. Around three quarter i.e.0.75 times of working capital generally preferred.

Thus, an enterprise should have neither a very high nor a very low ratio; it should have a satisfactory ratio. To judge whether the ratio is satisfactory or not, it should be compare with its own past ratio or with the ratio of similar firm in the same industry or with the industry average.

The inventory to working capital of selected paper in India is given in the Table No-1.1 as follows:

Table no - 1.1										
	<b>Inventory to Working Capital Ratio In Times From 2005 – '06 to 2011 – '12</b>									
				Com	pany Name					
YEAR	IAPPM	BILtd	JKPM	OPIL	SPBL	SPML	SIPL	SPM Ltd	INNPL	WCPML
2005-'06	7.25	0.30	0.39	0.65	0.96	98.00	0.55	-4.05	0.73	1.09
2006-'07	1.60	0.35	0.46	0.62	0.73	1.57	0.42	3.03	1.43	0.71
2007-'08	1.21	0.12	0.51	0.63	1.02	-3.49	0.47	2.66	1.84	0.43
2008-'09	1.71	0.13	0.44	0.96	0.73	1.31	0.40	2.42	0.93	0.35
2009-'10	0.97	0.44	0.59	0.82	0.39	1.16	0.49	40.56	0.65	0.59
2010-'11	1.46	0.64	0.55	0.64	0.17	3.02	0.53	6.05	0.65	0.53
2011-'12	21.67	2.34	0.98	-10.90	5.67	-2.56	0.91	-1.04	-0.71	-1.65
Average	5.12	0.62	0.56	-0.94	1.38	14.14	0.54	7.09	0.79	0.29
S.D.	7.62	0.78	0.20	4.40	1.91	37.05	0.17	15.11	0.80	0.89
C.V.	148.76	126.50	35.50	-467.63	138.43	261.97	31.85	213.06	101.38	304.35
Min	0.97	0.12	0.39	-10.90	0.17	-3.49	0.40	-4.05	-0.71	-1.65
Max	21.67	2.34	0.98	0.96	5.67	98.00	0.91	40.56	1.84	1.09





The above mentioned Table No- 1.1 and Graph No- 1.1 show the indicated a fluctuating trends of the Inventory to working capital ratio of selected paper companies in India from 2005-2006 to 2011-2012.

# Inventory to Working Capital Ratio:

The Inventory to Working Capital Ratio of selected paper companies during the study period has been shown an average 2.96 times During the study period the International Andhra Pradesh Paper Mills Limited was shown an average Inventory to Working Capital Ratio of 5.12 times, Ballarpur Paper Mills Limited was shown an average Inventory to Working Capital Ratio of 0.62 times JK Paper Mills Limited was shown an average Inventory to Working Capital Ratio of 0.56 times Orient Paper and Industries Limited was shown an average Inventory to Working Capital Ratio of 1.38 times, Sirpur Paper Mills Limited was shown an average Inventory to Working Capital Ratio of 0.56 times Orient Paper and Boards Limited was shown an average Inventory to Working Capital Ratio of 1.38 times, Sirpur Paper Mills Limited was shown an average Inventory to Working Capital Ratio of 0.54 times, Star Paper Mills Limited was shown an average Inventory to Working Capital Ratio of 0.54 times, Star Paper Mills Limited was shown an average Inventory to Working Capital Ratio of 0.59 times, T. N. Newsprint Paper Mills Limited was shown an average Inventory to Working Capital Ratio of 0.79 times, West Coast Paper Mills Limited was shown an average Inventory to Working Capital Ratio of 0.29 times.

Maximum Inventory to Working Capital Ratio was 98 times in the Sirpur Paper Mills Limited in the year 2005 –'06 and minimum Inventory to Working Capital Ratio was –10.9 times in Orient Paper and Industries Limited in the year 2011 –'12.

# ANOVA Test of Inventory to Working Capital Ratio

#### Hypothesis:

Ho: Null Hypothesis:

There is no significant difference in Inventory to working capital ratio of selected paper companies of India.

# H1: Alternative Hypothesis:

There is significant difference in Inventory to working capital ratio of selected paper companies of India.

# Level of Significance: 5%

Table :- 1.2 Inventory To Working Capital Ratio - ANOVA: Single Factor SUMMARY									
Groups	Count	Sum	Average	Variance					
IAPPM	7	<b>35</b> .8602	5.122885	58.07757					
BILtd	7	4.329086	0.618441	0.611991					
JKPM	7	3.919026	0.559861	0.039502					
OPIL	7	-6.57955	-0.93994	19.31971					
SPBL	7	9.67547	1.38221	3.661245					
SPML	7	99.00543	14.14363	1372.842					
SIPL	7	3.765781	0.537969	0.029358					
SPM Ltd	7	49.63884	7.091263	228.2802					
TNNPL	7	5.516525	0.788075	0.638263					
WCPML	7	2.047099	0.292443	0.792164					

