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Quality Management Practices and Product Quality Outcome in Indian Manufacturing Industry: A Case Study*

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Abstract :

In today's era of global competition, the business organizations across the world are in search of sustainable competitive advantage. The competitive advantage may be reflected in offering superior products or services at lower cost. Cost-based and differentiation-based business strategies are prerequisite for growth and survival of business organizations in today's turbulent, dynamic and complex business environment. Global competition is also characterized by increasing dynamics of innovation related to all the facets of the product life cycle. The ability to effect higher efficiency coupled with enhance quality of product or service, such Total Quality Management, allows one to better control the cost base whilst swimming in the stream of dynamic innovation. Owing to liberalization of the Indian economy, Indian industry is also experiencing an increasing pressure for improvement in quality of its products and services, for which it is adopting tools and techniques of quality improvement. In general, there has been an appreciable improvement in adoption of quality concepts in recent years in the Indian industries. The present study which is empirical in nature focuses on the study of quality management practices in Indian manufacturing organizations. This paper also attempts to study the relationship between main quality management practice dimensions and superior product quality outcomes.

Key Words: Quality Management, Manufacturing Practices, Total Quality Management

1. Introduction

The Indian economy today is in transition from government control to free market economy, from protection to competition and from isolation to globalization. As a result, the business environment in India is undergoing rapid transformation. With new economic policies, forces of global competition are permeating country's industry and commerce. Global competition today has made customer supreme. As customer is supreme only those enterprises are going to be successful, which are able to provide goods and services to customers in a cost effective manner

and at the same time provide better quality, which not only satisfy customer but also delights him. Indian firms in general are adopting Total Quality Management concepts to face these challenges successfully. Quality has become a key factor in achieving competitive advantage for both manufacturing and service organizations [5].

Quality management concepts are now being accepted by all industries. It includes industries like law firms, accounting practices, medical services, government agencies, military services, engineering construction firms, manufacturing companies, aerospace companies, universities, farming, oil companies, dentists, offices and transportation companies and all the functions like marketing and sales, R&D, production, accounting, finance, clerical, laboratories, transportation and distribution. For many companies to compete in the next decade rapid quality improvement may not provide a competitive edge, it may just be a necessary skill. In many companies quality improvement has become a way of life. For many

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companies quality improvement at a revolutionary pace is now becoming simply good management.

TQM is a philosophy that emphasizes the management of quality in all aspects and phases of a business in order to achieve and sustain high quality output that meets customer expectations. This philosophy is reflected in a set of constructs that defines a systems approach to TQM implementation. The constructs in the model are intended to be applicable to all organizations. However, the actual level of TQM implementation in different organizations may be influenced by contextual factors. A major contextual factor is industry type, which is conventionally analysed in terms of the distinction between service and manufacturing organizations. Several researchers have identified four characteristics of services that distinguish service organizations from manufacturing organizations. These are: intangibility, inseparability, heterogeneity and perishability [4]. The effect of industry type on the level of TQM implementation is based on the priori argument that service organizations are distinguished by the characteristics, which cause difficulties in implementing TQM; and that what is considered appropriate and effective in manufacturing might not be the case in services. This is especially so since TQM concepts originated in the manufacturing sector and have traditionally been applied in manufacturing organization.

Several studies have been conducted to examine quality management practices in different countries. These studies also provide a comparison of the quality management practices among these countries. Despite a higher level of interest in the Indian markets in recent years, to the best of our knowledge only few comprehensive attempts have been made to study the quality management practices in Indian industries. It shows that a study of Indian industry from the quality management practices angle is not only necessary but critical for both Indian manufacturing organizations.

2. Literature Review

Total Quality Management (TQM) principles and techniques are now a well-accepted part of almost every manager's tool kit [Dow et al., 1999]. Lot of research work has been done on TQM in developed countries. In the developing countries also, many studies are done in TQM implementations and its

critical success factors [1:27-44].

Good numbers of studies are done on quality management practices in the Indian Industry also. Jagdeesh R [6: 5321-327] studied growth and spread of TQM in Indian industries. Similarly Mandal et. al. [1999] empirically investigated the propagation of quality management practices among Indian manufacturing companies. The result of the study suggests that after the opening up of economy in 1991, Indian companies are fast moving towards implementing quality management programs.

