5.1 STATEMENT OF PROBLEM

While working in the industry, and especially working for ISO related activities, it was found that the system related to ISO can do wonders, provided it is implemented properly. Interacting with industry people it was found that many a times ISO certification becomes merely a formality. People work for it hard, but once the certificate is achieved, the momentum tends to get lost. It was also seen that the companies which are following it systematically without violating the procedures are getting more benefits than others. Many organizations were driven to seek ISO 9000 certificate by pressure from customers and some are going for it just because their competitors have already achieved it. They are not giving importance to the fact that ISO 9000 will help them to improve business performance. Under the pressure from the customer they will obviously sought the quickest route to certification. The question posed here is – Is our goal to survive the audit or to improve our performance?

It seems to be easier for the bigger companies to devise system and then to follow it. It also is affordable for them to hire specialized people to work on the different areas and also have dedicated people to work for ISO. But then bearing heavy pressure from the customers and tight delivery schedules, at times the companies deviate from the written procedures.

Small and medium scale enterprises on the other side have a limited infrastructure and hence one may feel that it may not be affordable for them to go for such certifications, but on the other side it is actually easy for them to devise a system as the business area is very narrow. One can keep a very close watch on the system implementation as it is a small unit and has got less number of employees. The bigger enterprises are heavily dependent on this type of companies for supplying the components, raw material or in some cases sub contracted material with partial processing. This necessitates the SMEs also to think in the direction of going for certification as in absence of the same there is a likelihood of losing the orders. Also
Government of India has taken the initiative of financing SMEs for the major chunk of expenditures incurred for getting ISO certificate. This has also worked quite well and many such companies started applying for the certificate.

It was felt that a systematic study should be carried out to find out the impact of ISO certification on the SMEs.

The problem with TQM is, one does not get immediate results and to some extent are intangible. As indicated above there is no certification of TQM and hence sometimes lack proper direction or becomes less motivating. It requires ongoing efforts at all levels of the hierarchy of the organization and in all the areas.

Nevertheless both ISO 9000 and TQM have their own merits as well as limitations. As indicated above SMEs are the backbone of any country’s economy, the present study is an attempt to know about the quality engineering approach in the small and medium scale manufacturing companies.

In this research main focus is on the small & medium scale manufacturing companies as the aim is to find out various impacts of ISO and TQM on such companies. However it was also felt that the companies without ISO and TQM must also be working with a systematic approach and which must be helping them to survive in this competitive scenario, hence a few responses were taken from companies without ISO certification and TQM implementation.

5.2 OBJECTIVES OF THE STUDY

The broad objectives of the study are as under:

1. Study of motivating factors for the SMEs to go for ISO certification
2. Analysis of the impacts of ISO 9001 certification
3. Analysis of impacts of TQM
4. To identify the difficulties in following TQM principles
5. Study of companies without ISO certification and TQM on how do they manage quality

In addition to the above the study also aims at creating awareness about the concept of Quality circle, its benefits, elements of TQM and 5s standard of Housekeeping. With the questionnaire containing the content related to the probable benefits of ISO and TQM it also aims at motivating the companies which do not follow ISO or TQM principles to go for it in future.

5.3 HYPOTHESIS

5.3.1 Part A: (for ISO certified companies)
1. ISO 9001 helps in increasing turnover of the companies
2. ISO 9001 helps in increasing customer satisfaction and improvement in the quality of product
3. ISO 9001 helps improving employees morale and induces positive environment in the company
4. ISO 9001 helps in reduction in the rejection rate and cost of production
5. ISO 9001 improves overall working system and productivity
6. ISO 9001 increases documentation

5.3.2 Part B: (for TQM companies)
1. TQM improves overall working environment for employees
2. TQM helps increasing customer satisfaction
3. TQM improves product quality
4. TQM improves relationship with the suppliers and quality of incoming material
5.3.3 Part D: (for companies with no ISO/TQM)

1. Non certified companies lose order due to lack of certification

2. Non certified companies feel that ISO certification increases documentation burden

3. Non certified companies have systematic quality plan and procedure for every work.

Apart from testing the above hypothesis, statistical analysis carried out for finding out following aspects as well.

   a) Ranking of motivating factors for ISO certification

   b) Status of achievement of quality policy and its connection with the year of certification

   c) Relationship between perception and result (ISO)

   d) Ranking of benefits of ISO

   e) Ranking of key elements of TQM

   f) Ranking of benefits of TQM

   g) Ranking of difficulties implementing TQM

   h) Awareness about ISO/TQM for non certified companies

   i) Awareness about 5s standards

5.4 METHODOLOGY

5.4.1 Research design

Various sources like books, journals, websites and certifying agencies were looked into to find out exact numbers of companies certified with ISO 9001 in various geographical regions and various sectors. Unfortunately the exercise did not give any concrete result. It was all the more difficult to find out number of companies
following TQM principles as in this case no agency is in a position to give the details. However it was certainly observed that there was a paradigm shift towards quality aspect.

