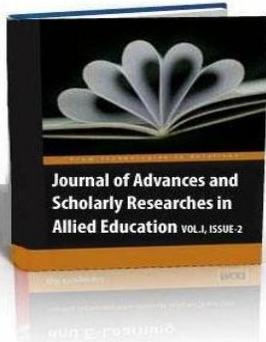


SURVEY OF TQM SUCCESS FACTORS IN MANUFACTURING AND SERVICE INDUSTRIES



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ABSTRACT

Total Quality Management is an integrative management Philosophy aimed at continuously improving the performance of products, processes and services to chieve and surpass customer expectations. There are many differences in manufacturing and service industries. The purpose of this study is to understand concept of TQM in both industry sectors and to identify the significant differences (if any) in TQM practices in northern India service and manufacturing organisations. For this purpose related literature is collected and classified in to various categories. The literature is deeply studied and the critical factors that influence the TQM success in industry are determined. Based on these factors a questionnaire was prepared which includes two types of questions, variable questions and ranking questions. The first eight questions are related to the company background and demographic data such as no. of employees, sector of business, type of industry, position of the respondent, etc.

The variable questions are grouped in to seven factors such as customer focus, continuous improvement, Team work and involvement, Top management commitment and recognition, training and development, communication in company, measurement and

feedback. A total of 60 questionnaires were sent to both types of industry. Then questionnaires were collected back from various industries and the data was managed in a usable format and the t-test is applied on the data with the help of SPSS & MINITAB Software. The result recorded is that there is no significant difference in the application of TQM in manufacturing & Service industries.

Key Words: Total Quality Management; Survey; Critical Success Factor

1. Introduction

TQM views an organization as a collection of processes. It maintains that organizations must strive to continuously improve these processes by incorporating the knowledge and experiences of workers. The simple objective of TQM is "Do the right things, right the first time, every time". TQM is infinitely variable and adaptable. Although originally applied to manufacturing operations, and for a number of years only used in that area, TQM is now becoming recognized as a generic management tool, just as applicable in service and public sector organizations [Garg, (2006)]. There are a number of evolutionary strands, with different sectors creating their own versions from the common ancestor. This paper will make an attempt to present a comparative study in TQM practice in Northern India service and manufacturing organisations. The paper discusses the results of a survey on Critical success factors (CSFs) of TQM implementation in Indian manufacturing and service industries. The paper begins with an overview of the CSFs for TQM, research methodology and data collection, reliability and validity tests conducted on the CSF instrument, followed by analysis of survey results.

2. Objectives of Present Work

The present work has been undertaken to carry out Total Quality Management in manufacturing

and service organizations. In order to accomplish this present work comprise of:

1. Survey and classification of literature on Total Quality Management.
2. Benefits of Total Quality Management in manufacturing and service organisations as stated in literature.
3. Short coming of Total Quality Management in manufacturing and service organisations as stated in literature.
4. Concept of Total Quality Management in manufacturing and service organisations.
5. Significant difference (if any) in Total Quality Management practices in manufacturing and service organisations.

3. An Overview of the Problems & Barriers with the Implementation of TQM

TQM is recently concerned to imply that it is a way of managing organisation to improve product/service quality and the overall efficiency of production or companies operations. Although there is evidence that supports the effectiveness of TQM initiatives in organisations, a large number of studies have shown that between 60% and 80% of TQM initiatives fail, or fail to have shown significant impact on business performance. Research has also indicated that many organisations have encountered difficulties in implementing TQM. Researchers with in TQM fraternity have suggested the following reasons for these failures:

- Lack of Top Management Commitment.
- No supporting infrastructure for cultural change.
- Lack of synergy between quality improvement programmes and overall business strategy.
- Poor management leadership
- Lack of focus on the Process
- Fear of Change
- Misperception that TQM is a set of tools rather than a way of thinking
- Inconsistent management commitment from department to department

- Lack of rewards and recognition
- Organisations are more concerned about short-term business returns rather than long-term sustainability of business performance.

4. Differences between Services and Manufacturing

Manufacturing is considered to be associated with those organisations where there is a very low level of direct contact with the customer, as in mining, farming and heavy engineering. Manufacture requires a physical transformation; a change in the form and utility of resources. In this research, manufacturing companies are defined as “those which produce tangible products with a significant element of their operations function involving manufacturing activities, such as raw materials being transformed to a product”.

