

Measure of Operational Performance Before and After Implementation of ISO 9000 Certification in Pumpsets Manufacturing Industries in Coimbatore, India

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Abstract

Coimbatore is one of the few centres in the country to manufacture pumpsets and had almost 70% share. However, it declined gradually and was 55% now. The manufacturers are forced to adopt innovative working methods, to invest on various technologies and on quality improvement programme. ISO 9000 is a management tool and a source of competitive advantage, which has a potential to stimulate the company to move towards quality competent. This paper describes the findings from a survey conducted on a sample of Coimbatore pumpsets manufacturing companies that have been ISO 9000:2000 certified.

Introduction

The pumpsets industrial scene in Coimbatore has undergone a significant change in the past 10 years of liberalization. Pumpsets manufacturing industries have gone for ISO 9000 certification in big way. There are about 2000 organizations in Coimbatore engaged in manufacturing pumpsets, out of which around 100 organizations have certified ISO 9000 series standards.

ISO 9000 is a family of standards that provides a series of guidelines on how to establish a quality system to manage the process that affect its product or services. This family of standards was first published by the International Organization for Standardization (ISO) in 1987 and was subsequently updated in 1994 and 2000. The quality system is required to be documented and

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employees are expected to follow consistently the documented procedures. One of the important aspects of ISO 9000 series is its structure which gives a consistent set of procedures, elements and requirements that can be applied universally. It creates an international common language for trade and standards of quality for the business community.

Literature Review

ISO 9000 standards offer to companies the capability to develop and implement an effective and dynamic quality system, with a focus on continuous improvement, as long as the companies show the necessary willingness and commitment to exploit it [19]. ISO 9000 standards' overall success depends on the way that certified companies implement these requirements [17]. The key of this success depends on company's commitment to quality improvement and their true motives for certification. However, Lee and Palmer (1999) showed that small companies are more likely to implement the standards because of external factors. Development and certification of a quality assurance system according to ISO 9000 standards can offer a good first step towards TQM, since it offers significant improvement in company's performance in all TQM elements [5, 18]

The empirical studies indicated that adopting ISO 9000 standards significantly helped the sample companies in implementing critical success factors of quality management [12, 16]. Costa and Lorente (2004) [6] in their case study of Spanish companies finds that the new standard is a good first step towards a TQM system. Kanji (1998) [9] has given an approach to make ISO 9000 system more effective and integrate it with TQM. The system offers a model and a process for continuous self assessment against an internationally recognized standards and it also can be seen as the basic foundation for the development of TQM [2].

The survey conducted in Malaysia [10] reveals that ISO 9000 certification has contributed greatly in improving intra-firm communications and satisfy customer needs. A survey conducted in Spain [3] concluded that ISO certification influences the companies progress towards total quality. They believe that companies get positive results from registration and this prompts managers to pursue higher level of quality. Many Singaporean companies start with ISO 9000 system and then move towards TQM [15]. The empirical survey results of companies in Australia [1], Greece [4], Thailand [7], Spain [3] and Singapore [15]

indicate favorable outcomes from ISO 9000 certification.

Mallak et al. (1997) [13], while doing cultural study of ISO 9000 certification found that, organizations seeking ISO 9000 certification should be decisive, team oriented, risk averse and should value stability, pay attention to detail, value working in a cooperative environment with good interpersonal relationships. Hua et al. (2000) [8] found that companies with ISO 9000 certificates were not necessarily better at quality management than those without certificates.

Hypothesis

Based on the earlier surveys and present survey, the following hypotheses are developed:

Null hypothesis H_0 : There is no significant difference in the operational performance before and after implementing ISO 9000.

Alternate hypothesis H_1 : There is a significant difference in the operational performance before and after implementing ISO 9000.

Methodology

A questionnaire survey has been used for data collection. This questionnaire has

been framed based on the literature available. The questionnaire so prepared has been posted to 100 ISO 9000:2000 certified companies in Coimbatore with a self addressed stamped envelope and received response from 69 companies. The addresses had been collected from Bureau of Indian Standards (BIS), Coimbatore.

Questionnaire Design

The questionnaire has been divided into two sections.

- (a) General section – This has been basically designed to collect general information about the company such as name, number of employees, year of certification etc.
- (b) ISO 9000:2000 implementation: This section covers the following areas
 - (i) Reasons for ISO 9000 certification: The reasons for seeking ISO 9000 series of standards are numerous and may vary between companies. Empirical evidence indicates that many companies are driven by external forces such as customer pressure and market related factors to obtain ISO 9000 certification [20]. On the other hand, there is also evidence showing that internal

factors, such as improving overall company's operational performance are dominant for seeking ISO registration [17]

Different studies about ISO 9000 certification show that there are a number of reasons that justify the certification decision. Quality managers were asked to rate the importance of these reasons on their firms certification decision using a one to five point Likert type scale, ranging from 1= not important to 5 = very important.

- (ii) Performance measures after certification: ISO 9000 certification influenced the companies in many ways, in terms of a number of benefits. These benefits are derived from the consistency it brings to the organization. Generally organizations are implementing ISO 9000 standards to achieve improved quality and efficiency, improved communication, competitive advantage, an increase in market share and reduce costs [14].

