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ENHANCING CUSTOMER SATISFACTION THROUGH QUALITY MANAGEMENT PRACTICES

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Abstract: *A large number of firms have embraced different quality management practices over the last few decades. The firms undertake quality initiatives in order to strengthen their competitive advantage by improving the plant performance and enhancing customer satisfaction leading to the growth of the firm. We study the relationship between quality management practices and customer satisfaction for manufacturing firms in this research. The study helps manufacturing organisation further improve the implementation of quality management in their plants. The study is done through a survey among 75 manufacturing firms in South India. Plant managers, quality managers and production engineers participated in the survey. Filled in questionnaires were received from 202 responses and is used for analysis. We carried out structural equation modelling to find out the relationship between various quality management practices and customer satisfaction of the firm. It is found out from the analysis that the quality management practices have a strong relation with quality performance and customer satisfaction.*

Keywords: *Quality performance, top management commitment, structural equation modelling, customer focus, employee involvement, process management*

1. INTRODUCTION

'Quality is meeting or exceeding customer expectations'

Quality of the products or services is one of the most important parameter which will determine whether a firm will achieve long term success or not. The importance of quality has been recognised by the firms long back and they are always looking for producing better quality products. It is established in several studies that in the long term, implementation of quality management practices lead to improvement in the performance of the firm. Organisations around the world, nowadays, follow rigorous quality practices which have been evolved over a number of years.

They also realise that as the tastes and preferences of the consumers are changing fast, it is important to be consumer focused and to come out with new

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products or services that excites the customers. This means that the firm must continuously improve. Firms attain this by bringing out changes in the processes and people. This has led to a stage where all the firms are embracing quality management practices. Quality management has become all pervasive management philosophy across almost all the sectors of business and has become a mature discipline with sound definitional and conceptual foundation (Sousa & Voss, 2002).

To ensure that the quality management programmes in an organisation is successful it is important for any firm to closely listen to customers and be customer focused. A good quality management program ensures that the organisation is customer focused. They need to increase the customer satisfaction levels and make the customers more loyal to their products; thereby increasing repeat purchase. This means that they should listen to the customers and offer the products that the customers seek. It is also important that they provide excellent customer service (Tackeuchi & Quelch, 1983).

This study is an attempt to study the relationship between quality management practices and customer satisfaction. A good customer focused quality management programme should result in better product quality, lesser customer complaints, and better customer satisfaction. First, we look at the evolution of quality management, then we review the literature to identify the factors of quality management and performance, then we develop our hypotheses and then the analysis, findings and discussions are provided.

1.1. Evolution of Quality Management in Manufacturing

The modern manufacturing management has its roots in two developments which happened in USA, the F.W. Taylor's Scientific Management and Henry Ford's Assembly line manufacturing system. Both these developments happened during the early 1900s. Both of them were aware of the importance of quality. During this phase of quality management, quality was ensured through massive inspection and so the focus was on correcting errors rather than preventing it. "Taylor asserted that his "one right way" guaranteed zero defects quality" (Drucker, 1990). "So was Henry Ford, who claimed that his assembly line built quality and productivity into the process" (Drucker, 1990). Frederick W. Taylor and friends, in the early 1900s, were not aware of statistical tools which can be applied to quality, but they used arithmetic mean and little more. Taylor also had an inspection system and production planning system which facilitated a good quality control (Flynn, 1998). "Inspection was given legitimacy by Frederick W. Taylor, who identified it as one of the functional tasks required for effective shop management" (Sliwa & Wilcox, 2008).

Ford's mass production system had to focus on quality as the parts had to be interchangeable and standardised. He attained this by having gifted mechanics

that were forced to experiment with ideas that made the parts absolutely interchangeable (Reeves & Bednar, 1994). Ford's production engineers also forced accuracy in fixtures and tools. Ford also had to use mass inspection at the end of the assembly line to ensure quality of the products (Drucker, 1990).

Later, "Walter Shewhart introduced the use of control charts in 1924 and published the first definitive book on statistical quality control in 1934" (Flynn, 1998). Shewhart is considered as the father of the modern quality movement and the tools used in modern day quality management has its roots in Shewhart's works (Sliwa & Wilcox, 2008). "The 1931 publication of Shewhart's *Economic Control of Quality of Manufactured Product* provided the foundation for many of the principles of quality that are used today" (Reeves & Bednar, 1994). Shewhart did his work for Bell Laboratories where he used SQC for zero defect mass production of telephone exchanges and sets (Drucker, 1990). Shewhart's contribution to modern day quality management is all the more important because the renowned quality gurus, Deming and Juran were members of the Shewhart's circle.

