

PERFORMANCE IMPROVEMENT OF THE RETAIL STORE OF HANDLOOM SECTORS BY OPTIMIZING INVENTORY

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Abstract

Right inventory at the right time at the right place with optimum cost is the talk of the twenty first century. Proper inventory control is very important to any manufacturing as well as trading enterprise. In textile industries, the requirements of inventory control in handloom sector are much different from other sectors. The textile items are categorized based on their types and price range. In each category there is minor variation in colour, design etc. This paper presents an inventory model for cloth retail shops. The model is illustrated through a case study done on a major handloom showroom situated in capital city of Odisha state in India. The result shows that the sales-counter of a cloth retail shop needs to keep sufficient variety of textile items to induce customers to make purchase. For more variety we need to keep more inventories. Also, in cloth retail shop the demand is affected by seasonal variation. So shops need to keep more variety and inventory to maximize sales during peak periods.

Keywords: Inventory Turnover Analysis, Reorder Quantity

1. Introduction

The handloom sector in India is the second largest employment provider after agriculture, providing direct and indirect employment of around 4.3 million people. This sector contributes nearly 22 percent of the total cloth produced in the country & has the largest infrastructure with 2.3 million weaving looms [1].

Handloom is the process of weaving fabric from cotton/silk/wool/nylon yarn using a hand operated machine. Handlooms have been a part of Odisha's traditional life style & also its cultural heritage since over three centuries. Its products, specially 'ikat' or tie and dye fabrics known as 'bandhas' in Odisha are recognized all over the country and abroad for their highly artistic designs, colour combinations & durability.

In this paper, data collections have done from various retail cloth shops in and around Bhubaneswar city, Odisha, India. For detailed study, a major handloom showroom was chosen as sample and a mathematical model has been prepared to improve the performance.

2. Literature Review

Handloom sector is the second largest economic activity after the agriculture. Several studies have been made on Handloom sector at national and international level.

Patnaik and Mishra [1997] have published a book namely "Handloom Industry in Action", where they have made a detail study on Handloom Industry and recommended measures to improve this sector.

Soundarapandian [2002] has discussed about performance, growth prospects of handloom sector. He has also explained the role of different marketing institution for promoting handloom sector.

Mohammad Morshedur Rahman [2011] brought the idea about how the working capital management has a positive impact on profitability of textiles industries and the correlation between them.

Nadh R R and Rao P V [2013] discussed how the power loom dominates textile production and encroached upon the handloom sector in India. They have stressed the need for market assessment and marketing strategy for the development of handloom sector in India.

Meenakshi Anand [2014] has focused on the financial strength of the textile sector in India and has analysed to what extent the available resources are used effectively. For this purpose profitability, liquidity and solvency position of textile companies were examined.

The present study is about performance improvement of the retail stores of handloom sector by inventory optimization.

3. Supply Chain Models of Handloom

Handloom items are produced by individual weavers. The weavers have mostly organized themselves by forming Weavers Cooperative Society (WCS). BOYANIKA is the Apex body of WCSs in the state of Odisha. It is meant to help various WCSs in procurement and distribution of raw materials required for production. It also helps in transportation, promotion and marketing. Boyanika has showrooms in state capital Bhubaneswar and various other cities in India. It also organizes sale through trade exhibitions in various parts of country and abroad. It has design-cells that provide designs to weavers as per latest fashion in market.

TANTUJA is another Apex body of WCSs of neighbouring state, which has shown very good performance.

Advance planning for replenishment of finished inventory at retail showroom has significant effect on production and sale.

4. Inventory Turnover Analysis

Each firm has to maintain certain level of finished goods as inventory so as to meet the business requirements. But the level of inventory should neither be too high nor too low. Higher the inventory implies higher carrying costs and higher risk of stocks becoming obsolete whereas too low inventory may imply the loss of business opportunities.

Inventory Turnover Ratio is a measure to express how many times the inventory rotated or sold or turned over in a year. Hence, inventory turnover ratio can often be used as a comparative measure of inventory performance. High turnover ratio generally indicates good inventory performance. It indicates low average inventory.

$$\text{Inventory Turnover Ratio} = \frac{\text{Annual Sales}}{\text{Average Inventory}} \quad (1)$$

But in cloth retail store, it is desirable to keep sufficient variety of goods to induce customers to make purchases. More variety means more inventories. Since there is variation in demand, the inventories need to be more during peak periods. The average inventory may be determined as under.

$$\text{Average Inventory, } I_a = (I_1 + I_2 + I_3 + \dots + I_n) / n$$

Where, I_1, I_2, I_3, \dots are the randomly selected inventories at instances 1, 2, 3, respectively and 'n' is the total number of instances.

