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A Case Study on Impact of Quality on Cost of Goods and Services in an Organisation

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ABSTRACT

The fast growing Indian economy is reaching a point where quality becomes just as important as quantity. However, the quality concept is still somewhat vague to many people and too many companies. One way to make it more concrete is to calculate quality costs. Quality cost is a measure of how costly it is for the organization to lack in quality in any way. This way is easier to understand quality and to see which areas should be prioritized in the quality improvement work. This thesis makes an attempt to map out the quality cost of an Indian company. Based on the calculated quality costs areas of improvement potential are suggested to the management. These way the company's improvement efforts can be directed to where they make the best use. Successful running, sound economy and profitability of an organization is entirely depends upon effective control of non-quality costs generated in an organization. This analysis of quality cost data has been done by using pareto analysis and effects of different cost elements of quality costs. Quality cost contains conformance costs - Prevention costs and Appraisal costs, non-conformance costs – Internal failure costs and External failure costs. Total quality costs can be controlled resulting considerable savings. This thesis discuss how quality has an impact on the costs of goods and services in an organization

Keywords: Quality Cost, pareto Analysis, Goods and Services

1 Introduction

The term “quality costs” was certainly in use in use in Western Europe in the late 1950s and early 1960s and may have originated with the categorization of costs into Prevention-appraisal-failure, which is attributed to the seminal paper of Feigenbaum in the mid 1950's. There have not been many theoretical innovations in quality costs Improvement since this early work of Feigenbaum. Quality costs featured in a 1957. British Productivity Council film Right First Time. In the discussion

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notes accompanying the film the costs of quality were broken down into costs of failure, costs of appraisal and costs of prevention.

Juran (1951) initiated the concept of quality costing, the economics of quality and the graphical form of the COQ model. Feigenbaum (1956) later proposed the now widely accepted quality cost categorization of prevention, appraisal and failure (internal and external) costs. Juran (1962) later highlighted the traditional tradeoff that contrasts prevention plus appraisal costs with failure costs. The basic suppositions of the P-A-F model are that investment in prevention and appraisal activities will reduce failure costs.

The American Society for Quality Control (ASQC, 1970), and the British Standard Institute (BS6143, 1990), and it is employed by most of the companies. Chauvel and Andre (1985) test various hypotheses related to relationships between quality cost components. They find that the prevention activities have a direct and positive influence on the profit margin. They also conclude that quality cost decreases dramatically with the size of the firms and that the investment in both prevention and appraisal reduce quality cost. However, exclusively investing in appraisal may lead to unacceptable costs and may affect a company's reputation.

2. Methodology

Prior to the study the only costs collected and identified as quality costs were the costs of operating the quality control department, expenditure on warranty, and the costs of scrap and defective products. The research approach in this case study was to examine the company's operations against the model elements of BS 61431(the 1981 version of the Standard) and to put Costs on them. The company's quality costs for the first quarter of the current year in which the study was carried out (hereafter referred to as Year 1) were measured. Then, using these costs, a projected quality cost report was prepared for the full year. The work was carried out in the third quarter of Year 1, by which time all the first quarter transactions and accounting were complete. In this study a deliberately ingenuous approach was adopted to try to ensure that all the major obstacles to the collection of quality costs in the company were discovered. Before attempting to gather costs, knowledge of the company's operations and practices was gained by studying the company's procedures and reports, supplemented by discussions with staff from quality control, inspection, personnel, work study, production and accounts departments. Attempts were then made to detect and measure costs against each of the cost elements listed in the BS 6143 guide1 (the 1981 version of the Standard).

Table 1.1 corresponding sections in BS 6143 and ASO Quality Costs— What and How categorization of quality-related cost elements.

BS6143	Elements
A1	Quality control and process control engineering
A2	Design and develop control equipment
A3	Quality planning by others
A4	Production equipment for quality -maintenance and calibration
A5	Test and inspection equipment — maintenance and calibration

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A6	Supplier quality assurance
A7	Training
A8	Administration, audit, improvement
B1	Laboratory acceptance testing
B2	Inspection and test
B3	In-process inspection (non-inspectors)
B4	Set-up for inspection and test
B5	Inspection and test materials
B6	Product quality audits
B7	Review of test and inspection data
B8	On-site performance testing
B9	Internal testing and release
B10	Evaluation of materials and spares
B11	Data processing, inspection and test reports
C1	Scrap
C2	Rework and repair
C3	Troubleshooting, defect analysis
C4	Re-inspect, retest
C5	Scrap and rework: fault of supplier
C6	Modification permits and concessions
C7	Downgrading
D1	Complaints
D2	Product service: liability
D3	Products returned or recalled
D4	Returned material repair
D5	Warranty replacement

3. Company quality control and accounting systems

The company, which is an approved supplier to the Indian Railway, has a comprehensive quality manual clearly setting out the responsibilities of quality, production, engineering and other personnel for quality-related matters. The manual contains no reference to quality costs other than warranty. There was, however, a clear acknowledgement of the existence of quality costs in the company. The company accounting system divides the company into 21 indirect cost centre's, covering its manufacturing facilities. There are also 188 financial codes, of which, apart from the routine administrative codes applied to the quality control cost centre, only sales of scrap material, indirect materials, inspection equipment, research materials and warranty repairs were readily recognizable as being quality-related. Another potential source of quality cost information — labour bookings — was equally disappointing, having only _defective material'as an obviously quality-related code, though it was learned later that bookings to _prototype'might also contain some quality costs. The accounts department does, however, produce a monthly scrap report analyzed across production cost centre's and displaying material, lab our and overhead costs.