5.4.1.1 Universe

As far as the ISO 9001 companies were concerned the universe was considered as the total no. of certified companies in India. According to the latest survey of ISO it was found that as on 31s December, 2010, the no. of ISO 9001 certified companies in India is 33250 (Total no. of certified companies all over world is 1109905); India is on 8th rank in the entire world as far as the number of ISO 9001 certified companies are concerned. Regarding TQM followers the researcher was unable to find out the numbers. And regarding the non ISO and/or TQM it was not felt so important to find out the exact number, as it is not the main area of present research.

5.4.1.2 Sample size

The sample size targeted was around 140 including ISO certified, TQM followers and non ISO certified companies. It was thought that around 100 responses would be collected from ISO certified companies, 15 from TQM followers and 25 from non ISO and/or TQM would be collected. As compared to ISO certified companies target number of companies are quite less for TQM followers as it is a well known fact that very few SMEs are following TQM. In order to meet with the targeted numbers and in fact to exceed the target, around 385 questionnaires were sent to various companies. The response rate was 46.49% and 179 responses were collected in all.

5.4.1.3 Sampling Design

Looking in the vast geographical area of the country and wide spread of industrial sector, it was decided to carry out sampling based on convenience. However, proper care was taken to get the respondents from various areas of Gujarat and outside Gujarat (a few), with different sizes and types; and with different certifying agencies.
5.5 SOURCES OF DATA

Primary and Secondary data are collected for this research purpose.

5.5.1 Primary data

Primary data was collected with the help of questionnaire. As mentioned earlier around 385 companies were approached for availing responses. Out of which 179 responses were received. 9 questionnaires were discarded due to improper responses and incomplete information. Total 170 responses are taken in to consideration for this study.

5.5.2 Secondary data

Various published materials from Journals, Magazines, Reports, Books and Websites on quality management are used as secondary data sources. References are clearly cited wherever required in this thesis.

5.6 TOOL USED FOR DATA COLLECTION

In order to meet with the objectives of the study a detailed questionnaire was designed and then after discussion with a few entrepreneurs of the local area, it was modified. The questionnaire was divided in to five major sections. However the first part of the questionnaire was common for all types of companies where they were to provide some personal details about the company. This initial portion of the questionnaire aims at gathering basic details about the company; like name, address and year of establishment to have idea about the locality and age of the company. An attempt is also made to find out what type of legal establishment the firms have and the scale of operation of the firms. It also aims at finding out the number of employees and the type of industry the companies belong to.

Companies certified with ISO 9001 certificate were required to fill up Section A & C. Followers of TQM were to fill up Section B & C. Obviously the companies having both ISO & TQM were required to fill three sections A, B & C. With a view to get rough idea about how the companies without ISO & TQM are managing Quality in their firms Section D was designed, which was to be filled by companies neither having ISO certification nor following TQM principles.
5.6.1 Section A

First part of the Section A of questionnaire regarding ISO is focusing on what were the motivating factors for the companies to go for the certification. What was there perception about the impact of certification of the company? Basically 13 factors were prompted in the questionnaire and using five point Likert scale the respondents were to rate from least important to most important factor. In the beginning part of Section A the respondents were asked to give the name of the certifying agency and when did they get the certificate.

Next part of Section A aims at finding details about to what extent the company has started achieving objectives mentioned in the quality policy, also, to see the feelings of the company executives about the documentation burden and its extent.

As ISO certification is not free of charge, an attempt is made to find out whether the cost incurred for certification is justified or not.

A few questions are asked related to objective setting, maintenance system, performance evaluation of processes, customer complaint as a non conformity, vendor rating & the criteria for the same exercise, product identity & trace ability, calibration and inspection to find out further details about how systematically the companies are managing their show.

An attempt is made to find out the inclination of the certified companies towards TQM implementation in future.

The last part of Section A was aimed at finding out the benefits derived by the certified companies as a result of the ISO certification. Again the same 13 factors were prompted and the respondents were asked to rate the improvement they have experienced, using 5 point Likert scale.
5.6.2 Section B

Part A of this section is to find out since when the company started following TQM principles, and to find out the ranking of nine key elements of TQM like Quality chain, process management, continuous improvement, employee empowerment, team working & synergy, creativity & innovation, Benchmarking, Housekeeping and Kaizen based on the rating by the respondents using 5 point scale.

Part B of this section was aimed at finding out the practice followed in the TQM organizations on various fronts. 26 statements were prompted and the respondents were to rate the same based on the extent to which the practice is followed using 5 point scale.

Part C of the section was intended to find out the impacts of implementation of TQM program in the organizations. 9 probable benefits were prompted to get the response on 5 point scale.

