



## A Model for Managing and Controlling the Inventory of Stores Items based on ABC Analysis

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**Abstract-** Today, the effective inventory management plays an important role in the success of the organizations in the new business environment. It is not clearly possible for the organizations that store hundreds of inventory items to economically design an inventory management policy for each inventory item separately. To have an efficient control of a huge amount of inventory items, traditional approach is to classify the inventory into different groups. Different inventory control policies can then applied to different groups. The well-known ABC classification is simple to understand and easy to use. Moreover, various inventory items may play quite different roles in the business of the organization. Hence, the managers need to classify these items in order to control each inventory category properly based on its importance rating. In this thesis we consider a model of college hostel mess stores items (grocery and vegetables) for inventory management through ABC analysis. This research is composed of the following sections: In the first section, the criteria affecting the evaluation of the inventory control system of the studied mess stores and the priority of each one of them will be identified, in the second section, the priority of each criterion such as cost of item, annual demand for an each item hence find annual consumption cost in each inventory category (A, B, C) is Calculated based on conventional model, in the third section, presents an alternative way of classifying the different productive items of accompanies and this ABC model compares with the classic Pareto classification, which ranks productive items according to their importance in terms of frequency and costs whereas rankings obtained using the classical method are based on information about costs and demand over a period in the past "A-items" that result from this new classification.

**Keywords:** ABC classification, inventory control, pareto classification.

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## I. INTRODUCTION

Given that at present, all the organizations maintain thousands different types of inventory, it is likely to lose the effective inventory management. Therefore, it is particularly important for all the organizations to establish the appropriate inventory

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control systems or to evaluate and improve the existing inventory control systems. Because on the one hand, the organization encounters the inventory-related costs, including Cost of Holding, Cost of Ordering, Cost of Shortage the increase of each one due to the lack of a suitable inventory control system will have negative effects on the profitability of the organization. On the other hand, since the number of inventory items is largely increasing due to the increase of the customers' demands for different products, the organizations should have a quick and effective response to the customers' demands to survive and maintain their competitive advantage. The establishment or improvement of an appropriate inventory control system can lead the organization in this path. Considering that today, the organizations save a large percentage of their total investment in the inventories, it has become of a special importance to all organizations to properly manage the inventory and establish a proper inventory control system. According to what was mentioned, all the organizations need an appropriate inventory control and planning system in order to effectively manage their resources and inventories. Therefore, in order to create a perfect inventory control system, various inventory items should be classified into the significant categories based on appropriate criteria and standards. Various models and methods have been so far presented to classify inventory among which, ABC analysis approach is one of the most common methods which is widely used for planning and inventory control (Kilgour & et al 2006). Inventory classification based on ABC analysis allows the organization to classify its inventory into the significant categories. Generally, the above approach has been formed based on the Pareto Principle which is also known as "20-80" law. Regarding the organizations' inventory, this principle will be expressed as follows: In the manufacturing organizations, there are only a few inventories which mostly contribute to the cost of the annual consumption of the organization's inventory system and there are only anew inventories which a little contribute to the dollar value of the annual consumption of the inventory system. Given that the primary purpose of the inventory classification based on this approach is to create appropriate control levels for each inventory category, this question will be raised that whether the inventory classification based on single criterion ABC

analysis will be able to meet all the needs of the organization's inventory control system. As a result, the organizations can apply proper control policies by identifying the most effective criteria in their inventory classification. This study has also tried to present proposed ABC model for the hostel mess stores, in order to evaluate the inventory control system of the studied in that. For this purpose, first, the criteria affecting the evaluation of the inventory control system, classification of inventory and the priority of each One of the criteria in the studied mess stores and the priority of each one of the criteria in each inventory category (A, B, C) have been identified and model will be proposed.