It is fair to say that, so far as quality-related costs are concerned, the accounting system lacked sophistication and the availability of data failed to meet expectations. Some idea of the situation may be gauged from the fact that only four of the 188 financial codes referred to quality-related matters, and perhaps even more telling, there was only one labour-booking code for work concerned with defective products. As a result, the costing relied a great deal on estimates. The extent of estimation was such that only 50 per cent of the total quality costs were derived from data specifically noted in accounts under headings identifiable as being quality-related.

4. Detection and measurement of quality-related costs

In many ways, and as already discussed, prevention is the most difficult of the categories to cost. This is because prevention activities are made up of a number of disparate elements carried out on a part-time basis by people from different departments. The cost depends heavily on estimates of apportionment of time by personnel who do not usually record how they spend their time. The prevention costs and findings are summarized in Table 1.2.

Table 1.2 Prevention Costs

Cost elements	Recorded Costs (Rs.)			Project Annual Cost (Rs.)	Source
	Jan.	Feb. 1 st qtr	Mar.		
A1 Quality control and process control	•	- •	-	6000	Estimated time
A2 Design and develop control equipment	•	- •	-	1000	Estimated time
A3 Quality planning by others	•	- •	-	Nil	
A4 Production equipment for	•	- •	-	200	Estimated time

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quality maintenance and calibration						
A5 Test and inspection maintenance and calibration	215	235	300	2200	Materials Ext. services Estimated time	
		550		2500		
				500		
A6 Supplier quality assurance	•	-	-	-	800	Estimated time
A7 Training	•	-	-	-	200	Estimated time
A8 Administration audits, improvements	•	-	-	-	1500	Estimated time Capital depre.
					2000	
Total					16900	
Total Prevention cost in (%)					0.33	

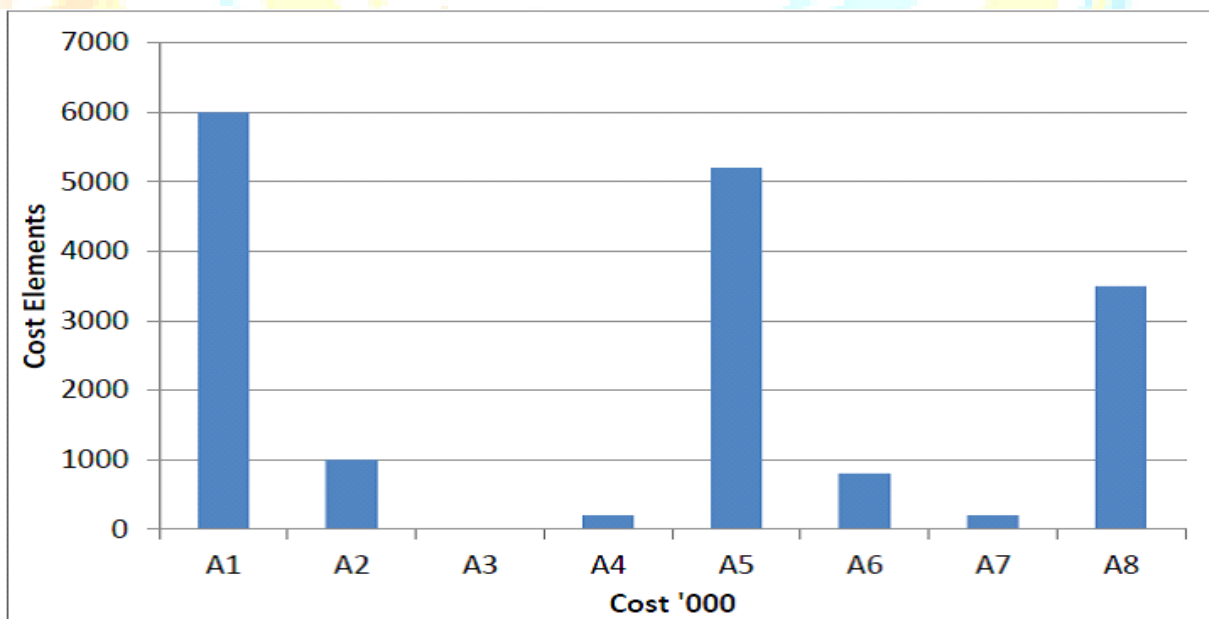


Figure 3.1 Cost Elements of Prevention Cost Verses Cost

The graphs of Internal Failure cost and external failure costs are shown below:

