Cost Optimization through Value Management Practices - A Success Mantra to Manufacturing Industries…

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Abstract:
Due to an intense competition from the competitors and pressure from the customers to reduce prices, many companies are taking the proactive steps to reduce their costs to survive in the market. Companies are taking the efforts to reduce the cost at various stages. Cost reduction is not only related with the operations cost but with the materials costs too. As a thumb rule, almost 70% cost is with the raw materials, so there is always a huge scope to reduce it. Reducing the manpower is not solving the problem but keeping the alertness and applying various ways to reduce the cost of the raw material helps to achieve the target. Value Management (Value Engineering / Value Analysis) is one of the easy and simple ways to do so. Along with Value Management practices a regular review of the BOM (Bill of Material) and the Cost quoted by the supplier is also helping on the cost reduction. Researcher has collected various practices followed at manufacturing industries. This paper may help the others to adopt at their works

Key Words: Cost Optimization, Value Engineering, Value Analysis, BOM

Introduction: In business world, everyone is often working at legitimate cross purposes, governed by self interest and own sub-goals. Customers look for lower prices, suppliers asks for higher prices. Unions demand higher wages; stock holders expect more and more earnings. The competition is always trying to market a better product or a product with more features at a lower cost. Business success depends on managing all these and some more. (1)

To cope up with this situation Cost reduction plays a vital role for the management. Value Management is the simple and easy way to achieve the success. The newness of Value Management lies in the use of all known available or in-house techniques and expertise as a system for developing solutions. It is team work multifunctional and even self directed.

There are many techniques for achieving cost reduction, but each of them is relevant to only certain specific applications. For instance, operations research techniques are excellent for solving problems related to distribution, resource optimization, and so on. Flow process charts are ideal for - the study of a process and the fixing of delays, but do not help in product development. But Value analysis is the most powerful [2].

Need and Significance of the Study: As mentioned by Mr.S.S.Nayar in his book Value Engineering a How to Manual, Value Engineering practices was being used by over half the
Fortune 500 corporations. It means there is a scope to implement this technique from Small Scale Industries to Large Scale Industries.

Some forward looking companies in India are using Value Engineering. But sufficient documentation is not available to indicate their experience in detail.

In one manufacturing company, the Top management has given Cost reduction task to employee to keep themselves alive in the competitive market. To reduce the Cost and to maintain the bottom line all the Individual and various teams works and achieved the success. How they have taken the steps to reduce the cost by using various ways? This would help the other industries to implement at their end.

**Literature Review:**

During Value Engineering (VE) or Value Analysis (VA), the product attributes are assessed, the costs of providing the specific attributes are calculated and lower cost alternatives are identified. Suppliers and customers may be involved in value engineering along with representatives from engineering, manufacturing, R & D, marketing and the accounting department. The goal is to reduce costs while maintaining the products Quality and functionality (i.e. equivalent performance at lower cost) (3)

Value Engineering is a powerful and effective tool for attacking material cost embedded in a product’s design as well as helps reduce variable overhead costs. Additionally, it is proactive in nature in that it can be employed in the design phase of processes and products that will aid in avoiding serious problems later in production. The dominant concerns of manufacturing CEOs are 1) achieving lower costs, and 2) warding off foreign competition. In this context, “foreign competition” includes U.S. competitors who source products offshore. Six Sigma and Lean Manufacturing are not enough to turn this around, however. This paper explores how Value Analysis/Value Engineering enhances the Lean-Six Sigma (4)

There are numerous problem solving techniques which have been used in different sectors of industries, societies, agricultures, managements and so on. Some of the techniques are Value Engineering, TRIZ, Six Sigma, 5s, QFD and so on. But VE is one of the methods which have been used to improve the system by lowering the unnecessary costs in different areas. (5)

**Objectives of the Study:**

1) To Study the various cost reduction approaches adopted in manufacturing industry.
2) To Study the Value Management Practices followed in manufacturing industry.

**Methodology Adopted:** The present paper uses a method of Interview was employed in this research as the data gathering tool.

