ABC ANALYSIS, MODEL FOR CLASSIFYING INVENTORY

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Abstract: *In this paper, I present a method of control of the inventories, the ABC analysis, a very popular method to classify the inventories, a method based on the Law's Pareto or the principle 80/20.*

Keywords: *ABC analysis, inventories, classification*

1. Introduction

Inventory classification using ABC analysis proved to be a highly successful method, it becoming popular due to the practical implications, helping managers to easily identify items on which they could turn their attention to creating a surplus value, I mean the articles of Class B and C or just those in the class that represented the bulk and stars stock. This method is now present because of the possibilities they offer policies concentrating on the best products.

2. ABC ANALYSIS

Bloomberg et al [1] showed the existence of two models for classifying stocks i.e. ABC analysis and critical value analysis.

ABC analysis is a method of inventory control based on a principle discovered by Vilfredo Pareto statistically, a nineteenth-century Italian economist, a principle known as the law of Pareto, who observed that 20% of the Italian population owned 80% of land used, and [2]. Pareto later discovered that other phenomena and processes of nature; the economy had the same distribution, [2].

Pareto's law is stated thus, [2]: „ In many projects 20% of the total effort produces 80% of the total result". Pareto's Law has the following situations that were reported [2]:
• „ 20 % of customers generate 80% of turnover
• 20% of products make 80% of turnover
• 20% of possibilities to make faults in production are responsible for 80% of product defects
• 80% of the decisions are made in 20% of the time in a meeting
• 20 % of products make 80% of profit
• 20 % of employees account for 80% of the time absent
• 80 % of results are achievable in 20% of working time if strategic time planning is used
• the best 80% of sellers are responsible for 80% of the profit of a firm
• 20% of the goods in a stock sum up to 80% of the stock worth
• 80% of the requests for stocked articles are on only 20% of the goods
• 80 % of the costs or losses of a business are caused by 20% of the problems".

Arthur, [2], says that 80/20 is justified only by observation, i.e. empirically observe that it applies to many software projects:

20 %	of these	80 % of these
modules	consume	resources
modules	contribute	errors
modules	consume	execution time
errors	consume	repair costs

enhancements consume adaptive maintenance costs

| tools | experience | tool usage. |

ABC Analysis is a „method of tiered inventory or supplier valuation that divides inventory/suppliers into categories based on cost per unit and quantity held in stock or turned over a period of time" and "allows different inventory/supplier management techniques to be applied to different segments of the inventory/suppliers in order to increase revenue and decrease costs. In terms of a Pareto Analysis, it separated the critical few from the trivial many.

"A" Category items generally represent approximately 15%-20% of an overall inventory by item, but represent 80% of value of an inventory. By paying attention close attention in real-time to the optimization of these items in inventory, a great positive impact is possible with minimal increase in inventory management costs.

"B" Category items represent 30%-35% of inventory items by item type, and about 15% of the value. These items can generally be managed through period inventory and should be managed with a formal inventory system.

"C" Category items represent 50% of actual items but only 5% of the inventory value. Most organizations can afford a relatively relaxed inventory process surrounding these items", [3]. ABC analysis is „ An analysis of a range of items that have different levels of significance and should be handled or controlled differently. It is a form of Pareto analysis in which the items (such as activities, customers, documents, inventory items, sales territories) are grouped into three categories (A, B, and C) in order of their estimated importance. 'A' items are very important, 'B' items are important, 'C' items are marginally important.

For example, the best customers who yield highest revenue are given the 'A' rating, are usually serviced by the sales manager, and receive most attention. 'B' and 'C' customers warrant progressively less attention and are serviced accordingly", [4]. ABC analysis means classify the sub-projects in classes A, B and C in order of decreasing yields which class A has projects with the highest efficiency , class B has projects with medium yield and class C projects with contains low-yield projects, as follows:„ Class A: subprojects with relative low costs returning an over proportional yield, i.e. the relatively few subprojects in this class should return a very high yield with low expense Class B: subprojects with at least average ratio of yield to cost. Yields of projects in this class should be at least direct proportional to costs. Class C: the rest of the subprojects, i.e. these subprojects generate low profit on high costs", [2].

ABC classification „allows an organization to separate stock keeping units (SKUs) into three groups: A, the most important; B, important; and C, the least important. The purpose of classifying items into groups is to establish appropriate levels of control over each item", [5].