During the World War II, the US military provided training courses in the statistical method and used statistical sampling procedures. This developed a number of statistical quality specialists and the manufacturing industries started gradually adopting statistical quality control. But, in most companies, quality was a specialist's job and the top management did not really take interest in quality improvements. The focus was still on mass inspection (Evans & Lindsay, 2005).

The path breaking movement in quality management happened after the World War II. Deming and Juran were invited by Union of Japanese Scientists and Engineers (JUSE) to Japan. The Statistical quality control techniques developed by Shewhart was widely accepted in Japan and quality & productivity of Japanese manufacturing leapfrogged. Japan instituted the Deming award for quality in 1951. In 1956, Feigenbaum, talked about total quality control (TQC). "TQC called for "interfunctional teams" from marketing, engineering, purchasing and manufacturing. These teams would share responsibility for all phases of design and manufacturing ..." (Garvin, 1987).

Several Japanese engineers also contributed to the development of various management practices tools that help in improving quality. Dr. Kaoru Ishikawa talked about companywide quality control and built on Feigenbaum's idea of total quality control. Ishikawa is also known for using seven quality control tools and promoting problem solving through quality circles. These seven tools are check sheets, Pareto chart, histogram, stratification, scatter diagram, fish bone or Ishikawa diagram and control charts. Genichi Taguchi is another Japanese engineer who focused on reducing the variations in the processes. One of his main contributions was Quality Loss Function.

Although Deming, Juran, Feigenbaum and other experts advocated the use of statistical control tools, they "were trying to get managers to see beyond purely statistical control on quality" (Garvin, 1987).

The quality improvements made by Japanese firms started showing results by late 1970s and the beginning of 1980s. The Japanese automotive (e.g. Toyota) and electronic (e.g. Sony) products started competing in the US and European markets. These products were of much better quality than their US counterparts. Consumers in US started to expect and demand reliable products of much higher quality. The US firms and the Government started realising that they are at a huge disadvantage in terms of quality of the products and recognised how critical quality is to the nation's economic health. Quality of products and services became a source of competitive advantage and it became a strategic issue.

Malcolm Baldrige National Quality Award (MBNQA) was established in 1987 in USA. In 1989, European Foundation for Quality Management (EFQM) was established. Deming Prize, established in 1951 for Japanese companies, was opened for other countries also in 1984. Deming's book *Quality, Productivity and Competitive Position* was published in 1981 and its renamed edition, *Out of the Crisis* was published in 1986 in US. ISO 9000 quality management system was released in 1987. All these efforts boosted the quality movement in US and Europe. The movement also spread to other nations in Asia, Australia, South America and Africa during 1980s and 1990s.

2. LITERATURE REVIEW

Juran defines quality as 'fitness for use'. According to him, two dimensions are critical to the meaning of quality. They are 'product features that meet customer needs' and 'freedom from deficiencies'. "He separated quality into two components: quality of design and quality of conformance. Quality of design relates to grade (i.e., a Cadillac has more features than a Chevrolet, even though both serve the same purpose). Quality of conformance concerns how well the product conforms to design specifications. Thus, "Juran incorporated the notions of both excellence and conformance into his quality definition" (Reeves & Bednar, 1994). Deming also talks about the multidimensional nature for quality when he tries to answer the question, 'what is quality?' According to him, quality can only be defined in terms of the agent or it depends on the person who is the judge of quality. Quality is different for a plant manager and for a consumer. It also varies from one product to another. Deming says quality must be measured by the interaction between three participants; 1) the product itself, 2) the user and 3) instruction and training given to the user.

Garvin (1983) talks about five approaches to defining quality, namely, transcendent approach of philosophy, product based approach of economics, user

based approach of economics, marketing and operations management, manufacturing based and value based approach of operations management. Feigenbaum (1961) defines quality as "best for certain conditions' but later added that product quality can be defined as the "composite of product characteristics of engineering and manufacture that determine the degree to which the product in use will meet the expectations of the customer". Reeves and Bednar (1994) looked at the strengths and weaknesses of different definitions of quality and summarises that each of the definitions are relevant and useful and depends on the situation of usage. They conclude that "the search for a universal definition of quality and a statement of law like relationships has been unsuccessful". Quality also needs to be considered as other elusive constructs and the quality management issues need to be studied by including the various components of quality depending on the situation of the study. Several researchers took efforts to organise and operationalise the various quality management practices and studied how these factors lead to better performance.