Part D of this section indicates certain probable difficulties acting as a hurdle in implementing TQM principles. 10 probable difficulties were mentioned in the questionnaire and response was to be given about degree of agreement on five point scale.

5.6.3 Section C

This section was mainly aimed at finding out the prevalence of quality circle, no. of quality circles, the advantages of having quality circles in ISO and TQM firms. An attempt was made with the help of question about awareness of “5S “standard on housekeeping and its implementation and the level of success achieved.

In the last part of this section it was tried to find out how frequently these organizations are identifying the training requirements of the employees and the effectiveness of the training programmes arranged for them.
5.6.4 Section D

This section was for companies without ISO and TQM. It was felt to find out certain details as to how they are dealing with the issue of quality in their firms.

In the first part a question was asked to find out whether they have quality plan in their organization or not. It was also asked that who is undertaking inspection activity and whether the inspection is carried out stage wise or only on finished goods. To find out additional details it was also asked to respondents whether incoming inspection is carried out on raw material, bought out components and customer supplied products or not. Next question was aimed at finding out the complaint rate from customers’ side.

It was very important to know whether they are aware of ISO and TQM or not and then to find out why they have not yet implemented the same. Few questions were also asked to find out if they have lost any orders due to lack of certification, if they find that ISO can increase their volume of business and whether they feel that ISO increases documentation burden.

An attempt was also made to find out what way the firm is assuring quality of product to the customers by prompting a few measures for quality assurance.

In the next part of this section it was tried to find out how frequently these organizations are identifying the training requirements of the employees and the effectiveness of the training programmes arranged for them.

The respondents were also asked to rank the key criteria for selecting and evaluating suppliers for their purchases. Finally they were asked to mention about what kind of maintenance system they have in their firm i.e. Preventive or Corrective.

In order to facilitate the respondents and to encourage them to give correct and quick responses, the questionnaire was formatted with more than 95% closed ended questions, With some of the questions where they have to select either from Yes and No, and most of the questions with using Likert Scale with five options.
5.7 DATA COLLECTION

The sampling was completely done on convenience based. Friends, relatives, consultants, entrepreneurs and contacts in industries were used to get the responses from various firms. In number of cases personal visit was made to meet the company owner or the responsible person. Sending questionnaires through mail was a bad experience and a very poor response was availed with that. Instead in some limited cases questionnaire was sent through email and could get reasonable response. It is a well known fact that the industry people are heavily occupied with the routine activities and hence the survey work took lot of time. Out of 370 questionnaires, 170 responses came, which was more than the target and reasonable enough to derive conclusions and a good size of sample for statistical analysis. Nine responses were discarded due to lack of major information and improper responses.

Following is the statistics of the questionnaires received.

Table 5.1 Statistics of respondents

| No. of responses from ISO certified companies | 128 |
| No. of responses from ISO and TQM companies  | 19  |
| No. of responses from TQM companies without ISO | 01  |
| No. of responses from companies without ISO and/or TQM | 41  |
| Total No. of responses                        | 170 |

The major locations from where the responses were sought for are: Vitthal Udyognagar, Baroda, Ahmedabad, Jamnagar, Rajkot, Ankleshwar, Surat etc. Majority of them are from Gujarat, however some of the responses are from outside Gujarat also.

5.8 DATA ANALYSIS TECHNIQUES

The data gathered with the help of questionnaires converted into a suitable form in order to carry out suitable statistical analysis with the help of which conclusions can be derived. After carrying out proper coding of questions and sub questions data entry was done in Microsoft Excel worksheets. After the data entry, data cleaning was done by giving proper treatment to missing responses. The excel files than were
converted in to SPSS (statistical software) files for carrying out appropriate tests for analysis.

Various techniques for data analysis were used to get the outcome form the data obtained against different questions of the questionnaires and transferred to the computer. Based on the objectives of the study and characteristics of the research design decisions about statistical techniques were to be made.

5.8.1 Frequency distribution
For questions where one variable was to be considered at a time, frequency distribution was carried out in order to obtain a count of number of responses. These distributions can be easily used to create bar charts and pie charts. Other statistics like mean, mode, variance, and standard deviation were also used to find the central tendency and the variance of the data.

5.8.2 One sample ‘t’ test
For hypothesis testing, one sample ‘t’ test was carried out at a confidence level of 95%. With the help of which hypothesis can be accepted or rejected.

5.8.3 One way ANOVA
To carry out further analysis of data of different scales of industries, different types of industries and different no. of employees etc. one way ANOVA is used.

5.8.4 Interdependence techniques: (Factor Analysis)
To find the interdependent relationship between various benefits derived by ISO (13 statements), factor analysis was carried out. Factor analysis helped in data reduction and summarization in four factors. However, number of statements was only one in case of one factor out of four factors. Factors help in explaining the correlations amongst a set of variables.