There has been a paucity of systematic empirical research to prescribe what factors are really crucial to the successful implementation of TQM programmes. Mohanty and Lakhe [10:511-520] studied the critical factors for TQM implementation through survey-based research carried out in Indian industry. Meanings and operational measures of such critical factors are articulated and developed by involving the industry managers as the appropriate subjects. The measures are subjected to internal consistency and reliability tests. The authors developed a factor model which facilitates the articulation of global perspectives, and understands business imperatives and undertakes strategic initiatives to implement TQM programmes across different industrial sectors.

Motwani and Mahmoud [11] conducted an empirical study of quality assurances practices among the Indian manufacturers. The study reports that the production of the quality products is one of the top manufacturing objectives of the Indian manufacturers. It was also substantiated by the fact that nearly all (96 %) of the surveyed organizations had maintained formal quality policies. The major causes of quality related problems were also delineated. The problem with the supplied material and parts was ranked the first. It was followed by the maintenance and other equipment related problems and workforce training.

Even though India has a large industrialized sector, there are few comprehensive studies available on quality management practices in India. However, there is considerable interest in the quality management practices of Chinese industries. Both India and China had comparable shares of world trade until a few years

ago. China has been able to double its share in world trade in the period 1978-1989 whereas the Indian share did not rise at all. Despite the opening of Indian markets and removal of several trade restrictions, India is not as successful in luring the foreign, especially Western, investment as China. Lack of understanding of the management practices of Indian industry, especially related to quality, may be one of the important reasons for this disparity.

The relationship between quality practices and superior quality outcomes is a fundamental and defining element of the whole concept of quality management. Flynn, Schroeder, and Sakakibara [18:339-366] define quality management as “an integrated approach to achieving and sustaining high quality output”. Most of the empirical evidence supports this assertion, but the vast majority of that research has been conducted by consulting firms or quality associations with vested interests in the outcomes, and most did not conform with generally accepted standards of methodological rigour” [13:15-37].

In order to measure both quality management practices and their effect on quality outcomes began with Saraph, Benson, and Schroeder [15:810-829] and Krafcik [7:41-52], and more recently with the Flynn, Schroeder, and Sakakibara [18:339-366] to strengthen the theoretical justifications. In each of these studies, the researchers found statistically significant positive correlations between quality practices and quality outcomes.

Powell [13:15-37] was the first researcher to seriously challenge this assertion. Powell found that only three of his 12 quality practice variables are significantly related to total firm performance. He concludes by suggesting that firms may be able to capture much of the benefit without subscribing to the full “TQM ideology”. The study of Powell motivates to examine whether all the quality management practices do truly contribute to superior quality outcomes.

Shrivastava et al examined the need for establishing linkages between factors affecting TQM, as well as organizational performance and suggested a comprehensive assessment framework [17:13-30]. They designed a diagnostic instrument to test in Indian industries that have implemented TQM during the last

decade. The result of their empirical study established the strong and weak linkages which contribute in providing feedback to manage and improve the TQM program.

However, the literature review does not find studies that have made comprehensive analysis of quality management practices in manufacturing industry in recent years. Hence there is a need to study the quality management practices in Indian context. In this direction, the present paper maps the current quality management practices in Indian manufacturing industries and attempts to study the relationship between main quality management practice dimensions and superior product quality outcomes.

3. Research Methodology

The present study is an empirical one and the survey was administered through email. A well-designed questionnaire was sent via email to respondent companies. The questionnaire was designed after brainstorming session with experts in quality management. The inputs from preliminary survey were also used to design the questionnaire. The questionnaire had two types of questions, variable questions and ranking questions. Most of these questions are taken in part from the two previous international quality studies. The questions in our survey were categorized into five different sections. These sections are:

- (1) “Quality is free” philosophy,
- (2) Quality performance,
- (3) Causes of poor quality,
- (4) Efforts to improve quality, and
- (5) ISO 14000 certification.

The first category of questions is basically to understand the commitment of management towards quality in an organization. This set of questions is based on the philosophy of one of the quality gurus, Crosby and includes questions in the area of strategic decision-making, importance of quality with respect to other decision-making factors, and involvement of management in quality-related issues. The “quality is free” philosophy selected here as one of the objectives of the study to compare the results of this study with similar studies conducted in other countries such as the USA and Japan.

Quality performance questions as prepared in the second category of questions are aimed at understanding the current status of quality standards in Indian industry. These mainly focused on customer satisfaction and perceived quality of products of the organization.