Saraph *et al.*, (1989) made a systematic effort to organise the critical factors and to operationalise the measures of quality management. They proposed a set of eight critical factors of quality management. These factors are 1) role of management leadership and quality policy, 2) role of quality department, 3) training, 4) product/ service design, 5) supplier quality management, 6) process management, 7) quality data and reporting & 8) employee relations.

Flynn *et al.*, (1994) developed a measurement instrument for quality management research to be used at the plant level. The instrument used seven dimensions of top management support, quality information, process management, product design, workforce management, supplier involvement and customer involvement.

In 1995, Thomas C. Powell developed a scale comprising of 12 variables to assess TQM. The twelve TQM factors were 1) committed leadership, 2) adoption and communication of TQM, 3) closer customer relationships, 4) closer supplier relationships, 5) benchmarking, 6) increased training, 7) open organisation, 8) employee empowerment, 9) zero defects mentality, 10) flexible manufacturing, 11) process improvement, 12) measurement.

Anderson *et al.*, (1995) developed a model based n Deming's quality management method. The model used seven constructs which are 1) visionary leadership, 2) internal and external cooperation, 3) learning, 4) process management, 5) continuous improvement, 6) employee fulfilment and 7) customer satisfaction. Ahire *et al.*, (1996) developed and validated scales for measuring constructs of QM Strategies. The study used 12 constructs which are Top Management Commitment, Customer Focus, supplier quality management, design quality management, benchmarking, SPC usage, employee empowerment,

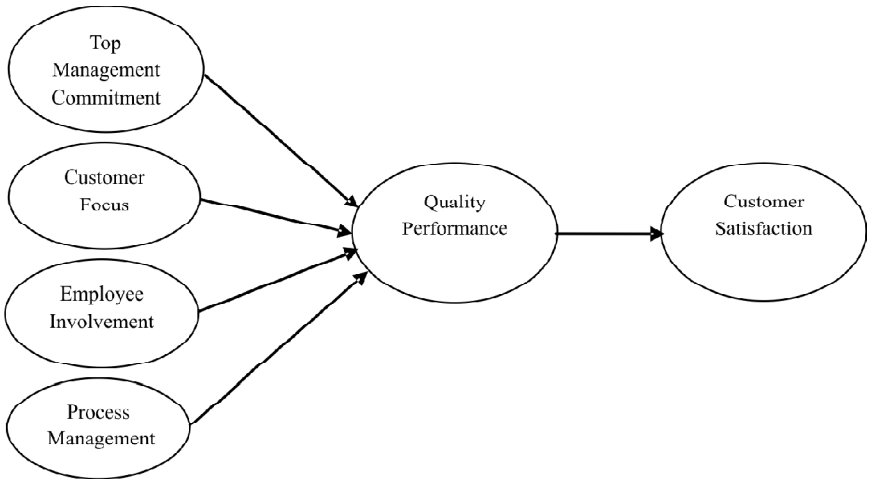
employee involvement, employee training, product quality and supplier performance.

3. CONCEPTUAL MODEL AND HYPOTHESES

3.1. Conceptual Framework

The proposed conceptual framework is as shown in the Figure1. The proposed model shows that quality management practices leads to better quality performance which will lead to better customer satisfaction. The quality management practices consist of four variables, namely, top management commitment, customer focus, employee involvement and process management. The items were taken from previous instruments of Saraph *et al.*, 1989, Flynn *et al.*, 1994, and Powell, 1995. The questionnaire used a five point scale. It is hypothesised that quality management practices in a firm will lead to better quality performance in terms of reduced defects and rejections, lesser warranty claims and reworks, lesser production stoppages, and better plant efficiency. This will lead to better service to the customers and improved customer satisfaction.

Figure 1: Conceptual framework showing relationship between quality management practices, quality performance and customer satisfaction



3.2. Hypotheses

3.2.1. Relationship between Quality Management Practices and Customer Satisfaction

The main research hypothesis of the study is that quality management practices will lead to better quality performance and this will lead to customer satisfaction.

