

# IMPLEMENTATION AND IMPROVEMENT OF QUALITY CONTROL SYSTEMS IN INDIAN SMEs

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## ABSTRACT

Quality control is a process which aims to prevent the defects and errors rather than finding out and then removing those defects. Proper emphasis is to be given on quality planning, quality design, quality implementation, quality gaps identification and quality improvement. This would result in the reduction of labour and material cost, minimum generation of scrap and waste, optimum utilisation of resources, better customer satisfaction, improved employee morale, better quality consciousness among employees and enhancement in productivity and efficiency of the SMEs. This paper is studying quality control conditions for different SMEs in India. Several quality tools are proposed to implement for improving quality control systems. Strategies are suggested to sustain quality in order to achieve organisational goals. Though different quality tools are being applied in a bare way in SMEs, but they are not in a well organised fashion. Therefore, it may be said that for sustaining their competitiveness and surviving in the market, the SMEs have to implement efficiently quality control systems since the large organisations expect assurance of high quality products and services from the SMEs.

**Keywords:** Cost, Customer, Quality, Tools, Waste

## I INTRODUCTION

Standing on the second decade of the 21<sup>st</sup> century Indian industries are facing tough challenges in the policy driven globalised open market scenario. Most of the Indian SMEs are fighting the war of survival in competitive market in the sectors of manufacturing, jute technology, leather technology, plastic moulding industry, food processing etc. The current status of competitiveness of Indian SMEs is as follows:

**Table 1: Competitive position of Indian SMEs among the world**

Country Name	Total Number of SMEs	Average Value of Export per Company in USD
Singapore	9296	6.74 million
Malaysia	28840	2.05 million
South Korea	2.9 million	45000
India	26 million	4000

Indian SMEs enjoy some potential assets as highly capable entrepreneurs and managers (we have world class Engineers and Managers who are leading some international companies worldwide), extensive industrial infrastructure (Indian SMEs are using same type of plant, machinery and technology as used anywhere else in the world), availability of skilled technical manpower in a large scale, low cost labour ( $\frac{1}{4}$  th or  $\frac{1}{5}$  th of the labour cost compared to South-East Asia, Europe or USA is paid in India) and above all abundance of natural resources (we have advantage of indigenous sources of raw materials at much cheaper rates than any other part of the world). In spite of enjoying these assets Indian SMEs are performing too poor, as shown in the above table, in global competitive market. The question is “why”?

This paper is finding the solution of the question by implementing and improving quality control systems in Indian SMEs. Quality is a concept to achieve perfection by eliminating wastes. ‘Quality’ is the success mantra of any industry. This paper first indentifies the problems, then analyzes them by different models and finally prescribes the possible solution depending upon the results of implementing quality tools.

### 1.1 Literature Review

**Table 2: Literature review**

Name of Author(s)	Respective Year of Publication	Key Findings
McAdam et al., Garengo et al., Singh et al.	2000 2005 2008	SMEs are considered as the backbone of economic growth in all countries and they contribute in providing job opportunities, act as supplier of goods and services to large organizations.
Sohail and Boon Hoong	2003	The importance of the small and medium industries will become more significant as the country expands its industrial base in meeting the challenges of the new millennium.
Akhavan and Jafari	2008	Small and medium enterprises are critical to the economies of all countries.
Fathian et al., Gadenne and Sharma	2008 2009	Small and medium enterprises are especially critical to the economies of the developing countries.
Sharma and Kodali	2008	Quality is widely recognized as one of the most important disciplines/strategies or competitive priority for an organizational development.
Thassanabanjong et al.	2009	SMEs are found in every sector of the economy and play a vital role. They are crucial for sustained, long-term growth, dynamism and employment.
Gadenne and Sharma	2009	SMEs are regarded as one of the main driving forces of economic development, stimulating private ownership and

		entrepreneurial skills. Application of quality management (QM) practices in small and medium enterprises has improved their overall performance by a combination of “hard” QM factors such as benchmarking and quality measurement, continuous improvement, and efficiency improvement; and the “soft” QM factors consisting of top management philosophy and supplier support, employee training and increased interaction with employees and customers.
Mirbatrgkar	2009	For developing economies SMEs often offer the only realistic prospects for increases in employment and value added services or products.
Singh	2010	SMEs generally employ the largest percentage of the workforce and are responsible for income generation opportunities.
Abdullah	2010	There is logic and structure to high performance businesses and the application of TQM, as the award-winning companies perform better over their closest rivals.