**Discussions and Observations:** Bharat Manufacturing Industry is a Multinational Company manufacturing the Cases used for daily use and for outing purpose.

From the last 10 years the plant was enhancing their capacity due to increase in Demand and to satisfy the customer but from last two years it was observed that the demand is decreasing slowly. To overcome the issue meeting was called in the Indian plant.
Following were the reasons to decrease the demand like…

1. New Manufacturer entered in the market.
2. High prices as compared to local manufacturer.
3. Customer’s dissatisfaction for the service after sell.

Out of the above three points, point no. 1 & 2 were the main problem for the decreasing demand. The cost of the new manufacturer was 15 – 20% less than Bharat’s products. So to compete with the New Manufacturer it has been decided to reduce the cost of the product which will solve both the problem.

Value Analysis is an effective tool for cost reduction and the results accomplished are far greater. It improves the effectiveness of work that has been conventionally performed as it questions and probes into the very purpose, design, method of manufacture, etc., of the product with a view to pinpointing unnecessary costs, obvious and hidden which can be eliminated without adversely affecting quality, efficiency, safety and other customer features.(6)

**Value Engineering/ Value Analysis Job Plan :**

The Job Plan consists of the following sequential phases

A. General Phase - In the General Phase, the stage is set by organizing the task force, identifying the decision maker, selecting the areas of effort, assigning specific task to each member of the team and inspiring them for coordinated team work.

B. Information Phase – The problem is broken into specifics for avoiding generalities.

C. Functional Phase - ‘Function’ is the key to the value effort. One of the basic problems a manufacturer faces is that providing a function. An item is a means to the end of a providing a function not the end itself. In this phase, the function needed is first identified, then defined and classified as the BASIC and SUPPORT FUNCTIONS. (1)

D. Creation Phase - This step requires a certain amount of creative thinking by the team. A technique that is useful for this type of analysis is brainstorming. This stage is concerned with developing alternative, more cost effective ways of achieving the basic function. All rules of brainstorming are allowed, and criticism needs to be avoided as it could cease the flow of ideas. Simply list down all ideas, not regarding whether they sound apparently ridiculous. (7)

E. Evaluation Phase - In this phase of the workshop, the VA team judges the ideas developed during the creative phase. The VA team ranks the ideas. Ideas found to be irrelevant or not worthy of additional study are disregarded; those ideas that represent the greatest potential for cost savings and improvements are selected for development.

F. Investigation Phase – The creative ideas so refined, evaluated, and compared are then subject to investigation in the Investigation Phase. (1)

G. Implementation Phase - During the implementation and follow-up phase, management must assure that approved recommendations are converted into actions. Until this is done, savings to offset the cost of the study will not be realized (7).

**How Bharat Manufacturing Industry implemented in their organization?**
In General phase, one separate department “VALUE ENGINEERING” department was formed and a cross functional team was working for this department. Team was also familiar with the ERP system which would help them to retrieve the past & current data from the system.

In Information Phase, the problem that “Reduction of cost” is broken down into two categories.
  A) Cost directly related to product (Material Cost)
  B) Indirect Cost through various processes during conversion.

In Functional Phase, the activities are classified as follows along with VE Team.
  1. Verification of BOM (Engineering and Production Department)
  2. Verification of Costing with the Suppliers and negotiations (Engineering and Purchase department with Supplier)
  3. Brain Storming at each level in the Organization and with Suppliers
  4. Material Substitution (Design and Purchase Department)
  5. Supplier Substitution (Purchase Department)
  6. Import Substitution (Purchase Department)
  7. Simplification of Processes in the entire organization (Engineering and All the Departments)

In Creation Phase, all the above seven activities were started to achieve the objectives of the study. Evaluation, Investigation and Implementation Phases are taken care in all these seven activities.

1. Verification of BOM – BOM is a document which is a backbone of the pricing of the product in which the Quantity of the raw material, Unit of measurement and Name of the warehouse (where the raw materials will be consumed and SFG or FG will be produced is mentioned).