Table no – 1.3 ANOVA ( F- Test Result) of Inventory To Working Capital Ratio								
Source of Variation	SS	D.F	MS	F	P-value	F crit		
Between Groups	1354.226	9	150.4696	0.89337	0.536714	2.040098		
Within Groups	10105.75	60	168.4292					
Total	11459.98	69						



- $\blacktriangleright$  Degree of freedom = 70-1= 69
- Table Value of 'F' = 2.0401
- Calculate Value of 'F' = 0.89337

o F calculate	<	F table
o0.89337	<	2.0401
o F calculate	<	F table

Table No -1.3 indicates the calculate value of 'F' is 0.89337 and the table value of 'F' at 5% level of significance is 2.0401 so, the calculate value of 'F' which is less than the table value. It indicates that the Null Hypothesis is accepted and Alternate Hypothesis is rejected. It indicates that there is no significant in inventory to working capital ratio of selected paper companies in India.

## 2. Stock (Inventory) Turnover Ratio:

# Meaning:

This Ratio establishes a relationship between Cost of Goods Sold and Average Stock

# Objective:

The objective of computing this ratio is to determine the efficiency with which the Stock is converted into sales

# **Components:**

- 1. Cost of Goods sold =Net sales –Gross Profit
- 2. Average Stock = (opening Stock + closing Stock)/2

# **Computation and interpretations:**

This ratio is computed by dividing the cost of goods sold by the average Stock. This ratio is usually express as an 'x' number of times. In the form of a formula, this ratio may be express as follows:

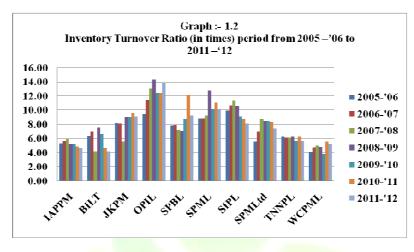
# Stock Turnover Ratio = Cost of Goods sold

# Average Inventory

This ratio indicates the speed with which the Stock is converted into sales. In general, a high ratio indicate efficient performance since an improvement in the ratio shows that either the same volume of sales has been minted with a lower investment in stocks, or the volume of sales has increased without any increase in the amount of stock. A too high ratio may be the result of very low Stock levels which may result in frequent stock-outs and thus the firm may incur high stock out costs. Thus, a firm should have a satisfactory ratio. To judge whether the ratio is satisfactory or not, it should be compare with its own past ratio or with the ratio of similar firm in the same industry or with the industry average.

Table :- 1.4										
	Inventory Turnover Ratio (in times) period from 2005 –'06 to 2011 –'12									
				CON	<b>IPANY NAM</b>	IE				
YEAR	IAPPM	BILT	JKPM	OPIL	SPBL	SPML	SIPL	SPM Ltd	TANNT	WCPML
2005-'06	5.32	6.41	8.18	9.50	7.88	8.92	9.94	5.61	6.34	4.14
2006-'07	5.72	7.01	8.13	11.45	7.96	8.91	10.77	7.03	6.15	4.79
2007-'08	5.96	4.18	5.60	13.06	7.27	9.33	11.43	8.79	6.18	5.03
2008-'09	5.23	7.56	9.07	14.41	7.08	12.84	10.65	8.47	6.30	4.83
2009-'10	5.17	6.62	9.06	12.46	8.76	10.19	9.11	8.45	5.69	3.87
2010-'11	4.87	4.73	9.67	12.45	12.26	11.13	8.86	8.36	6.33	5.60
2011-'12	4.72	4.19	9.20	13.88	9.33	10.18	8.12	7.48	5.72	5.18
Average	5.28	5.82	8.42	12.46	8.65	10.21	9.84	7.74	6.10	4.78
S.D.	0.44	1.41	1.36	1.63	1.78	1.41	1.19	1.13	0.28	0.60
C.V.	8.29	24.28	16.17	13.09	20.53	13.79	12.10	14.57	4.61	12.51
Min	4.72	4.18	5.60	9.50	7.08	8.91	8.12	5.61	5.69	3.87
Max	5.96	7.56	9.67	14.41	12.26	12.84	11.43	8.79	6.34	5.60





The above mentioned Table No- 1.4 and Graph No- 1.2 show the indicated a fluctuating trends of the Inventory (stock) turnover ratio of selected paper companies in India from 2005-2006 to 2011-2012.

### Stock (Inventory) Turnover Ratio:

The Inventory Turnover Ratio of selected paper companies during the study period has been shown an average 7.93 times During the study period the International Andhra Pradesh Paper Mills Limited was shown an average Inventory Turnover Ratio of 5.28 times, Ballarpur Paper Mills Limited was shown an average Inventory Turnover Ratio of 5.82 times JK Paper Mills Limited was shown an average Inventory Turnover Ratio of 8.42 times Orient Paper and Industries Limited was shown an average Inventory Turnover Ratio of 12.46 times Seshasayee Paper and Boards Limited was shown an average Inventory Turnover Ratio of 8.65 times, Sirpur Paper Mills Limited was shown an average Inventory Turnover Ratio of 10.21 times, South India Paper Mills Limited was shown an average Inventory Turnover Ratio of 9.84 times, Star Paper Mills Limited was shown an average Inventory Turnover Ratio of 7.74 times, T. N. Newsprint Paper Mills Limited was shown an average Inventory Turnover Ratio of 6.10 times, West Coast Paper Mills Limited was shown an average Inventory Turnover Ratio of 4.78 times.