## 1.2 Reasons For Poor Quality And Competitiveness

After making a contribution of more than 45% in our country's GDP our SMEs are lacking considerable efficiency, good quality of products and better response to competitiveness. Some observed reasons for this lagging performance by our SMEs are enlisted below:

- Lack of interest by the Owner/CEOs in quality improvement.
- Flat organisational structure.
- Departmental focus of the company.
- Paucity of innovation.
- Inefficient system of maintenance of Plant and Machinery.
- Absence of long-term strategy.
- Poor technical discipline.
- Lack of organized system for quality improvement.
- Poor house-keeping and non-attention to various kinds of waste in the company.

Lack of involvement of CEOs in quality control is the biggest single cause for comparatively poor quality and cost competitiveness. Most CEOs consider Quality Control department as a minor functional group, and leave it to a junior manager/engineer. There is a misconception among managers particularly in small scale units that quality improvement effort affects productivity and adds extra costs, making the products non-competitive. But, a number of studies abroad and recently carried out even in India, has broken this myth and shown the opposite effect. These studies have shown that planned quality improvements not only enhances the product quality, but also results in cost savings which helps the bottom line of the company.

## II METHODOLOGY

Following are the quality improvement methods followed in the study for a Medium Scale Enterprise:

- Present plant information and previous records were collected.
- An awareness seminar was arranged for the Management and senior staff of the company on strategy for quality improvement and cost reduction.
- A diagnostic study was arranged to identify the weaknesses of the company and major areas of waste. The diagnosis also assessed rough estimate of cost of the waste due to poor quality management.
- After diagnostic study, a pilot project was taken for quality improvement and cost reduction. The scope of the project which included training of staff and working hands holding during implementation of the project was also defined.
- Actual implementation of the project was carried out by a selected team from the company.
- Results were evaluated after completion of the pilot project and the future actions were planned.

## III ANALYSIS OF PLANT STUDIES

The plant was plotted into three parts for studies according to the contribution of employees: the upper management, the floor management and the general workers. All the employees were interviewed personally according to their group standard, before the implementation of pilot project. The previous performance of the enterprise was studied from past records to find out the actual quality gap in the system. From that study it was clear that the enterprise was facing survival threats from the competitive market. After the completion of the pilot project following result came out:

- Name of the company: XYZ (cannot be mentioned for permission issues).
- Location of the company: Howrah industrial belt, West Bengal, India.
- Products: Automotive cold formed components.
- Reduction in set up time: 19.43% (10 minutes 41 seconds)
- Total number of die changes per year:  $320 \times 12 = 3840$  (in 8 presses)
- Increased availability of power presses: 745 hrs. / year
- Estimated increase in production due to reduced set up time: 357500 pcs / yr.
- Estimated increase in profitability @ Rs. 5 / pc. : Rs. 17,87,500 / year

This study was completed within 6 months.

## IV APPLICATION OF QUALITY TOOLS

Depending on the detected problem it was facing, following quality tools were applied in three phases during the pilot project:

**Table 3: Applied quality tools according to phase**

Tools	Remarks
<b>Tools for Phase I</b>	
Total Quality Management (TQM)	Ensuring quality in every stage of production, instead of making a lot of non-value added inspections at the end of process.
Workplace Organisation (5S concept)	Sort (Seiri), Set-in-Order (Seiton), Shine (Seisco), Standardise (Shitsuke), Sustain (Seiketsu).
Waste elimination	Eliminating detected non-value added activities from the system.
Motion study and time study	Determining the non-value adding activities and their effect on the cycle time.
Management training	Training the higher management to be skilful to implement quality practices.
Worker training	Training the workers to understand the significance of quality practices and their responsibilities.
<b>Tools for Phase II</b>	
Job rotation	Changing jobs with respect to workers to avoid boredom.
Cross functional team	Departmental barriers are eliminated and replaced with cross functional teams.
Quality circle	Small group activities are done to sustain quality.
Total Productive Maintenance (TPM)	Consists of a companywide equipment maintenance program that covers the equipment life cycle and requires participation by every employee.
Poka-yoke	Making an error proof system instead of eliminating errors at the end of a system.
<b>Tools for Phase III</b>	
Customisation	Producing product according to customer feedback and market demand.
Obtaining ISO Certification	Ensuring the quality of the enterprise under ISO certificate.
Continuous Improvement	Competing with own self to improve own performance.

