Model to build cost competitiveness through material productivity – a case study

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Abstract. Companies are facing increased customer expectations and cut throat market competition. Organizations are driving three major performance measures which are market outperformance, incremental margin, and cash flow conversion. As companies continue to outsource large portions of their manufacturing, managing material costs in the supply chain are important in reducing overall costs and remain competitive in order to ensure that all supply chain partners particularly in the upstream supply chain survive and be part of the future growth. The purpose of this paper is to present the detailed analysis of the various cost factors which affects the organizational performance and developing a unique model for the material productivity program. The key criterions include the innovative ideas of cost reduction, continual focus to eliminate wastes in the supply chain and also to drive excellence in execution of these projects. As the case industry has become global, it is essential for the case industry to carry out structured and sustained material cost reduction activity in order to capture the potential market through cost leadership and to emerge as best cost supplier among the other plants. This particular research work discusses more in detail about Indian market conditions, the changing customer needs due to entry of the global multinationals, the new challenges that we face in the local and the global market and how we respond to it and also to spell out the changing customer demand for the reduced cost, the challenges of price escalations of various input costs, the processes which case industry follow to reduce the cost, and suggesting a cost reduction methodology to achieve sustained cost reduction year on year. The result shows 4% reduction in material costs and the quality improvement of the production of automotive ancillary components.

1. Introduction

Every organization aims for profit and competency so that it can sustain in the market. The challenge is despite the increase in material costs, manufacturing costs, material costs contribution in the product cost is maximum since it plays a significant role in determining the revenue of the company. The case industry is a multi-national and there is a lot of opportunity available across the world. It is important for the case industry to do a structured, sustained material cost reduction activity in order to capture the potential market and to emerge as a competitive supplier.
This work discusses more in detail about market conditions of India, the fluctuating customer demands, the fresh challenges that the country faces in the local and the international market with respect to cost and how we react to it. The objective of this study is to demonstrate the altering customer ultimatum for reduced costs, the challenge of input costs, the procedures, which case industry follow in order to lessen the cost and developing a method for refining the cost competitiveness of the upstream supply chain.

2. Literature review

In complementarities and cost reduction magazine, from the auto supply industry by [1] Susan Helper Apr 1997, shown the need to manage costs across the entire company by Japanese corporations. According to Aqua MCG Special [2] Report – Supply Chain Cost reduction is, for any organization, meeting the end customer expectations, maximizing the value or return to the investors is the key requirements. as General Motors seeks cost reduction by setting up a global competitive market, while Ford and Chrysler are trying to attain the same goal by making long term commitments to a few firms. The voice relationship with suppliers reduces the customer’s bargaining power Helper and Levine, (1992). The incremental strategy demands on cost reduction to create shareholder value by improving capital and labor productivity. As mentioned in the report published by [3] Ernst & Young on Cost competitiveness from [5]complexity to confidence , during the last few years of economic and market volatility, reducing costs have been a constant focus of management around the world.

According to [4] Neil De Koker, (2002) managing director of the OESA (Original Equipment Suppliers Association), merger and acquisition activities do not provide any increased margins,. In most industries sourcing & procurement plays an important role, as company’s profitability rests substantially on its ability to obtain goods, services at the lowest total cost. Refer following figure 1

![Figure 1 Survey output.](image-url)
3. Cost reduction framework

The framework followed for reducing the cost in the case industry is shown below in figure 2.

![Figure 2 Cost reduction methodology.](image)

4. Supplier competency improvement

4.1. Cost Effectiveness Model

This model is applied explicitly to tier 1, tier 2 suppliers of case industry. In the triangular model developed, the bottom of the pyramid seeks the support of the customer and as it reaches the top of the pyramid, it drives the development to the substitute suppliers to be on their own to build cost competitiveness. The model is shown in the figure 3.

![Figure 3 Competitiveness of the supply chain.](image)
• Bar made to cold forging of Turned parts:
The traditional practice of turning bar using single spindle, multi spindle auto machines. About 20-30% of the material will be wasted in the form of burr removal. The cycle time taken for machining was replaced with cold forging method which resulted in an overall cost reduction of 30-40% per part. The before and the after comparison is shown in the figure 4.

![Image](image_url)

**Figure 4** Hose adopter manufacturing - process change.

• Gravity Die casting (GDC) to Pressure die castings of Aluminium castings (PDC)
There is a possibility to reduce the weight of the input alloy material through conversion from GDC to PDC. The investment cost of the PDC die was higher than the GDC. Converting from GDC to PDC depends on the return on investment (ROI) calculation. One such example of GDC to PDC is shown in the figure 5.

![Image](image_url)

**Figure 5** Aluminium castings process change.
- Self-driven improvement: 3 CNC machines used for machining aluminium castings. The modification of set up time, cost, cycle time by the supplier is shown in figure 6.

![Table showing improvements and cost reductions](image)

**Figure 6** Cost reductions through innovation - A supplier case study.

The implementations of various kaizens are shown in following figure no 7, 8, and 9.

![Kaizen idea flange process change](image)

**Figure 7** Kaizen idea flange process change.
Figure 8 Kaizen idea source change of heavy coil spring.

Figure 9 Kaizen idea Material change of Ram.
• **Benefits**

1. Productivity Improved from 450nos. /day (3machines) to 480nos. /day (1machine). 2. No. of machines used for this Operation is reduced from 3 to 1 by using 4th axis in new machine. 3. Man power, Electricity, pressured air, oils, etc. consumption reduced and floor space is saved for the production of this component. . Material Movement & component loading frequency reduced.

Because of the above cost reduction ideas, the material cost of the product has reduced significantly by 23%. The benefit was also shared with the customer and thus the case industry was able to offer the product at the best competitive rate in comparison with the competitor. The price comparison is shown in the figure 10.

![Material cost 23%](image)

**Figure 10** Price comparisons of spring brake actuator – after.

5. **Conclusion**

The work on material productivity resulted in synergy among different function, global alignment, and improving the supply chain. Material productivity Management process can support the organization to concentrate and bring in ownership with all the stakeholders. What was thought as not possible in meeting the international expectations on material productivity so far, have been changed with the approach to work on the system, the process and structures. This brought a cultural change within the organization to accept the material productivity as an organizational requirement.

The model on upstream – Supply chain competitiveness, gave a road map on how we bring about change with our tier 1, tier 2 suppliers to build their capability and be self-driven in bringing about changes at their factories.

6. **References**

[1] Susan Helper 1997 *Complementarities and cost reduction: (Evidence from the auto supply Industry)*

[2] Aqua MCG Special Report – Supply Chain Cost reduction opportunities for Indian Companies ([www.aquamcg.com](http://www.aquamcg.com))

[3] Ernst & Young 2011 *Cost competitiveness – From complexity to confidence ([www.ey.com](http://www.ey.com))*

[4] Neil De Koker 2002 — *The Global Automotive Industry: Strategies for Competing ([www.oracle.com](http://www.oracle.com))*

[5] Ernst & Young 2011 *From Complexity to confidence ([www.ey.com](http://www.ey.com))*