## II. LITERATURE REVIEW

- a) In 1987, an article was presented entitled "The application of multiple criteria ABC analysis" in which the results of the use of multiple criteria ABC analysis have been provided to classify the storage inventory. The studies conducted in this paper show that the managers can use both "cost criteria" and "non-cost criteria" in the classification of warehouse inventory and formulate specific policies by using different criteria to manage warehouse inventory.
- b) In 2008, an article was presented entitled "Particle Swarm Optimization "in order to classify the inventory in which an optimization approach is proposed regarding the inventory classification problems at the conditions when inventory items should be classified based on a target or multiple targets, such as minimizing annual consumption costs, maximizing the rate of inventory turnover.
- c) In 2007, an article was presented entitled "A simple IJSSM, 2012, 1(1):1-13 classification for multiple criteria ABC analysis". In this paper a simple model is proposed for multiple criteria classification of the inventory. In fact, this model covers the criteria of all the criteria in a single criterion. The study conducted in this paper shows that by appropriate conversion of the scale model of different criteria of the inventory classification, the organizations can reach some criteria of the inventory items without need for linear optimization. The model presented in this paper can be widely used by the organizations with minimum experience in the optimization. The criteria reviewed in this article include: the dollar value of the annual consumption, the average cost of each unit, and lead time.
- d) In 2006, an article was presented entitled "the inventory classification based on multi criteria ABC using weighted linear optimization.
- e) In 2010, an article was presented entitled "The use of techniques based on the artificial intelligence for multiple criteria ABC analysis" by" Maine-Chun-Yu". In this paper, a study has been conducted to compare the classification techniques based on artificial intelligence and traditional classification techniques (MDA).
- f) In 2010, an article was presented entitled "Fuzzy AHP-DEA approach for inventory classification based on multiple criteria ABC approach". In this article, two approaches of Data envelopment Analysis and fuzzy analytic hierarchy process are combined for multiple criteria ABC classification of inventory.
- g) In 2008, an article was presented entitled "The inventory control by combining ABC approach and fuzzy classification". The purpose of this study is to provide a new approach on the inventory control called "ABC fuzzy classification".
- h) In 2004, an article was presented entitled "multi criteria classification approach to manage the spare parts inventory". In this article, the best strategy has been reviewed to manage inventory in each category (A, B, C) (Braglia & et al, 2004).

## III. PROBLEM ENVIRONMENT

A study is conducting in TCE men's hostel for my thesis. In TCE mans hostel there are two stores are available. One is for variety mess store and another one is for value mess store. Totally 550 students are in value mess and 650 students in variety mess. Here I identified the problem in inventory in both stores. Due to incorrect optimal order quantity and insufficient forecasting the more inventories\_held in both mess. In the mess stores they used previous experience for order the items. They did not use any formulation or techniques such as P MODEL, Q MODEL system for find the optimal order quantity. So that only inventory problem arises there. So here in my thesis I will use both the system and find EOQ for all items thereby reduce the inventory level and reducing annual consumption cost of mess stores. In order to find the EOQ, it is very important to know about that are the various items affecting the inventory cost in stores. So ABC analysis is requiring knowing about the inventory affecting items. Form the ABC analysis we have easily know the items which are contribute in inventory, only the A types item. So, in this paper presents only the ABC classification of stores items (grocery & vegetables) of hostel mess stores.

IV. PROPOSED MODEL

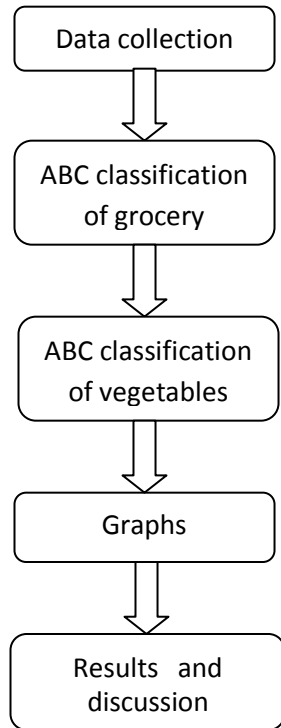


Figure 4 : Proposed model for ABC analysis

In this proposed methodology the various data's such as unit price of an item, annual demand of an item were collected from mess stores and based on this data, grocery and vegetables were segregated for doing the ABC analysis of an each and individual items.

V. RESULTS AND DISCUSSIONS

a) ABC Model

Price/unit= P, Unit/year= U

Annual consumption cost (A) = P\*U

Cumulative values of Annual consumption Cost C1= A1, C2=A2+A1, C3=A3+A2+A1 etc.