Services are defined as “a process which transforms inputs such as strategy, technology, skills etc. in to an output i.e. service”. In this research, service companies are defined as those which produce intangibles with a service operations focus. Several researchers have identified four characteristics of services that distinguish service organisations from manufacturing organisations. These are: intangibility, inseparability, perishability, and heterogeneity. The differences between manufacturing and service industries are as follows:

4.1 Inseparability

This involves simultaneous production and consumption, which characterizes most services. The inability to store services is a critical feature of most service operations. Since the customer must be present during the production of many services, inseparability ‘forces the buyer into intimate contact with the production process’ [Carmen, (1990)]. This simultaneous production and consumption eliminates many opportunities for quality control intervention.

4.2 Intangibility

Because services are performances, ideas or concepts rather than objects, they cannot be seen, felt, tasted, heard or smelled in the same manner in which goods can be sensed [Ograjensek, (2002)].

When buying a product, the

consumer is usually able to see, feel and oftentimes test its performance before purchase.

However, with

services, the consumer must often rely upon the reputation of the service firm. This thereby greatly influences the expectations aspect of quality measurement in services.

4.3 Perishability

This refers to the concept that a service cannot be saved or inventoried [Bessom, (1975)]. Hotel rooms going vacant, empty airline seats, and unfilled appointment times for a doctor are all examples of opportunity losses.

This perishability presents a problem of synchronizing supply and demand, causing customers to wait or not be served altogether. The implications for customer satisfaction are quite obvious.

4.4 Heterogeneity

Since the same service can be provided by various employees at the same facility or different facilities, the quality and essence of the service can vary from provider to provider, from customer to customer, and from day to day. Attempting to offer a consistent service or to measure the variability of different performance types can be difficult. Unlike manufacturing, in which the product is inspected before delivery, services must rely upon a sequence of measures to ensure the consistency of output [Zeithaml, (1991)].

5. Research Design and Data Collection

Research methodology guides researchers to meet the objectives of the research in a structured

and organized manner. A total of 60 questionnaires (30 each) are sent to both industrial sectors. The questions in the questionnaire (refer to Appendix) are designed and adapted from the published work of leading academics in TQM research and the various articles given by researchers. The questionnaire is based on the seven critical factors identified from case study, conceptual and survey articles. The manufacturing industries included electronic, automotive, plastic and textile, while service industry included banking, hotels, insurance, hospitals, telecommunication and other public utilities.

The companies used for this research are chosen from the Northern India. The method used for gathering data is postal survey. This method was chosen due to the advantage that the designed questionnaire could be sent to a large number of organizations in a limited time. The questionnaire included two types of questions, variable questions and ranking questions. The first eight questions are related to the company background and demographic data such as no. of employees, sector of the business, type of industry, position of respondent etc. The variable questions are grouped in to 7 factors. Each factor is then divided in to variables or statements. The list of critical factors [Garg, (2005 & 2002)] is shown in Appendix-A.

5.1 Customer focus- This factor covers the investigation of customer complaints, the specification of internal and external customer requirements and their satisfaction.

5.2 Continuous improvement- This factor covers the continuous improvement activities on the system, processes and continuous monitor of employee's performance. Moreover, the review on the quality issues and identification of opportunities for improvement are also included in this factor.

5.3 Teamwork and involvement- The participation of all employees in quality activities, implementation of quality improvement teams, team rewards and teamwork structures are included

in this factor.

5.4 Top management commitment and recognition- This factor includes the awareness and support of top management on the quality systems. The recognition of quality improvement and employees contribution is also covered in this factor.

5.5 Training and development- This factor is related to the availability of training programmes to the employees. Training programs include the statistical improvement techniques, quality related matters and teamwork. Furthermore, the education for the suppliers and subcontractors are also covered.

5.6 Communication within the company- The cooperation between various departments or units with in a company is covered in this factor. This factor accentuates the use of cross functional teams for problem solving and team working.

5.7 Measurement and feedback- The measurement of the performance of processes, performance in financial and non financial terms and feedback provision are embedded into this factor.

As each variable is measured on a Likert Scale in the questionnaire, quantitative data analysis method was used. Moreover, it is important to verify the data reliability. The data collected is analysed by using SPSS Version 7.5 and Minitab Version 13.