Implementations of the recommended tools in different phases are important to achieve and sustain quality in the enterprise. Tools of Phase I are the basic tools and techniques to establish quality practice in an enterprise as well as to understand its importance. Tools of Phase II are targeting to achieve quality standards and its regular practices. Tools of Phase III are the advanced techniques to sustain quality in the organisation and progress with it. This sequential application of the quality tools has the significance of step by step change in the enterprise

toward advancement and this is the most efficient way of quality implementation as the system experiences very slow change in this method.

## V KEY FINDINGS AND RECOMMENDATIONS

Most companies are managed by through various functional departments. The departments mainly focus on the criteria, based on which their performance will be judged.

**Table 4: Findings and recommendations of the study**

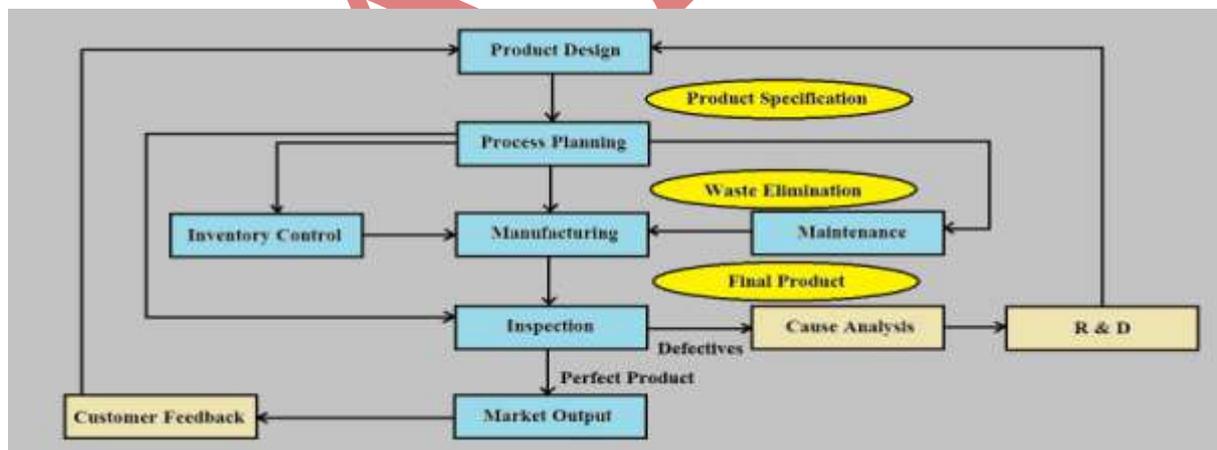
Name of Department	Problems Found	Recommendations
Production	<ul style="list-style-type: none"> <li>• Normally concentrates on maximising the quantitative output of the product. Even when there is sufficient stock of unsold goods, the production will continue.</li> <li>• They will tend to approve deviations in the specifications which may have some impact on product quality or continue production even when some specified process conditions are not fully complied with.</li> </ul>	<ul style="list-style-type: none"> <li>• Improve general house-keeping of production area.</li> <li>• Maintain proper documentation system of standards, drawing and specifications.</li> <li>• Establish Process Planning section for developing process procedure, Develop tools. Jigs &amp; fixtures.</li> <li>• Conduct process capability studies of important machines.</li> <li>• Institute process controls to ensure that products conform to specifications.</li> <li>• Ensure proper maintenance of plant and machinery.</li> </ul>
Materials Handling and Equipment Maintenance	<ul style="list-style-type: none"> <li>• Focuses on saving the cost of purchased material by pressurising the vendors.</li> <li>• The vendor may accept the order at lower price, because he may be short of orders at that time. However since he is not getting much margin on this order, he will give it a low priority and there is a strong possibility of</li> </ul>	<ul style="list-style-type: none"> <li>• Establish vendor evaluation system and their empanelment.</li> <li>• Developing specifications and acceptance criteria to be given to the vendor with orders.</li> <li>• Arranging proper inspection of incoming material through QA group.</li> <li>• Carryout annual performance evaluation of vendors.</li> </ul>