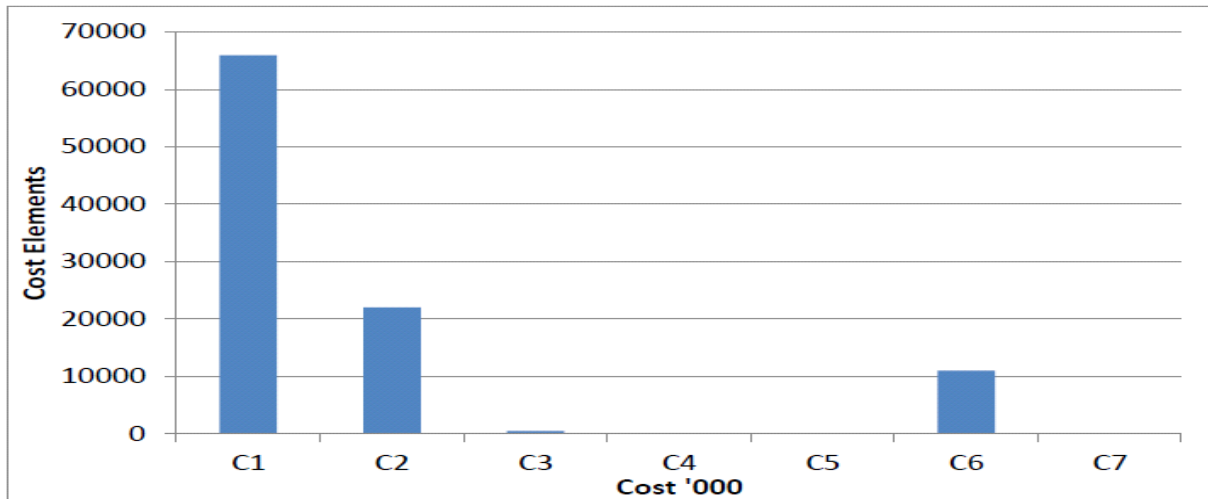


Figure 3.2 Cost Elements of Internal Failure cost Versus Cost

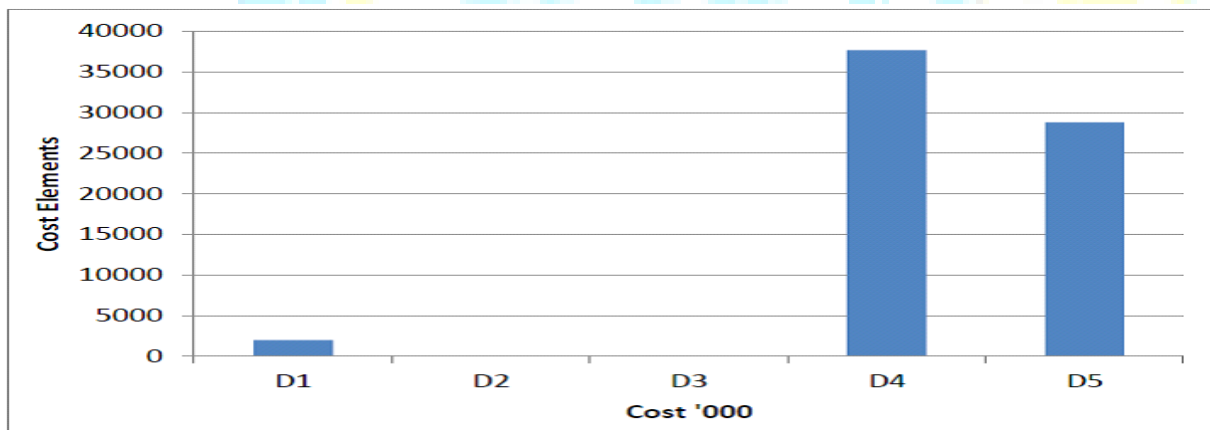


Figure 3.3 Cost Elements of External Failure cost Verses Cost

5. Conclusions

It is observed that the company is spending Prevention cost (0.33%), Appraisal cost (3.13%), Internal failure cost (1.99%) and External failure cost (1.34%) of the total cost. So industry invested most of the money in the Appraisal cost and least in Prevention cost. The highest cost element observed is B2 which comes under Appraisal cost and average cost element are D5, D4 and C2 which comes under external failure cost and internal failure cost respectively. The highest cost spend on this cost element is not desirable therefore it is required to reduce cost spending on this element.

6. Future scope

Most of the small scale industry does not using the Pareto analysis which is very effective technique the cost comparison. Therefore by using this technique industry is very well aware where to spend more cost and where to spend less cost and due to which company can increase the profit.

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