6. Paired Sample T-Test

Paired t computes a confidence interval and performs a hypothesis test of the difference between two population means when observations are paired (matched). When data are paired, as with

before-and-after measurements, the paired t-procedure results in a smaller variance and greater power of detecting differences than would the above 2-sample t-procedure, which assumes that the samples were independently drawn.

A statistical test of the null hypothesis that two population means are equal. It is used when the observations for the two groups can be paired in some way. (For example, when the same person is observed before and after a treatment.) Pairing is used to make the two groups as similar as possible. Observed differences between the groups can then be attributed more readily to the variable of interest.

The Paired-Samples T Test procedure compares the means of two variables for a single group. It computes the differences between values of the two variables for each case and tests whether the average differs from 0.

7. Correlation

Correlation calculates the Pearson product moment coefficient of correlation (also called the correlation coefficient or correlation) for pairs of variables. The correlation coefficient is a measure of the degree of linear relationship between two variables. You can obtain a p-value to test if there is sufficient evidence that the correlation coefficient is not zero.

8. Reliability & Validity of the Data

The survey instrument is evaluated for reliability and validity. Reliability refers to the instrument's ability to provide consistent results in repeated uses. Validity refers to the degree to which the instrument measures the concept the researchers wants to measure. Three types of validity tests are considered: content validity, construct validity and criterion-related validity.

Reliability or internal consistency can be estimated using a reliability coefficient such as Cronbach's Alpha (1951) [Cronbach, (1951)].

It is found that alpha values are significant and indicating that data is internally consistent and reliable as for Manufacturing organisations Cronbach's alpha is 0.7163 and for service organisations Cronbach's alpha is 0.7712 and for significant results the alpha value should be greater than 0.7.

8.1 Content validity

Content validity depends on how well the researchers create measurement items to cover the content domain of the variable being measured. As a result, it is often subjectively judged by the researchers. The content validity of the questionnaire is based on the previous studies of Black and Porter (1996), Joseph et al. (1996), Mann and Kehoe (1995), Jiju Antony and Craig Fergusson (2004). So it is strongly believed that the factors considered for this comparative study have a content validity.

8.2 Construct validity

For construct validity, one may generally check for unifactoriality. Unifactoriality means that a single factor is extracted for each test. In order to determine the construct validity, each factor was subjected to an individual principal component factor analysis to check for unifactoriality. The analysis indicates that all the 7 factors were unifactorial. The unifactorial nature of each factor is a measure of construct validity. All factors in each unifactorial test accounted for more than 60% of the variance of the respective variable tests.

8.3 Criterion-related validity

Criterion-related validity is concerned with the extent to which a measuring instrument is related to an independent measure of relevant criterion. However, no criterion was designed in this survey. The fact for this study may result in a better understanding of TQM in Indian manufacturing & service industries, to identify the opportunities for improvement of the implementation process.

9. Ranking of Data

The respondents were asked to rank the factors in descending order of importance from 1 to 7. The rank 1 means the most important factor for implementation of TQM and rank 7 means the least important. The scores were then added together to determine the list of factors in a hierarchical manner. Table-1 illustrates the total scores of each critical factor in both manufacturing and service organisations. The possible reason for the relative unimportance of communication in company is the nature of service industry.

10. Comparing TQM Implementation in the Manufacturing and Service Organisations

In order to compare the levels of TQM practice in both industrial sectors, it is important to define the question “Is there any significant differences on the mean for each factor between manufacturing and service sectors?” The levels of significance i.e. 5% is chosen to analyse the data. In order to compare the average scores of each factor in manufacturing & service industries, t-test is conducted with the help of SPSS & Minitab Software.

The software provides the so called p-value, which is used as the criterion to see as if there is any significant difference between the average scores in these two industries. Here p-value refers to the probability of obtaining the results of a statistical test by chance. If the p-value is less than the predetermined alpha level or significance level, then the null hypothesis (there is no difference in the mean score for a critical factor between manufacturing & service

industries) shall be rejected. In other words, if the p-value is smaller than the alpha value, it can be concluded that the difference in the mean scores for a critical success factor is statistically significant.

Table-3 shows the different statistical values such as mean, standard deviation, p-value and significant correlation for different factors at 5% significance level. From the table it can be seen that none of the factors have p-value less than 0.05, it means that our hypothesis that there is no significance difference in the TQM implementation in manufacturing and service industries.