Take the print out of the BOM and go on the shop floor to check each and every item. Many times the material which is mentioned in the BOM is different and usage is different or the consumption is in Gms and by mistake it is mentioned in the Kgs without conversion from Gm to Kg and so on…

a) If a worker is using items which are not mentioned in the BOM will disturb the entire Inventory. Also the item which is mentioned in the BOM is less costly than what he is using then he is making loss for the company. It may possible that he will fill the alternate usage to correct the Inventory in the system but ultimately he is making loss.

b) If a person who maintained the BOM in the system have entered the wrong Quantity or Unit of measurement may be a cause for making loss to the company and ultimately hampering the price of the product.

c) In Bharat Manufacturing company the Operation Cost was calculated as “(Department wise Hourly Cost” X Total Time). Suppose there are few operations which are carried out in a department whose Hourly cost is more than all other departments then break the process in two different departments.
Example – Paint Shop for Metallic items: One item needs Fabrication, Painting, Riveting and Packing etc. While calculating the time, the most time consuming operation was Fabrication which consists of Cutting, Blanking, Piercing etc operations and the Hourly rate of Fabrication department was less than Paint Shop. The set up of paint shop was huge and it required more electricity and manpower than fabrication. So it is observed that instead of total time for the entire item break the item (time) in two operations i.e. Fabrication and Painting.

Example -

<table>
<thead>
<tr>
<th>Operations</th>
<th>Earlier</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Operation</td>
<td>Hourly Rate</td>
<td>Run Time in Minutes</td>
<td>Run Time in Hours</td>
<td>Operation Cost</td>
<td></td>
</tr>
<tr>
<td>Fabrication, Painting,</td>
<td>750</td>
<td>5</td>
<td>0.083333</td>
<td>62.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Proposed</td>
<td>Operation</td>
<td>Run Time in Minutes</td>
<td>Run Time in Hours</td>
<td>Operation Cost</td>
<td>Saving / Item</td>
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<td></td>
<td></td>
<td>Rate</td>
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<td>25.00</td>
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<tr>
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<td>0.05</td>
<td>12.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Painting</td>
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<td>3</td>
<td>0.05</td>
<td>25.00</td>
<td></td>
<td>37.50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>25.00</td>
</tr>
</tbody>
</table>

Source: Cost Sheet of Bharat Manufacturing Company

2. Verification of Costing with the Suppliers and negotiations - Now Verification of Costing is also an area where we can save the cost.

Cost consists of Material Cost and Operation Cost + Taxes and overheads.

In this area the focus is on Taxes and Overheads. Always check the tax structure declared by State or Central Government and make the necessary changes in our costing.

Verification of Costing of Supplier may give surprises which he has quoted.

It is noticed that so many suppliers give the cost Ad hoc, yes it is in line with the expected cost but not supported with BOM, Tax, Overheads, and Profits etc. It is observed that if we ask him scientifically then we get something from this.

3. Brain Storming at each level in the Organization and with Suppliers

Here take a profit margin sheet from costing department and first attack on those products whose profits are less than what the top management has decided as minimum profit percentage.

Prepare a list of product on which Brain Storming is needed for cost reduction.

In Bharat Manufacturing Industries, they have adopted three systems.

a) On line workers will give their idea on a paper with existing practice and his proposal.

b) Officer and above in the plant will meet in the brain storming meeting conducted by VE (Value Engineering) Department.
c) Brain Storming with Marketing and sales people as they are the eyes of the company in the market.

The workers who are the real contributor in the actual production are giving so many suggestions to reduce the cost in terms of material or to reduce the operation cost.

Only once in a month the brain storming meeting is conducted in the office hours only as if we call them after office hours they will not be in a condition to participate whole heartedly in the meeting. Process is as follows….

Preparation for this meeting by VE Department:

i) Physical Sample of each product.

ii) BOM with costing of each product. The costing is fabricated in such a manner that ….

a) Material and Operation Costs are bifurcated.

b) Item wise cost / product is arranged in descending order so that in the meeting all participants can focus on Items contributing maximum cost of the product. Make the items list as we are doing the A-B-C analysis.

