

A Study on TQM Practices in Small and Medium Enterprises of North Karnataka

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Abstract

The prime weapon in a performance oriented market for increasing the customer base and capturing market share for SMEs is 'Quality'. The current tools and methods followed by SMEs for quality practice are becoming outmoded. SMEs must shift from traditional practices and make major changes in their management philosophy. Even though SMEs follow quality practices it is found that it is on ad hoc basis. There is a need to have a structured approach towards TQM for their sustainability and growth on a continuous basis. The role of Fact based decision making is a crucial element for TQM implementation.

Keywords: Small and Medium Enterprises-SME, Total Quality management-TQM, Overall Firm Performance indicators (OFP).

Introduction

Small and Medium enterprises (SMEs) play a crucial role in the sustainable growth and Socio economic transformation of both emerging and developed economies. SMEs sector is the driving force for long term growth of Indian economy. The balanced regional distribution of growth along with development of local skill and resources are adding advantages to SMEs which are pivotal in grassroots development and social progress. SMEs need to have consistent and continuous effort to have efficiency, innovativeness and quality focus in the processes. SMEs have distinct advantage over large firms in terms of flexibility and cost effectiveness by controlling quality in the products and processes.

A survey done by KPMG clearly shows that our industry has not yet adopted the concept of 'making quality happen'

The survey identified some of the traditional approaches of SME towards quality:

- Accepting a certain probability of delivering defective components to customers.
- Internal costs of defects are traded-off with high cost of inspection. Accepting inspection cost and ignoring external failure cost of defects such as losses to customers.
- Using statistical approach for manufacturing of products but not for processes.
- Accepting process defects and making provisions for the same.
- Costs of quality are equated with products of superior grade.

Such primitive thinking about quality has to be changed as the market has become competitive with the introduction of liberalization and globalization. SME must make an effort to make products better by making them affordable and also bringing them to market faster.

Statement of the Problem

The TQM programs are required to improve a company's ability to compete as well as its reputation with its customers. Enterprises are affected when defective products are returned by customers. Based on the research objectives, the extensive literature survey and informal talks with other academicians the research problem has been proposed as:

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“Role of Fact based decision making on TQM Practices of Small and Medium Enterprises of North Karnataka”

Objectives of the Study

To study the effect of Fact-Based Decision making on Total Quality Management practices of SMEs.

Hypothesis for the Study

- H_0 : There is no significant association between type of enterprise and the respondent's opinion on fact based decisions for developing new processes for old and obsolete ones to achieve *quality in end product*

Theoretical Framework

The literature is reviewed with an attempt to understand and interpret the previous work on different aspects related to Total Quality management (TQM), key principles of TQM and Overall Firm Performance indicators (OFP).

After the review of contributions of quality gurus, it has become clear that each has his own distinctive approach towards TQM. The principles and practices proposed by the quality gurus provide the better understanding of the concept of TQM for the researcher. The insights offered by quality gurus provide a solid groundwork for conducting this study. Even though the approaches to TQM proposed by quality gurus are not exactly the same, there are some common points to share:

- The process control, quality system improvement and design of product/service is critical. The emphasis should be on prevention not on correction.
- Each opines that for global competitiveness quality is a must and Quality is not cost but saves money.

Fact Based Decision Making: Based on the facts gathered from the shop floor the plant has to be reorganized. The SME have customized products so in many cases need to realign the shop floor to suit the smooth flow of process. The process comprises of machines, tools, methods, materials and employees engaged in production process. Process control and improvement involves a set of methodological and behavioural practices, which have implemented to control and improve processes that produce products (Juran and Gryna, 1993). *New processes are to be developed for old and absolute ones, the new advanced processes makes the manufacturing processes without interruptions despite workforce variability* (Flynn et al., 1994).

It is very important to keep the firm neat and clean, which can improve process (Ho, 1999). The firm should implement 5S for maximum productivity at the shop floor.

Deming (1986) stated that mass inspection is not the solution for improving product quality. Quality comes from improvement of production process not from inspection. A firm should try to implement effective inspection and testing activities in order to reduce any non-value added activities.