Earlier studies have shown that there is a strong relationship between quality management practices and customer satisfaction and product quality (Choi & Eboch, 1998, Das *et al.*, 2006, Parasat *et al.*, 2007, Ugboro & Obeng, 2000, Agus, 2001).

H1: There is a significant relationship between quality performance and customer satisfaction.

3.2.2. Top Management Commitment

"Of all the ingredients for successfully achieving quality superiority, one stands out above all: active leadership by upper management." (Juran & Gryna, 1993). Top management support and commitment is one of the most important prerequisite for the successful implementation of a quality management program. "The importance of top management's leadership in creating and communicating a vision for continual improvement in order to enhance the viability of the organisation cannot be underestimated." (Anderson *et al.*, 1995). A successful quality performance requires the dedication of top management commitment towards that goal.

H2: Top management commitment has a positive structural loading on quality performance

3.2.3. Customer Focus

According to Juran, Quality means those features of products which meet customer needs and thereby provide customer satisfaction. Customer satisfaction is the degree to which an organisation's customers continually perceive that their needs are being met by the organisation's products and services (Anderson et.al., 1995). Understanding customer needs, meeting those needs are critical to the success of any firm. To improve customer satisfaction significantly, whole of the organisation should have customer focus by creating unity of purpose and removing barriers between departments and individuals (Deming, 1984, Terziovski, 2006). Quality performance is perceived to be highly associated with the firm's orientation towards customers.

H3: Customer focus has a positive structural loading on quality performance

3.2.4. Employee Involvement

After leadership, people are the most important component of total quality **(**Evans & Lindsay, 2006). It is essential that all employees in the organisation work together as a team to achieve quality and performance objectives. This requires participation from all the employees who are qualified, well trained and committed. Employee involvement in the various aspects of the processes and quality management will help in moving the decision making closer to the actual processes (Easton & Jarrel, 1998, Tari & Sabater, 2006).

H4: Employee involvement has a positive structural loading on quality performance

3.2.5. Process Management

"Process management involves planning and administering the activities necessary to achieve a high level of performance in key business processes, and identifying opportunities for improving quality and operational performance, and ultimately customer satisfaction"**(**Evans and Lindsay, 2006). Effective process management will help in reducing the variations in the process resulting in better quality performance (Flynn, 1995). This involve fool proofing, so that errors are reduced, proper scheduling which allows workers to plan their work properly as well as giving time for stoppages, presence of managers on the shop floor and proper maintenance of equipments.

H5: Process management has a positive structural loading on quality performance

4. RESEARCH DESIGN

The objective of the study is to find out the relationship between the quality performance and customer satisfaction. The study is conducted among 75 manufacturing industries in South India. The respondents include plant/production managers, quality managers and production engineers. The responses are taken from those managers who are related with the quality management practices and are hence, knowledgeable about the quality management practices of the company.

The survey instrument is developed based on the quality management practices used in the earlier literature. The survey instrument was refined with the help of views from experts. Professors who teach production management and TQM for post graduate courses and six plant managers were used as experts to review the questionnaire. This is done to ensure that language was not ambiguous and also to make sure that all the relevant aspects were incorporated in the instrument. There are 34 elements for the four independent variables and 8 elements for the dependent variable in the questionnaire.

The database of the South India Engineering Management Association was used for selecting the respondents. Three questionnaires each were send to 220 member companies addressing the quality manager requesting it to be filled in by the plant manager, quality manager and production engineers. This was followed up through telephone calls and personal visit to the companies. Questionnaires were received from 202 respondents from 75 companies, a response rate of 30.6%.

5. ANALYSIS

The study uses structural equation modelling to examine the relationship between quality management practices and customer related performance. In the study, a

confirmatory factor analysis is done to see if the variables were actually part of the construct as defined. The internal consistency of each of the items is tested using Cronbach's alpha. Some of the items were eliminated in order to maximise the alpha value. After eliminating some of the items, there were totally 31 items and were used for further analysis. The Cronbach's alpha values ranged from 0.823 to 0.912. The alpha values of the main variables are shown in Table 1. These values are above the suggested value of 0.70.

The SEM Correlations are shown in Table 2, and measures of the model fit are shown in Table 3.