The third category of questions is related to the causes of the poor quality with an objective to evaluate the impact of factors such as process control, worker training, raw material and multiplicity of vendors on the quality of products. Each question

addresses the overall status of the company to limit any bias or speculation on the part of the person responding to the survey.

The efforts put in the quality management area to improve product quality by the manufacturing organizations are assessed by the fourth category of questions. These mainly focus on:

- level of employee involvement,
- Commitment of management,
- Future projections of quality improvement efforts, and
- Quality as a factor in performance evaluation of employees.

The last category of questions is formulated to measure the commitment towards standardization of quality management practices. These questions are related to ISO 14000. Several manufacturers in the international market are adopting ISO 14000 standards for quality systems. This set of questions helps in estimating the willingness of Indian manufacturers to adopt such quality standards.

Apart from above, In order to measure the relationship between quality management practices and product quality outcome, the following four indicators of quality are employed:

- (1) Percentage of defects at final assembly,
- (2) Cost of warranty claims,
- (3) Total cost of quality, and
- (4) Assessment of the defect rate relative to competitors.

The database for this study mainly consists of 100 randomly chosen major Indian manufacturing companies. The list of Indian manufacturers was obtained from the CMIE Prowess. The survey questionnaire was mailed to 100 randomly selected major manufacturing companies. Three types of companies are taken for this study such as large companies with more than 1000 employees, medium sized companies with 500 to 1000 employees and small companies less than 500 employees.

4. Results and Discussion

The questionnaire as described in the earlier section (vide art 3.0) was sent to various organizations through email. Nearly 90% of the organizations responded to the study. Based on the response of the companies, some key findings are obtained which are discussed below. The number of employees of the responding organizations, the position of respondents, the demographics of the respondents and the status of TQM implementation are the main focus areas as these affect the key findings.

4.1. Company Size

The company size is assessed with regards to the numbers of employees working in the company. It is found that most of the responses came from large companies, that is, 57.8%, while response from medium sized companies is 26.7% and 15.5% responded from small companies.

4.2. Position of Respondents and Quality Programmes

With regards to position of respondents, the largest group of respondent included Director/vice president, production manager and quality managers. Regarding the status of TQM implementation, most of the companies, i.e. 86.7% indicated that they had ISO certification for at least one division. Some of the companies they are preparing to apply for the accreditation of the ISO standard, while some companies have been accredited with other type of certification.

Regarding quality programme, many companies implemented more than one quality control programs. The quality programs implemented are: total quality management, statistical quality control, quality circle,

sample inspection, batch inspection and benchmarking. It is found the most widely adopted quality program is sample selection. Almost 91.1% of the companies responded are using sample surveys for quality checking for at least one of their products. The average duration of sample inspection is 10 years which is also largest duration for any quality program in the Indian manufacturing industries.

4.3. Quality of Products/Services and Customer Issues

The first set of questions in the questionnaire is intended to reveal the extent to which Indian manufacturers adhere to the philosophy of “quality is free” suggested by Crosby. It is found from the result that the percentage of respondents who agree with the “quality is free” philosophy is much greater than that of those who do not. However, a substantial percentage of them disagree with the statements on the “quality is free” philosophy. Therefore the “quality is free” philosophy is not universally accepted by these companies.

The second set of survey questions are intended to assess the quality performance of Indian companies as perceived by employee of these companies. From the results, it is found that 72 % of the employee thinks that the quality of their products is compatible with the quality of the products manufactured by the market leaders in the global market place while the other 28 % disagree with the statement (Figure-1).

Figure-1 Product compatibility

With regard to customer satisfaction, 86 % of the employee thinks that their customer services are better than those provided by their competitors. However,

14 % of the respondents strongly disagree with the statement (Figure-2). This indicates that some employee have the strong feeling that their companies are not providing good enough services to their customers. Similarly, 83.2 % of the respondents agree that their customers are satisfied with the quality of the products that their companies manufacture, but 16.8 % of them disagree with the statement (Figure-3). In general, most of the respondents feel that their companies are providing quality products and services to their customers.

Figure-2 Customer services

Figure-3 Customer satisfaction

4.4. Causes of Poor Quality

The third set of questions focus on the causes of poor quality. Inadequate training of workers, poor quality control and defective raw materials are considered as the leading causes of poor quality by the majority of companies. The lack of commitment from management to motivate workers and lack of quality consciousness by design engineers are believed to be major causes of poor quality by fewer than half of the respondents.