For grocery

Table 5.1 : ABC analysis for grocery

Sl.No	Description	Price/unit (Rs.)	Unit/year (kg)	Annual consumption Rs./year	Cumulative values of Annual Consumption(Rs.)	Classification
24	Peanut oil	85.9	15600	134004	1340040	A
1	Rice(Ponni)	34.6	21600	747360	2087400	A
2	Idly rice	28	14400	403200	2490600	A
35	Ghee	370	1080	399600	2890200	A
8	Black gram	62.9	4800	301920	3192120	A
28	Wheat flour	34.7	7200	249840	3441960	A
26	Papadam	100	2400	240000	3681960	A
54	Garlic	119	1800	214200	3896160	A
5	Red gram	64.6	3240	209304	4105464	A
6	Green gram	71.9	2880	207072	4312536	A
4	Basmati rice	84.75	2440	206790	4519326	A
21	Fried gram	53.5	3600	192600	4711926	A
25	Sesame oil	258	720	185760	4897686	A
41	Boost	334	540	180360	5078046	B
42	Bounvita	330	540	178200	5256246	B
37	Prunes	408	360	146880	5403126	B
48	Vermicelli	54	2440	131760	5534886	B
20	Asafoetida	600	180	108000	5642886	B
36	Cardamoms	599	180	107820	5750706	B
27	Maida flour	35.5	3000	106500	5857206	B
39	Tea powder	290	360	104400	5961606	B
51	Ground nut	82	1200	98400	6060006	B

29	Rolong Semolia	38.5	2400	92400	6152406	B
44	Sambar powder	154	540	83160	6235566	B
32	Sago	69	1200	82800	6318366	B
11	Tamarind	110.9	720	79848	6398214	B
34	Jaggery	60	1200	72000	6470214	B
45	Idly powder	170	420	71400	6541614	B
16	Pepper	569	120	68280	6609894	B
30	Peanut flour	55	1200	66000	6675894	B
49	Butter	273	240	65520	6741414	C
33	Milletts	54	1200	64800	6806214	C
55	Dal powder	165	360	59400	6865614	C
46	Cowpea	49	300	14700	7353384	C
38	Raisins	110	120	13200	7366584	C
47	White raw rice flour	34	360	12240	7378824	C
56	Flattered rice	39	300	11700	7390524	C
17	Aniseeds	93	120	11160	7401684	C
18	Salt	3	3600	10800	7412484	C
43	Porco roso	30	360	10800	7423284	C
53	Caraway	880	12	10560	7433844	C
15	Fenugreek	41	120	4920	7438764	C
52	Cinnamon	160	12	1920	7440684	C
				Total	7440684	

From this ABC analysis of grocery items A type items have more annual consumption costs. So here 13 items have classified under A category out of 57 items.

For Vegetables

Table 5.2 : ABC analysis of vegetables

Sl.No	Description	Price/unit (Rs.)	Unit(kg)/year	Annual consumption Rs./year	Cumulative Value of Annual Consumption (Rs.)	Type
1	Onion	19	30000	570000	570000	A
3	Tomato	13	10800	140400	710400	A
4	Potato	23	6000	138000	848400	A
20	Cauli flower	24	2600	62400	910800	A
25	Amaranth	19	3000	57000	967800	B
2	Shallot	38	1200	45600	1013400	B
28	Drumstick	60	720	43200	1056600	B
8	Ladies finger	15	2400	36000	1092600	B
19	Beans	19	1800	34200	1126800	B
7	Brinjal	13	2440	31720	1158520	B
10	Cabbage	10	2400	24000	1182520	B
9	Green chilli	20	1080	21600	1204120	B
17	Ginger	54	360	19440	1223560	B
27	Panner	25	720	18000	1241560	C
12	carrot	16	960	15360	1256920	C
15	Coriander leaves	20	720	14400	1271320	C
26	Mushroom	20	720	14400	1285720	C

14	curry leaf	30	360	10800	1296520	C
11	Raw mango	25	360	9000	1305520	C
22	Broad beans	25	360	9000	1314520	C
18	Turnip	11	720	7920	1322440	C
21	Bitter guard	15	480	7200	1329640	C
24	Capsicum	30	240	7200	1336840	C
5	Yam	27	240	6480	1343320	C
23	Radish	11	480	5280	1348600	C
16	Peppermint leaves	20	180	3600	1352200	C
13	Beet root	10	240	2400	1354600	C
			Total	1354600		
			A(70%)	948220		
			B(20%)	1219140		

From this ABC analysis of vegetables items A type items have more annual consumption costs. So here 4 items have classified under A category out of 28 items.