The application of statistical tools and techniques for the measurement and analysing the variation in the process is called as Statistical Quality Control (SQC) (Juran and Gryna, 1993). SQC can be used to achieve process stability, for guiding process improvement by reduction in variation and by providing information to management in decision making process (Dale, 1999).

A number of quality techniques can be used to control and improve processes. These methods include Failure Mode Effect Analysis (FMEA), Computer Aided Designing and Manufacturing (CAD/CAM), Just in Time (JIT) material management (Dale, 1999; Mann, 1992).

Before starting commercial production, new product design should be thoroughly reviewed to avoid production related. ISO states design review as a systematic examination of a design, properly documented to evaluate process capability to fulfil the requirements for problem identification, development of solutions related to quality.

Prototypes have to be developed to reduce the time and the expense needed to develop a new product. This greatly improves the performance of the new product, and lead to the success of new product in market (Zhang, 1998).

For a new product design Quality Function Deployment (QFD) is an effective methods in product design (Daetz et al., 1995). It helps in establishing a relationship between new product attributes and customer needs, which can support market competitiveness (Daetz et al., 1995; Reed et al., 1996; Slack et al., 1995). QFD consists of a series of interlocking matrices that translates customer needs into process and product characteristics (Juran and Gryna, 1993). Thus Fact based Decision making is very crucial element of TQM implementation in a SME.

Knowledge Gap

Various researchers have done study on TQM application in SME across the globe. When we look at the information generated by all these studies we find some aspects are missing in them. The following have been observed as the research gaps based on the review of literature. These gaps can be categorized as Country specific and industry specific.

- Fact based decision making was treated as a tool to improve business performance. It was not given the core competence view while some companies were successful in reaping the benefits of it.

Methodology

The empirical data collected through questionnaire survey is used for research methodology.

Independent Variables used in the study: Fact-Based Decision Making

Dependent variables considered are: Financial (Sales, Cost Reduction, Market Share, Exports); Non-Financial (TQM, Productivity)

The research methodology designed for this study follows the guidelines as presented by Parasuraman et al (1988).

Analysis and Findings

Data analysis serves the purpose of meaningfully inferring and establishing relationship from the data collected. Reliability and validity are mainly used for evaluation of analysis.

Using SPSS reliability analysis procedure, an internal consistency analysis was performed (UCLA). The reliability analysis using Cronbach's Alpha is 0.938 with a standard deviation of 22.76 for 49 items.

Based on KMO and Bartlett's test the factor analysis result shows that components are significant. This is because the data SPSS KMO of sampling is adequate with 0.5487 KMO standard requirement of 0.50 which is therefore appropriate and accepted.

H_0 : There is no significant association between type of enterprise and the respondent's opinion on fact based decisions for developing new processes for old and obsolete ones to achieve quality in end product

Chi square is not significant (sig. value is 0.932 > 0.05), no evidence to reject null hypothesis. It means that there is no significant association between type of enterprise and their opinions on fact based decisions for developing new processes for old and obsolete ones to achieve quality in end product. (Table 1)

The strength of association between type of enterprise and their opinions on fact based decisions for developing new processes for old and obsolete ones to achieve quality in end product is 0.075 (Table 2)

The regression table summarizes the model performance through the following statistics. (Table 3)

R: represents the multiple correlation coefficients with a range lying between -1 and +1. Since the R value of 0.815 it means thorough review of new product design is carried out before production has a positive relationship with Prototypes are developed and tested before commercial production, Using time study, activity or work sampling and Outsource the parts which are costly to manufacture in house.

R square: represents the coefficient of determination and ranges between 0 and 1. Since the R square value is 0.664 it means 66 % of the variation in thorough review of new product design is carried out before production is explained by Prototypes are developed and tested before commercial production, Using time study, activity or work sampling and Outsource the parts which are costly to manufacture in house.

From the ANOVA calculation F value is significant (significant value is less than 0.05) it means dependent variable through review of new product design is carried out before production is more reliable. (Table 4 and 5)

The model coefficient reports the coefficients for Prototypes are developed and tested before commercial production, using time study activity or work sampling and outsource the parts which are costly to manufacture in house along with the significance value. The model coefficients are used in the construction of Regression equation. A low significance value of less than 0.05 for Prototypes are developed and tested before commercial production, using time study and activity or work sampling and Outsource the parts which are costly to manufacture in house are very strong impact on thorough review of new product design is carried out before production. (Table 6). The regression equation is furnished below.