4.5. Quality Improvement Efforts

The response to the fourth group of questions which is designed to examine the quality improvement efforts of the manufacturers reveal that the majority of the manufacturers are improving and maintaining quality standards. They follow through the sales to determine customer satisfaction, treat customer complaints with top priority, and resolve customer complaints to the customer's satisfaction. They also maintain consistent quality standards throughout the year and encourage shop floor workers to suggest and try new methods to improve product quality.

The percentage of Indian companies indicating that 30 % or fewer employees are involved in quality improvement teams is lower than those of Germany and Japan, but higher than those of Canada and the USA. Therefore, relatively fewer Indian companies

have a large proportion of employees involved in quality improvement teams, which indicates, Indian companies are expecting a substantial increase in employee involvement in quality improvement teams.

4.6. Product/Technology Changeover

With respect to incorporation of customer expectations into the design of new products and services, 20 % of respondents indicate “always”, 48 % “frequently”, and 32 % “sometimes” (Figure-4). 60 % of respondents indicate that the application of new technology is “important” in meeting customer expectations, and 35 % indicate that it is “extremely important”. Only 5 % of them responded that it is “not important at all” (Figure-5). Regarding the role of customer satisfaction in strategic planning, 71 % of respondents indicate “important”, 19 % “very important”, and 10 % “somewhat important”.

Figure-4 Customer expectation on product/service

Figure-5 Importance of application of new changeover technology

4.7. Quality Certifications

The fifth group of questions is designed to assess the status of ISO certifications in India. Among all the companies that responded to the survey, only 11 % have received the ISO 14000 certification. Among the rest of the companies that are not certified, 19 % have applied for the certification. 68 % are planning

to apply for the ISO 14000 certification within the next two years. All companies that have received the ISO 14000 certification believe that the total savings realized and the increase in profits by complying with ISO 14000 exceeded the expenses for getting the certification. They also believe that the certification has helped them in improving the export of their products and also in improving their positions in the domestic market.

The relationship between quality outcome dimensions and each of the quality practice is tested by inspecting the correlations between each of the identified quality practice dimensions and the quality outcome construct. Only three among all the quality practice dimensions (workforce commitment, shared vision, and customer focus) have a significant positive association with quality outcomes. A fourth construct (JIT) has a weakly significant correlation.

Although, these findings potentially contradict much of the TQM literature, still these are broadly consistent with Powell's [13:15-37] results. Despite the loose correspondence between quality practice dimensions and the use of different dependent variables the similarities are quite strong. Both Powell and this study find measures of commitment and employee empowerment to be positively associated with performance. Similarly, both studies have found measures of training, the use of benchmarking, and flexible manufacturing systems to be unrelated to performance. It is clear here that several of the softer quality management practices, when combined together, do have a positive relationship with quality outcomes that is pervasive across most industries.

5. Conclusions

This present study is an effort to assess the current status of quality management practices in manufacturing companies India. The results of this study show that the majority of the Indian companies are well aware of the modern quality management concepts and philosophies. It reconfirms importance and awareness of quality related issues as reported by Motwani and Mahmoud[11]. In general, these companies also believe that they are doing a good

job in providing high quality products or services to their customers. The comparison shows that although Indian companies are not behind industrialized countries in term of efforts for improving quality and the application of modern quality management principles, still there is a long way to go in order to achieve the best practices.

The findings of this study will help managers to understand the quality management practices in India. In today's global economic environment, companies are often looking for suppliers or other business partners all over the world. Therefore, it becomes imperative to study the quality management practices of other countries.

The study has also some limitations leaving a scope for further study. The sample size of this study is relatively small. Therefore, the results of this study need to be substantiated by future studies. To achieve a better understanding of the quality management practices in Indian industry, future studies should be carried out with larger sample sizes and individual industrial sectors to examine the differences between industries. To develop a true profile of quality management practices in Indian companies, workers and managers at the different work levels of the organization should also be included in the survey.

In summary, this study includes insights and contributions for both practicing managers and quality management researchers. For practicing managers, the study presents further and more reliable evidence that certain key elements of current quality management practices do yield substantial benefits in quality outcomes and performance. This may serve to propagate even further the adoption of the softer quality practices, such as employee involvement, creating a shared vision, and customer focus.

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