Studies conducted by Lee (1998) [11] suggest that ISO 9000 will benefit the internal operations of the certified firms. A revision of literature identifies a collection of 17 measures of performance [2]. Quality managers were asked about

the influence of ISO 9000 certification on the company's performance. They were asked to rate the improvement by using a one to five point Likert type scale, where 1 = No Improvement to 5 = Definitely Improved.

Survey Findings

Reason for seeking certification

The scores were added together and then divided by the number of observations per factor to determine the mean score of each factor. The higher the mean score, the greater is the importance of the factor. Internal reasons are related to the improvement of quality of products and process and external reasons are related to the improvement of the companies' position in the market.

The average rating of motivations shown in Table 1 reveals that improving internal processes and procedures was the most predominant reason given by the companies studied, followed by improving product / service quality. Improving company image and certification is a basis for TQM which also motivates the company to go for ISO registration where as, improving market share stimulates the companies moderately.

A t-test is performed to see which reasons for certification are thought to be more important than the medium level. The important level of all 13 items turned out to be significant at a 90% confidence level (see Table 1).

Table 1 : Reasons for Certification

| Reasons for Certification | Type | Mean | S.D | t-value |
|---|------|--------|--------|---------|
| Improving Internal Process and procedures | I | 4.6577 | 0.6290 | 17.01* |
| Improving product/service quality | I | 4.4998 | 0.8914 | 10.65* |
| Improving company image | E | 4.1051 | 0.8991 | 7.72* |
| A basis for TQM | I | 4.0525 | 0.9723 | 6.78* |
| Corporate level decision | I | 4.0247 | 1.1092 | 5.77* |
| Increasing the competitive advantage | I | 3.8025 | 1.1819 | 4.20* |
| Requisite to compete in the sector | E | 3.7382 | 1.1053 | 4.13* |
| Anticipating Customer demands | I | 3.7011 | 1.3823 | 3.13* |
| Cost reduction | I | 3.6200 | 1.2625 | 3.01* |
| Maintain/Improve market share | E | 3.4691 | 1.2528 | 2.27* |
| Use it as a promotional tool | E | 3.4525 | 1.2659 | 2.16* |
| Anticipating market trend | I | 3.4308 | 1.3019 | 2.00* |
| Direct entrance to new markets | E | 3.4248 | 1.2939 | 1.96* |

I = Internal, E = External and S.D = Standard Deviation

* The significant level is set to 0.10

Hypothesis Test

Operational performance before and after implementation of ISO 9000

A paired t-test has been conducted between the averages of different factors before and after implementation of ISO 9000. Table 2 shows the mean, and p-values of the

level of improvement of different measures of company performance. The mean value of all components of operational performance found to be higher after implementation of ISO as compare to before implementation, which indicate that there is significant improvements in operational performance after implementing ISO 9000. The results of the survey proved that the most important benefits that the companies get from certification are

- Customer Satisfaction
- Customer Service
- Product Quality

Table 2 : Measures of Operational Performance

| Measures of Operational performance | Mean(Before) | Mean(After) | p-value |
|--|---------------------|--------------------|----------------|
| Customer satisfaction | 4.00 | 4.61 | 0.0000* |
| Customer service | 4.02 | 4.45 | 0.0013* |
| Product Quality | 3.93 | 4.36 | 0.0018* |
| Fewer defects | 3.79 | 4.00 | 0.1242 |
| Productivity | 3.66 | 3.97 | 0.1658 |
| Employee satisfaction | 3.45 | 3.75 | 0.1145 |
| Competitiveness | 3.69 | 3.93 | 0.1742 |
| Employee motivation | 3.61 | 3.65 | 0.9641 |
| Revenue | 3.28 | 3.57 | 0.0992 |
| Product innovation | 3.42 | 3.45 | 0.8808 |
| Market share | 3.40 | 3.51 | 0.5873 |
| Employee turnover | 2.98 | 3.11 | 0.5711 |
| Lower expenses | 2.78 | 3.00 | 0.2940 |
| Profit before taxes | 2.61 | 2.73 | 0.5963 |

The improvement in customer satisfaction and customer service might have been achieved through implementing proper procedures and define responsibilities and duties of every employee. Costa and Lorenie (2004) [2] points out that improvement in customer satisfaction could be due to improvements in claims management. Product quality of the organizations is also improved after certification. This may due to the proper work instructions and a procedure which reduces variability in the production process. We can also see that companies surveyed are achieving fewer defects because this factor has got a mean score of 4.0. On the other hand, the least significant benefits were:

- Employee Turnover
- Lower Expenses
- Profit Before Taxes

These low scores in these performance measures may be due to the fact that ISO 9000 standards do not require proof of any actual performance results related to financial performance and employee satisfaction, and also these types of benefits take time to materialize.

Limitations

The following are some of the limitations of this study

- The sample size (100) of this research is comparatively smaller than the other previous surveys.
- The response rate of 49% (49 respondents) appears to be low.