The items are classified using the annual use value, which is the product of annual demand and the average unit price, [6]. Inventory items are „ordered descendingly with respect to their annual dollar usage values", [5].

According to this classification, items are subject to a different control. Thus, „Class A inventory items require cautious inventory control because they represent a large percentage of the total dollar value of the inventory. This state requires certain demand forecasts and detailed record keeping. Class C inventory items should receive a flexible control. Class B items should have a control effort that lies between A and C", [5].

ABC analysis is done in six basic steps, [3]:
„1. Identify the objective for the analysis. Determine success criteria.   An ABC analysis can accomplish one of two primary goals: to reduce procurement costs or to
increase cash flow by having the right items available for production or direct to customer sales.

2 Collect data on the inventory under analysis.
The most common data, generally available from standard accounting already in place, is annual spend per item. This can be in terms of raw purchase dollars, or weighted cost including all ordering costs and carrying costs, if those can be readily calculated.
3. Sort inventory in decreasing order of impact. From most to least, rank orders each inventory item by cost.

4. Calculate accumulated impact.
Using a spreadsheet tool, calculate the cumulative impact of the list of inventory items by dividing item annual cost by total inventory annual spend, then adding that amount to the cumulative total of percentage spent.

5. Divide inventory into buy classes.
This may not be a precise 80/20 characterization. Take a holistic view and do not concern yourself with an exact 80/20 rule.
The goal is to find areas where renegotiating contracts, consolidating vendors, changing strategic sourcing methodology, or implementing e procurement may deliver significant savings or ensure in-stock availability of high-volume items.

6. Analyze classes and make appropriate decisions.
The key to this step is follow-up and tracking. Once strategic cost management is in place based on categories, periodic review is critical to monitoring the success or failure of the decisions." For the determination of the borders of classes A, B, C have been proposed various methods, for the class A the proposals range from 5% to 33%, and for class B from 15% to 33%, and for class C from 25%to 50%, using many practical cases the so-called Lorenz curve, where the x axis is cumulative costs, and on the y axis are cumulative yields projects, [2].
An example is the Lorenz curve below, which shows the size of land owned by firms vs. total number of farms, where both axes are in units of percent, [2].
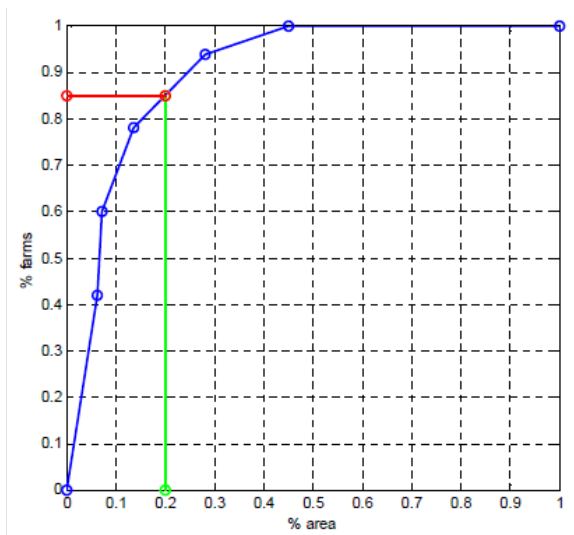

Fig. 1 Lorenz curve of land area usage in South Africa, [2]

Classification of items in groups A, B, C in ABC analysis was done using a single general criterion, frequently being that the total annual dollar value, but because it was recognized that the traditional ABC analysis has a serious drawback, because using a single criterion can generate significant financial loss problems, for example, articles for class C or class a big delivery prone to obsolescence can cause large financial losses due to possible disruption of production or creation of large stocks were ABC proposed classification based on multiple criteria, such as delivery time, criticality shortage of stock on an item, obsolescence rate, scarcity, substitutability, order an item size and other important criteria to consider which criteria can provide a comprehensive management control, [5].

3. Conclusions

In this paper we present a method for classification of stocks, namely ABC analysis. This method is very useful both from the theoretical point of view but also from a practical standpoint. Has many uses and can be used initially to the classification of stocks, and suppliers, and projects, and by analogy we can extend the method to other fields of knowledge. Yet the most important use is in inventory management.

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