Maximum Inventory Turnover Ratio was 14.41 times in Orient Paper and Industries Limited in the year 2008 –'09 and minimum Inventory Turnover Ratio was 3.87 times in West Coast Paper Mills Limited in the year 2009 –'10.

### ANOVA Test of Inventory (Stock) Turnover Ratio:

### Ho: Null Hypothesis:

There is no significant difference in Inventory (stock) turnover ratio of selected paper companies of India.

### H1: Alternative Hypothesis:

There is significant difference in Inventory (stock) turnover ratio of selected paper companies of India.

# Level of Significance: 5%

Table :- 1.5   Inventory Turnover Ratio (in times) - ANOVA: Single Factor   SUMMARY									
Groups	Count	Sum	Average	Variance					
IAPPM	7	36.986	5.284	0.192					
BILT	7	40.710	5.816	1.994					
JKPM	7	58.925	8.418	1.854					
OPIL	7	87.214	12.459	2.658					
SPBL	7	60.544	8.649	3.153					
SPML	7	71.505	10.215	1.984					
SIPL	7	68.890	9.841	1.418					
SPM Ltd	7	54.176	7.739	1.272					
TNNPL	7	42.713	6.102	0.079					
WCPML	7	33.441	4.777	0.357					



Table :-1.6								
	ANOVA (F- Test Result) of Inventory Turnover Ratio							
Source of Variation	SS	D.F.	MS	F	P-value	F crit		
Between Groups	384.545	9	42.7272	28.5574	1.6526	2.0401		
Within Groups	89.77122	60	1.4962					
Total	474.3162	69						

- Degree of freedom = 70-1=69
- Table Value of 'F' = 2.0401
- Calculate Value of 'F' = 28.5574

• F calculate	>	F table
00 5574	0.0401	

- 28.5574 > 2.0401
- F calculate > F table

Table No-6.2.2 indicates the calculate value of 'F' is 28.5574 and the table value of 'F' at 5% level of significance is 2.0401 so, the calculate value of 'F' which is greater than the table value. It indicates that the Null Hypothesis is rejected and Alternate Hypothesis is accepted. It indicates that there is significant in inventory (stock) turnover ratio of selected paper companies in India.

# IX. SUGGESTION

- The inventory to working capital ratio of selected paper companies in India shown an average 2.96 times. The average of inventory turnover ratio was not satisfactory as those companies ratio below than average ratio as Ballarpur Paper Mills Limited, JK Paper Mills Limited, Orient Paper and Industries Limited, Seshasayee Paper and Boards Limited, South India Paper Mills Limited, T. N. Newsprint Paper Mills Limited and West Coast Paper Mills Limited. Due to high value of inventory, there was insufficient coverage of working capital in companies. So, it is suggested that paper companies should try to reduce the volume of inventory and try to increase the current assets.
- The inventory (stock) turnover ratio of selected paper companies shown an average 7.93 times. It means sales were more than average inventory. It also means that the company is in a position to used/sold bulk quantity. But it is suggested that International Andhra Pradesh Paper Mills Limited, Ballarpur Paper Mills Limited, Star Paper Mills Limited, T. N. Newsprint Paper Mills Limited and West Coast Paper Mills Limited should decreases the average inventory as early as possible and try to increase the sales.

# **X.** LIMITATIONS OF THE STUDY

- The study is based on secondary data taken from published annual report of selected paper companies in India its findings depend entirely on the accuracy of such data.
- > The study should be based on 10 companies belong to only are listed on Bombay stock exchange.
- The different methods of analysis of inventory management of selected paper companies in India in this connection view of experts differ from one other.
- The study is largely based on the financial tool of ratio analysis, which has its own limitations that also applies to the study.

# XI. SCOPE FOR THE FURTHER RESEARCH

This is "INVENTORY MANAGEMENT A COMPARATIVE STUDY OF SELECTED PAPER COMPANIES IN INDIA". It is expected that the present study would encourage and provide further research on various aspects of inventory management. A few recommendations are given for further studies are as follows.

- The coverage of the present study is confined to only seven years and ten paper companies of India. This can further be increased in order to broaden up the scope of the present study.
- Separate in depth studies can be made for each aspect of inventory management of foreign paper companies in order to compare the inventory management of Indian paper companies.
- Specific study can be carried out to compare inventory management of paper companies with other capital intensive companies in India.
- > The present study can be further compared with the inventory management of pre-liberalization period of paper companies in India and pre-liberalization inventory management and liquidity & profitability should also be measured.



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