11. T-Test for perceptions between Manufacturing and Service Organisations

Table-3 shows that there is no significant difference between manufacturing and service organisations in TQM practices. All p-values are greater than 0.05. Table-3 also shows the significance correlation for each factor between manufacturing and service, which itself explains the importance of each factor for any organisation. Correlation in any case if is positive and near to 1 can be taken as significant for those correlated factors [Carmen, (1990)].

12. Discussion & Key Findings

From the various tables it can be seen that there is no significant difference in the critical factors for the implementation of TQM in manufacturing and service industries. From the table-3 it can be seen that the p-value of each factor is greater than 0.05 which should be less than 0.05. It shows that there is no significant difference in the implementation of TQM in manufacturing and service industries in the Northern India.

From table-1 and table-2 it can be seen that the communication in the company has the least importance in both manufacturing and service industries. The communication with in the whole company is very important for effective and efficient operations. Better communication could

reduce the misunderstanding and confusion of the requirements from internal and external customers. The top management are responsible to communicate and explain the quality goals and policies to companies' employees. Besides, the participation of top management in the process of quality management can motivate employees to take active part in quality activities.

13. Conclusion

The project presents the results of a survey on TQM carried out in the Indian manufacturing & service organisations. 60 questionnaires were sent to both manufacturing and service industries. A total of 7 factors consisting of 35 variables were considered in the questionnaire. It is found that all the 7 critical factors are considered to have lower importance for TQM practices in the Indian service industry when compared to manufacturing industry. The results of critical success factors in the Indian manufacturing and service industries were collected and then the factors were ranked accordingly as shown in the table-2.

14. Limitations of the Study

The limitations of the study are:

- Owing to the time limitation, a postal questionnaire survey was applied for this project. However, semi-structured interviews would enable us to have a greater understanding of the TQM practices in these companies.
- It would be better to carry out factor analysis on the data for identifying the critical success factors of TQM in both industrial sectors with statistical significance.
- It was found during the course of this research that the response rate for the postal survey was not very high. Another factor was that some of the questionnaires were returned incomplete.

So as not to bias any adjustment, these were disregarded and only the completed questionnaires were considered for the analysis.

□ It is worthwhile considering whether implementation of TQM has any impact on business performance and competitive advantage of these companies.

REFERENCES-

- [1] Antony, Jiju and Fergusson, Craig (2004), "Comparing TQM success factors in UK manufacturing and service industries", Journal of advances in Management Research, Vol.1 (2), p.32-45.
- [2] Bessom, R. & Jackson, D. (1975), "Service retailing: a strategic marketing approach", Journal of retailing, Vol. 8, p. 137-149.
- [3] J.M. Carmen, (1990), "Consumer perceptions of service quality: an assessment of the SERVQUAL dimensions", Journal of retailing, Vol. 66(1), p. 33-55.
- [4] L.J. Cronbach, (1951), "Coefficient alpha and the internal structure of tests", Psychometrika, Vol. 16, p. 292-334.
- [5] D. Garg, T.K. Garg and Raj Kumar (2006), "Total Quality Management: an approach to success", AISN, p. 391-395.
- [6] D. Garg, T.K. Garg and Raj Kumar (2005), "Perspectives of TQM in Indian industries", Productivity, March, Vol. 45, No.4, p.634-641.
- [7] D. Garg, T.K. Garg and Raj Kumar (2002), "Quality management practices in Indian Industries", Productivity, Vol. 43, No.3, Oct- Dec., p. 426-433.
- [8] R. P. Mohanty and R. R. Lakhe, (1998), "Factors affecting TQM implementation: an empirical study in Indian Industry", Production, Planning and Control, Vol.9, No.5, p.511-520.
- [9] Irena Ograjensek, (2002), "Applying Statistical Tools to improve Quality developments", Social Service Methodology, Metodoposki Zevzki, 18, Ljubljana: FDV, p.239-251.
- [10] V.A.Zeithaml, A. Parasuraman, and L.L. Berry, (1985), "Problems and strategies in service

marketing”, Journal of marketing, Vol. 49, p. 33-46.

[11] V.A.Zeithaml, A. Parasuraman, and L.L. Berry (1991), “Refinement and reassessment of the SERVQUAL scale”, Journal of retailing, Vol. 67(4), p. 420-450.



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