Since record of Opening Balance (OB) of inventory at beginning of each month is generally maintained in most retail shops, these instances may be used for determining average inventory.

$$\text{So, } I_a = (I_1 + I_2 + I_3 + \dots + I_{12}) / 12$$

In financial Statement calculation where Opening Balance (OB) and Closing Balance (CB) are given only for 1 year, the Average Inventory (I_a) may be determined as:

$$I_a = (OB + CB) / 2$$

Since in the retail shop only Opening Balance is maintained at beginning of each month throughout the year, we get 12 instances of the inventory. The average inventory is determined as under.

$$I_a = \frac{\sum_{i=1}^{12} OB_i}{12} \quad (2)$$

Where,

i = Months starting from April-2014 to Mar-2015,

OB= Opening Balance or Beginning Inventory,

CB= Closing Balance or Ending Inventory = (OB+ Purchase - Sale)
Inventory Turnover Ratio of Boyanika which constitutes several WCSs having several retail shops is given for four consecutive years in table.

Table 1: Turnover Ratio of BOYANIKA

Year	OB of Inventory in Million Rs	CB of Inventory In Million Rs	Average Inventory	Sales	Inventory turnover ratio
2011-12	102	126	115	326	4.6
2012-13	128	164	146	707	4.8
2013-14	164	187	175	768	4.4
2014-15	187	240	213	773	3.6

(Source: Balance sheets & P&L Account)

Inventory turnover ratio is important for profitability of retail business. Too high inventory causes increase in inventory holding cost whereas low inventory may cause loss of sales. So there is need to optimize inventory. For this a major retail shop of Boyanika was chosen for the study.

Table-2: Sales across various counters of Retail outlet

Counter No.	Item	Sales in million Rs.	% Sales
1	Costly Cotton Saree	29.8	22%
2	Daily Wear Saree	11.5	9%
3	Cotton chadar, Bedsheet, Bedcover	8.9	7%
4	Diti, Lungi, Towels	5.5	4%
5	Suit Piece, Dress Material	19.2	14%
6	Silk Saree	25.9	20%
7	Furnishings	2.3	2%
8	Khandua Silk, Tasar	22.7	17%
9	Readymade Shirt, Kurta suit for men	4.5	3%
10	Readymade dress for ladies	2.5	2%

The retail shop has ten counters. The total sales data of these ten counters is given in table 2. It is observed that the sales-counter 1, 6, 8 and 5 contribute to around 75% of the total sales of retail shop.

Table-3: Inventory Turns Calculation for different Counters of Retail Shop

Counter No.	Average Inventory in million Rs.	Total Sales in million Rs	Inventory Turnover Ratio
1	8.47	29.8	3.5
2	1.91	11.5	6.0
3	3.34	8.9	2.7
4	1.53	5.5	3.6
5	5.48	19.2	3.5
6	11.4	25.9	2.3
7	0.79	2.3	2.9
8	5.91	22.7	3.8
9	0.68	4.5	6.6
10	0.66	2.5	3.8

Next the inventory turnover ratio of each sales-counter was calculated by dividing annual sales of sales-counter by its average inventory. The calculation is shown in table-3. It is observed that there is too much fluctuation in turnover ratio of different sales-counters. It is very high for some counters (e.g. counter-2 and 9) and very low for some other counters (e.g. counter-3 and 6). The overall inventory turnover ratio is 3.3. Hence, it is necessary to optimize inventory.

5. Mathematical Model

In most cases, sales volume is independent of quantity of goods in stock. But in case of cloth retail shops, there exist a relationship between sales and inventory. Customers like to see a variety of dress items before making a choice. Customers never buy any dress item (e.g. Saree) unless they are given option to choose from a lot consisting of different variety of items. Based on Market Survey and Salespersons' experience it can be said that for a cloth retail shop there exists a relationship between sales and inventory. Low inventory (less variety) may cause loss of sales in retail cloth shops. Hence it is essential to keep some stock (fixed component) in the retail shop to induce sales.

The amount of stock should also be based on the expected sales. In cloth retail shops, the demand is affected by seasonal variation (shown in fig-7). Hence the average inventory must also have a seasonal component.

In this paper a mathematical model for inventory control is presented by considering the above aspects to rationalize inventory level in each sales-counter without affecting the overall inventory level of retail shop.

The rationalization of inventory level at each sales-counter is done on following principle.

Case-1: When the 'Inventory turns of sales-counter' is greater than 'Overall Inventory turns (3.3)', the inventory level of that sales-counter is increased.

Case-2: When the 'Inventory turns of sales-counter' is less than 'Overall Inventory turns (3.3)', the inventory level of that sales-counter is decreased.