These limitations may affect the outcome of the research. The author is planning to extend this survey by going in for larger sample size by including other manufacturing ISO 9000 certified company in the next phase of the study.

Conclusions

Many organizations are familiar with ISO 9000 series, therefore a logical starting point for organizations is ISO 9000 registration. Continuous improvement makes sense if an organization knows its processes, which need to be improved. The ISO 9000 standards force an organization to describe the key processes and make them more transparent.

ISO 9000 is about giving confidence that the supplier can consistently meet the customer requirements. Certification to ISO 9000 standards is a major achievement to any company. The results of the survey show that companies are seeking ISO 9000 certification mainly to improve the internal processes and

procedures and to improve the overall operational performance. ISO 9000 standards offer a great opportunity to Indian companies to improve their organizational system and increase their competitiveness. The results show that all components of operational performance have been improved, but there is a significant improvement in Customer Satisfaction, Customer Service and Product Quality after registration to ISO 9000. But ISO 9000 is not an end in itself. It is only the first step in the endless road to quality. The survey result proves this, as many firms implemented ISO 9000 quality management system by considering it as basis for TQM.

References

- Beattie. K. R, and Sohal. A. S, "Implementing ISO 9000: A study of its benefits among Australian organizations." *Total Quality Management*, 1999, Vol. 10, pp (95-106).
- Costa. M. M, and A. R. M. Lorente, "ISO 9000 as a tool for TQM: A Spanish case study." *Quality Management Journal*, 2004, Vol. 11, pp (20-30).
- Escanciano. C, E. Fernandez, and C. Vazquez, "Influence of ISO 9000 Certification on the progress of Spanish Industry towards TQM." *International Journal of Quality & Reliability Management*, 2001 Vol. 18, pp (481-494).
- Gotzamani. K, "A thorough analysis of ISO 9000 contribution to SME: A comparison with large enterprise." *Journal of Management Practice*, 2004, Vol. 1, pp (41-55).
- Gotzamani. K. D, and G. D. Tsiortas, "An empirical study of the ISO 9000 standards contribution towards total quality management." *International Journal of Production and Operations Management*, 2001, Vol. 21, pp (1326-1342).
- Hesham Magd and Adrienne Curry, "ISO 9000 and TQM: are they complementary or contradictory to each other." *The TQM Magazine*, 2003, Vol. 15, pp (244-256).
- Hong. J. W, and Satih Phitayawejwat, "The impact of ISO 9000 certification on Quality Management practices in Thailand." *Journal of Industrial Technology*, 2005, Vol. 21, pp (2-6).

- Hua. H, K. S. Chin, H. Sun and Xu. Y, "An empirical study on quality management practices in Shanghai manufacturing industries." *Total Quality Management*, 2000, Vol. 11, pp (1111-1122).
- Kanji. G. K, "An innovative approach to make ISO 9000 standards more effective." *Total Quality Management*, 1998, Vol. 19, pp (67-78).
- Lee Peng tan and Gilgert, Lim Teck Sia, "ISO 9000: The answer for total quality management implementation ? The Malaysian case." *Total Quality Management*, 2001, Vol. 12, pp (223-229).
- Lee. T. Y, "The development of ISO 9000 certification & the future of quality management: A survey of firms in Hong Kong." *Total Quality Management*, 1998, Vol. 15, pp (162-177).
- Mahadevappa. B, and G. Kotreshwar, "Quality Management Practices in Indian ISO 9000 Certified Companies: an Empirical Evaluation." *Total Quality Management*, 2004, Vol. 15, pp (295-305).
- Mallak. L. A, L.S. Bringelso, and Lyth. D. M, "A cultural study of ISO 9000 certification." *International Journal of Quality & Reliability Management*, 1997, Vol. 14, pp (328-348).
- Najmi. M, and D. F. Kehoe, "An integrated frame work for post – ISO 9000 quality development." *International Journal of Quality & Reliability Management*, 2000, Vol. 17, pp (226-258).
- Quazi. H. A, and Padibjo. S. R, "A Journey towards TQM through ISO 9000 – A study on SME's in Singapore." *International Journal of Quality & Reliability Management*, 1998, Vol. 15, pp (489-508).
- Rao. S. S, T. S. raghu Nathan, and L. E. Solis, "Does ISO 9000 have an effect on quality management practices? An international empirical study." *Total Quality Management*, 1997, Vol. 18, pp (335-346).
- Tsiortas. G and Gotzamani. K, "ISO 9000 as an entry key to TQM: the case of Greek industry." *International Journal of Quality & Reliability Management*, 1996, Vol. 13, pp (64-76).

- Van der Wiele. T, and A. Brown, "ISO 9000 series experiences in small and medium-sized enterprises." *Total Quality Management*, 1997, Vol. 18, pp (300-304)
- Williams. N, "ISO 9000 as a route to TQM in small to medium-sized enterprises: Snake or ladder?" *The TQM Magazine*, 1997, Vol. 19, pp (8-13).
- Yahya. S, and Wee-Keat Goh, "The Implementation of an ISO 9000 quality system." *International Journal of Quality & Reliability Management*, 2001, Vol. 18, pp (941-966).