	<p>delayed supplies, which may result in stoppage of production or buying the part on emergency basis by paying a higher price.</p> <ul style="list-style-type: none"> <li>• Both eventualities may cost more than the anticipated savings due to lower purchase price, thus eating into profitability.</li> <li>• Normally Equipment of Maintenance department is not given its due importance.</li> <li>• Generally there is a tendency that if a manager is not dynamic enough to get higher production, he is shunted to maintenance.</li> <li>• Because of his low profile, he may not be able to arrange resources or money to ensure planned preventive maintenance, which may need to shut down of some machines affecting overall production schedule and waste due to idle machines.</li> </ul>	<ul style="list-style-type: none"> <li>• Planning optimum inventory level by shortening the procurement cycle.</li> <li>• Proper storage and maintenance of procured martial.</li> </ul>
Quality Control	<p>This department is mainly responsible for:</p> <ul style="list-style-type: none"> <li>• Carrying out inward goods inspections, stage inspection and final inspection.</li> <li>• Monitoring process control in production processes.</li> <li>• Carrying out various tests required in their laboratory.</li> <li>• Very rarely it takes up quality improvement project or analyzing the causes of defects occurring in the production.</li> </ul>	<ul style="list-style-type: none"> <li>• Inspection of incoming martial, in-process inspection and final inspection and then generating data on trend of rejections for the information of the management.</li> <li>• Checking effectiveness of process control.</li> <li>• Assisting production in analyses of processing defects to find the root causes and taking corrective actions.</li> <li>• Determining the cost of poor quality in the company in financial terms and submission of report to the management.</li> </ul>

Marketing	<ul style="list-style-type: none"> <li>• Normally concentrates on fulfilling or even exceeding their allotted targets by giving all kinds of incentives and concessions within the power of the marketing executives.</li> <li>• Sometimes, they may even promise tight delivery schedule to get a large order. This may necessitate the Production to put personnel on overtime or resort to emergency purchase of material at higher cost.</li> <li>• Such orders may cause loss to the company rather than profit.</li> </ul>	<ul style="list-style-type: none"> <li>• Focus on marketisation.</li> <li>• Keep balance between order time and delivery time to control inventories.</li> <li>• Maintain regular communication with other departments.</li> </ul>
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## VI QUALITY MANAGEMENT MAPPING FOR SMEs

A perfect mapping should be done to sustain quality in the SMEs. To implement and keep quality practices in the SMEs the application field should be understood well. By following an exact and effective roadmap we can ensure the achievement of quality practice for SMEs.



**Figure 1: Quality Control Diagram for Indian SMEs**

In general, the production systems for SMEs are a simple straight line method to be followed and some traditional steps are taken sometimes to detect defects at the end of the process. But in fact these methods are insufficient to produce quality products and services. Fig. 1 describes a diagram, which can be treated as a mapping plan for Indian SMEs to sustain quality. In a production system, design, process planning, manufacturing and inspection are the most significant steps to be considered to control quality of the entire system. We divided the entire system in three major operational parts in our diagram, i.e. product specification,

waste elimination and final product output. Planning and application of different quality tools should be done in these particular areas of a production system to achieve better quality control and optimum output.

## VII CONCLUSIONS

To stimulate processes of qualitative growth in SMEs, this study investigated the application and effectiveness of basic and advanced quality management tools in Indian firms. The results highlighted that most managers still are experiencing low levels of quality management implementation and they do not recognize the need to compete in the pursuit of modern technologies. This could be due to major problems to SMEs such as knowledge deficiency, human and financial resource limitation, product design and development capability, training infrastructure and networking. There is a growing need for advanced and codified quality managerial practices. SMEs in India are expected to transcend from their present state through training and skill development, in order to undertake a more important role in supporting the requirements of India's industrialization process.

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