Thorough review of new product design is carried out before production = $0.413 + 0.125$ (Outsource the parts which are costly to manufacture in house) + 0.216 (Using time study, activity or work sampling) + 0.587 (Prototypes are developed and tested before commercial production).

Discussions

Based on the analysis the following points are to be considered for Fact Based Decision Making

Reorganizing Plant Layout

While improving quality the SMEs need to consider their existing plant layout.

Developing New Processes for Old and Obsolete

New processes are more efficient and it increases the productivity of the employees thus improving the quality (ASQ).

Implementing 5S

5S brings in good mood for work, encourages employees to take care of production facilities, and makes them more productive. Good housekeeping allows employees to identify any problems quickly (Feigenbaum, 1991).

Automatic Inspection and Testing

A system to automatically inspect and test raw materials into production system is to be developed to save manpower and reduce rejection (Slack et al., 1995)

Statistical Quality Control (SQC)

Statistical quality control use statistical methods to measure and analyse variation in a process. This can be used to judge whether the process are near to the set dimensions. Most of the SME have Computer numerical Control (CNC) machines and data is continuously fed into the statistical packages, which check the process stability.

Failure Mode & Effect Analysis (FMEA)

FMEA method can be implemented in identifying potential failure modes and the effect of those on external and internal customers. (Automobile Industry Action group, Troy, MI, 1995).

Using Computer Aided Design and Manufacturing

The use of these tools helps reduce time-to-market, design errors and precious time of designers. These can be used more effectively and inexpensively in SMEs manufacturing customized products.

Just in Time (JIT) Materials Management

This philosophy is effective in the firms having repetitive, manufacturing batches of standard products in large volumes with a continuous flow of materials. (Vuppalapati, K., Ahire, S.L. and Gupta, T, 1995).

Outsourcing

If the firm is not having the required resources and if it does not want more capital investment then outsourcing strategy can be considered. (Porter, Michael E, HBR, 1996)

Using Time study, Activity or Work Sampling

These help in estimating the percentage of employee's time spent in unavoidable delays of repairing finished from an operation or supplying material products to an operation work sampling is also used to set labor standards. These standards can be used for employee rewards, for quality management by setting achievable targets. (B. Mahadevan, 2010).

Use Quality Control (QC) Circle

The employees improved quality of their work by discussing problems faced at the work centers (Kano and Lillrank, 1989). Proper use of QC circles improves products, processes, working environment. The discussions enhance the knowledge and understanding level of employees regarding difficulties faced by the firm (Dale, 1999; Robson, 1999; Vries and water, 1992).

Review of New Product Design

Designs for new products have to be thoroughly reviewed before production. Thorough review of new product designs reduces assembly errors and other sources of quality problems during manufacturing. This approach can be effectively applied if the designers are given experience on shop floor to make them better understand the actual conditions of use, and the difficulties encountered in making refurbishing and repairs (Feigenbaum, 1991).

Test Prototypes before Commercial Production

Prototypes help in checking the required dimensions so that rejection rate comes down after the final production.

Conclusion

After reliability analysis, validity analysis and factor analysis had been conducted, it was concluded that the TQM implementation instrument is reliable and valid. The data obtained through this instrument can be used for subsequent data analysis. The tested and validated TQM implementation instrument had 5 scales that consisted of 55 measurement items.

Based on Hypothesis testing it was found that there is a significant association between the type of enterprise and their opinions on Total Quality Management practices. Using ANOVA technique regression model was formulated based on dependent and independent variables.

Implications of the Study

The practitioners can use these validated instruments for:

- i. Identifying areas where improvements can be done
- ii. Evaluating TQM practices in these firms
- iii. Finding areas where excellence currently exists

Recommendations

The system should have a proper facts and data collection process. These facts have to be compared on a timeline to check variations. These variations have to be recorded and documented.

Directions for Further Research

Based on findings and recommendations future research may start from a relatively higher level of knowledge. The research work is exploratory so re-examining the validity of findings can be done using larger sample sizes, more geographical diversification and variety of firm sizes.

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