6.2. Pie Chart for Vegetables

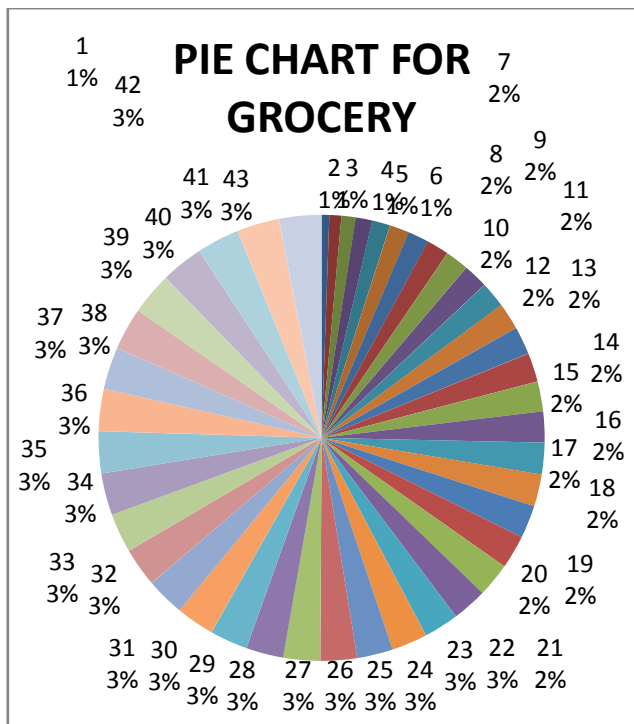


Figure 6.1 : Pie Chart

From the pie chart we clearly know 13 items have classified under A category out of 57 item and of grocery items of mess stores.

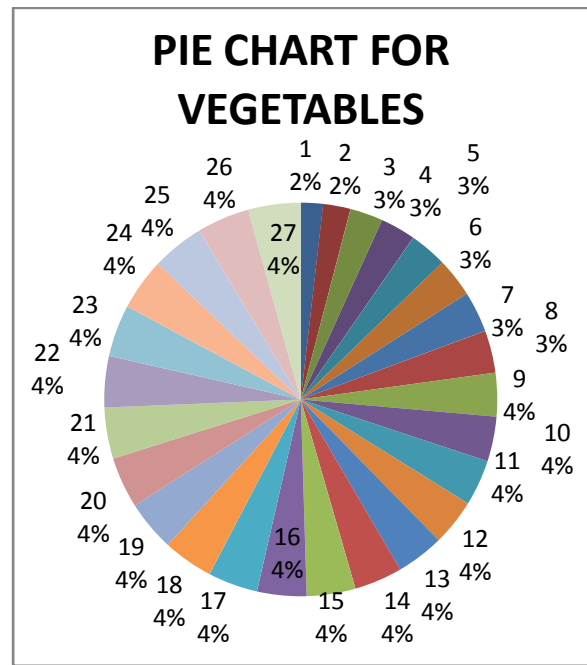


Figure 6.2 : Pie Chart

VI. CONCLUSION

In this study, the indices affecting the evaluation and control of the inventory control system of TCE men’s hostel stores. the results of ABC classification that these criterions of “the required accuracy in ordering” in the inventory category A and the criterion of “the effect of inventory on the process” in the inventory categories B and C have the highest importance. From this ABC analysis of grocery items A type items have more annual consumption costs so here 13 items have classified under A category out of 57 item and of groceries. For vegetables here 4 items have classified under A category out of 28 items and only the A type



items have more annual consumption costs and creates more inventory in stores. So Economic Order Quantity and re-order level will be calculated for these A type items hence reduce inventory and annual consumption cost.

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