“A” items are those only 10% items contribution 70% of the product cost.

“B” items are those only 20% items contribution 20% of the product cost.

“C” items are those only 70% items contribution 10% of the product cost.

C) Also the items are arranged supplier wise i.e. Local, Imported and Subcontracted.

In the meeting, write down each and every suggestion given by the participants with their name.

It was noticed that just for the sake of giving suggestion all participants take part in the meeting but while working all keep them self away and again after implementation ready to take the credit for the suggestion.

So the Top management has decided to give the name of the person who has given the suggestion and he will work along with VE person for the further work and VE person is sole responsible for execution of the project i.e. sample making, trial, testing etc.

After the meeting the real work starts….

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<table>
<thead>
<tr>
<th>Step</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scrutinize all the suggestions and make list of final projects for Value Engineering. (Also include the suggestions given by workers)</td>
</tr>
<tr>
<td>Allot unique project number for the accepted suggestions</td>
</tr>
<tr>
<td>Calculate the tentative saving per product and impact of saving / month and per year project</td>
</tr>
</tbody>
</table>
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2. **Material Substitution** – The Company worked to reduce the cost without hampering the Quality of the product by using the substitute material. For this point they have segregated the item of the BOM with their basic raw material and brain storm with design department for the alternate material whose consumption or unit price will be less than the existing raw material.
In each type of materials there are different types of Grades or various other materials or different blending manufactured by RM manufacturer which one can try as alternate material considering there is a substantial cost saving without hampering quality.

There may be so many components where functionality is important than the visual, there they have eliminated the process of surface finish etc. of course all these changes are implemented as per the procedure mentioned in point no.3.

3. **Supplier Substitution** – It is observed that dependent on one supplier increases the cost of raw material day by day so always keep two or more supplier so that one can get the competitive price.

This company took the following ways for supplier substitution.

- If the existing supplier is out of state find out supplier in between state or near to city which reduces the transportation cost.
- If the existing supplier is monopolistic, then develop new supplier for the same item.
- Find out the supplier from “Government subsidies industrial zone” where he is getting the benefits of taxes.

4. **Import Substitution** – The Company listed down the parts which they were importing. Here there were two objectives of import substitution one is two reduce the cost of the product and another is to reduce the Inventory Carrying cost.

It was observed that if the imported items are with full container load then the transportation cost was low but if it is less than the container load the transportation cost is too high which reduces the profit.

If the company buy the same material in 20 Ft container load then the Inventory carrying cost increases, so it was decided by the management to focus on Import Substitution.

Also there is fluctuation in crude oil prices which impacts on the sailing cost and transportation cost from port to plant.

The company has to keep minimum 3 months inventory for their production because of following points.

- Lead time of Import Supplier was 30 Days
- Sailing Time approximately 25 Days
- Custom Clearance at our port approximately 10 Days (Considering previous shipments)
- Total are 65 Days
- Company’s policy to use Safety time instead of Safety Stock = 15 days.

So the company has to keep the stock for 90 days in their warehouse which carries the Inventory carrying cost.

Almost Imported Material procurement was 30% of the Total Procurement of Rs. 300 Cr. So there was substantial saving in Import Substitution.

5. **Simplification of Processes in the entire organization**: This task was conducted by the VE team department wise. In this task they found so many duplication of work. The same work
is carried out by two or more persons for their own tracking purpose. So listed the activities and one common format was given to IT department which only one person will enter the data and rest all will use the same data.

The same thing studied on the shop floor which reduced the operation cost.

**Conclusion:** Bharat Manufacturing Company took various initiatives like BOM verification, Cost verification, Supplier and Import Substitution and Simplification of Process which indirectly reduced the cost.

By implementing Value Engineering and Value Analysis at Brain Storming and Material Substitution, company could achieve the target of cost reduction by keeping the quality as it is.

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