Desired Average Inventory for each sales-counter is rationalized by dividing its total expected sales by overall inventory turns. The desired average inventory of each counter is shown in table 4.

Table-4: Calculation of Desired Average Inventory at the same level of Resources

Counter	Actual Avg Inventory in million Rs.	Total Sales Value in million Rs.	Actual Inventory Turns	Desired Avg Inventory in million Rs.
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1	8.47	29.8	3.5	8.51
2	1.91	11.5	6	1.92
3	3.34	8.9	2.7	3.30
4	1.53	5.5	3.6	1.53
5	5.48	19.2	3.5	5.49
6	11.4	25.9	2.3	11.26
7	0.79	2.3	2.9	0.79
8	5.91	22.7	3.8	5.97
9	0.68	4.5	6.6	0.68
10	0.66	2.5	3.8	0.66
Net Value	40.17	132.8	3.3	40.11

To take care of seasonal variation in demand of goods, the desired inventory level should be maintained in keeping with expected sales in different months.

From previous year data it is observed that there is wide variation between ratios of actual inventory to sales of different months. If ratio is too high it indicates higher inventory than what is necessary, whereas low ratio indicates loss of sales. Desired inventory level in the beginning of each month should be based on sales during that month. This may be calculated as under.

$$I_m = wI_a + \frac{(1-w)I_a S_m}{S_a} \quad (3)$$

Where

- I_m = Desired inventory level in beginning of month 'm'
 I_a = Desired average inventory of sales-counter
 S_m = Sales during the month 'm'
 S_a = Average monthly sales
 w = Weight assigned for minimum inventory to be maintained irrespective of sales

Table-5: Calculation of Desired Inventory at beginning of month based on sales

Month	Actual inventory in million Rs.	Actual Sales in million Rs.	Inventory to Sales Ratio	Desired Inventory in million Rs.
April	7.32	0.89	8.19	4.67
May	7.10	2.82	2.52	9.26
June	7.38	1.99	3.71	7.27
July	7.42	1.56	4.75	6.26
Aug.	9.98	1.23	8.13	5.46
Sept	8.89	4.08	2.18	12.26
Oct.	8.83	3.12	2.83	9.98
Nov.	8.91	1.92	4.64	7.11
Dec.	8.46	2.02	4.19	7.35

Jan.	9.48	1.98	4.79	7.25
Feb.	9.36	3.27	2.86	10.33
Mar.	8.45	4.93	1.71	14.29
Average	8.47	2.49	3.41	8.46

Month wise desired inventory calculation for sales-counter-1 is shown in table-5. For this calculation weight 'w' assigned for fixed component is taken to be 0.3. It means, irrespective of sales 30 percent of average inventory should be maintained to induce purchase.

Desired inventory can be determined by month wise sales forecast for coming periods. Replenishment quantity is calculated for each month based on expected sale so that closing inventory at the end of month become same as desired inventory of next month.

$$ROQ = I_{m+1} + S_m - I_m \quad (4)$$

Considering expected sales in a particular month to be same as that of corresponding month in previous year, the inventory replenishment quantity for different months for sales counter-1 is calculated and given in table-6.

Table 6: Inventory Replenishment Quantity

Month	Replenishment in million Rs.	Month	Replenishment in million Rs.
April	5.49	Oct.	0.26
May	0.83	Nov.	2.16
June	0.97	Dec.	1.92
July	0.77	Jan.	5.06
Aug.	8.03	Feb.	7.23
Sept	1.80	Mar.	0.00

6. Conclusion

This study has been done to improve performance of a major handloom retail shop through proper management of finished goods inventory. The sales is influenced by quantity or variety of stock maintained in the shop. So there is need to maintain a desirable inventory to sales ratio to boost sales of a retail shop.

There is also seasonal variation in sales. The retail shop has many sales counters and there is significant variation in sales volume at different sales-counters.

An inventory model has been suggested to rationalize inventory level in different sales-counters based on their expected sales volume at each counter. Rationalization of inventory is also done with respect to seasonal variation of sales.

Rationalization of inventory is necessary not only for controlling inventory but also to improve sales.

The following suggestions have been drawn based to improve the performance of retail handloom shop of Odisha.

1. Customers look for choices before they buy. Inventory level has positive influence on sales. So some amount of inventory is necessary to induce buying.
2. Opening inventory or average inventory should be kept more for peak periods and minimum for lean period.
3. Stock may be procured every month or some fixed periodicity. The quantity to be procured in each period may be determined in advance and communicated to weavers.

The model can be refined by undertaking further studies on:

- Effect of variety of finished goods in stock on sales
- Effect of discount on sales
- Effect of time on deterioration of goods in stock

This paper will be guideline for the decision makers of retail shops.

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A Brief Authors' Biography

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