Table 1
Table showing reliability coefficients of variables

Variables	*Items*	*Cronbach's α*
Top management Commitment (TMC)	8	0.823
Customer Focus (CF)	4	0.907
Employee Involvement (EI)	5	0.876
Process Management (PM)	7	0.854
Quality Performance (QP)	4	0.912
Customer Satisfaction (CS)	3	0.892

6. DISCUSSION OF RESULTS

Table 2
SEM Correlations Matrix

Variables	*TMC*	*CF*	*EI*	*PM*	*QP*	*CS*
TMC	-					
CF	0.524**	-				
EI	0.563**	0.589**	-			
PM	0.411**	0.387**	0.434**	-		
QP	0.323**	0.459**	0.472**	0.548**	-	
CS	0.576**	0.549**	0.326**	0.422**	0.526**	-

**p<0.001

Table 2 shows the correlation matrix and it is observed that all the correlations are significant at 0.001 significance level. Since none of the correlations are above 0.9, it can be stated that there exists no multicollinearity (Hair *et al.* 2006, Singh, 2007). The correlations also suggest that all the quality management practices constructs does contribute to each other and as found out in many previous studies, the practices needs to be implemented together. It can be said that the quality management practices has got an impact on the quality performance and on

customer satisfaction. This is in accordance to the existing literature that stronger quality management practices can lead to better business performance. (Saraph *et al.*, 1989; Flynn *et al.*, 1994; Ahire *et al.*, 1996; Powell, T., 1995).

Table 3
Measures of the model fit

Statistics	*Model value*
$\chi 2$/ dof ratio	2.15
Goodness-of-Fit Index (GFI)	0.939
Normed Fit Index (NFI)	0.916
Comparative Fit Index (CFI)	0.923
Tucker & Lewis (TLI)	0.943
RMSEA	0.067

Table 3 shows the goodness of fit measures and the measures suggest that the hypothesized model is having acceptable fit with data. ÷2 to degree of freedom ratio is 2.15 which shows a good fit. The Goodness-of-fit index (GFI) is 0.939 which is above 0.9 showing a good fit. Normed Fit Index (NFI) also shows a good fit with a value of 0.916. Comparative fit index (CFI) has a value of 0.923 showing the model is a good representation of the data. The TLI index value is 0.943, which is closer to 1.00 showing good fit. RMSEA value for the model is 0.067 which is below 0.1 showing that the model is acceptable.

Table 4
Structural Results

Relationships	*Path Coefficient*	*Error estimate*	*p value*
H2: Top management commitment→ Quality Performance	0.845	0.095	0.000
H3: Customer Focus → Quality Performance	0.445	0.116	0.000
H4: Employee Involvement → Quality Performance	0.652	0.065	0.000
H5: Process Management → Quality Performance	0.342	0.201	0.000
H1: Quality Performance → Customer Satisfaction	0.943	0.165	0.000

As shown in table 4., all hypothesised relationships are significant and the coefficients are positive. From the table we can see that top management commitment to quality performance is having large magnitude, whereas, customer focus to quality performance and process management to quality performance is moderate in magnitude. Quality performance to customer satisfaction is showing a strong relationship.

7. IMPLICATIONS AND CONCLUSION

The study aims to find out the relationship between quality management practices and quality performance and customer satisfaction. The study uses a structural equation model to study the relationship and finds out that there is a significant relationship between the variables. The model was framed based on the existing literature; data was collected from manufacturing firms in South India. The model tested six hypotheses and the model supported all the six hypotheses.

This suggests that manufacturing plants must implement quality management practices which will help them to increase the customer satisfaction which is one of the primary goal of any organisation. The practices include a strong commitment and leadership from the top management, involvement of the employees, focus on customers and process management. All these practices form an integral part of any quality initiative such as ISO 9000 or TQM programme. Hence, it is important that firms focus on these quality management practices so that they can improve the quality of their products and thus can enhance customer satisfaction.

The study has got certain limitations in the sense that the respondents were the managers of the manufacturing plants including the quality manager and the plant manager. How far the quality practices are implemented and understood by the workers is not understood from the study. Another limitation is that the quality performance data, such as reduced rework and defects are perceptual data and is not based on real data. Also, the customer satisfaction data is not taken from real customers, but measures the perception of the managers of the firm . Hence the results would have been more reliable if the data on quality performance and customer satisfaction were taken from real objective data. In order to generalise the results of the study, more study need to be undertaken in other parts of the country and in other countries.

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