

THE EFFECTIVENESS OF TOTAL QUALITY MANAGEMENT IN THE MANUFACTURING INDUSTRIES

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Abstract

The purpose of this paper is to determine the history and implications of the term “Total Quality Management”, to define its concepts, core principles and to test their prevalence and effectiveness in the manufacturing industry. This research paper consists of an in depth survey, which was distributed to the employees of manufacturing industries in Haryana. This survey aimed to collect the data which was predominantly qualitative in nature. It was built to inquire about the utilization of quality management systems within the participant’s companies. The core objectives includes to find out the direct effects of Total Quality Management, as well as to check the knowledge and usage of Total Quality Management principles in these industries. The collected data was then analysed using the content analysis. Results from the research showed that the core principles of Total Quality Management were widely implemented in manufacturing industries. It was also seen that, despite of this, many employees don’t have a clear idea of what Total Quality Management (TQM) is, and that the more successful industries tended to have more deep knowledge and usage of the TQM principles. These companies may get benefit by giving time to fully understand TQM concept and can use it to its fullest potential.

Keywords: Manufacturing industries, Total quality management.

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Introduction

Since the 1980s, when the total quality management (TQM) concept was firstly defined (Deming, 1986, Crosby, 1979, Juran, 1986), practitioners and researchers alike have broadly defended the positive effects of TQM practices on firms' overall effectiveness and performance. However, although TQM has been clearly conceptualized around basic principles such as consumer focus, continuous improvement and human resource management, there has been a lack of consensus regarding its primary constructs, which prevents comparison across studies and generalizations from the empirical evidence. The 90s mark the starting point of empirical research on critical factors in TQM, although different studies have yielded different sets of TQM factors (Saraph *et al.*, 1989; Flynn *et al.*, 1994; Powell, 1995; Ahire *et al.*, 1996; Black and Porter, 1996; Zhang *et al.*, 2000; Antony *et al.*, 2002). As a result, there is no single measurement instrument to evaluate TQM implementation. Furthermore, evidence concerning the impact of TQM on business performance is also based on a wide range of indicators that differ across studies and are in some cases contradictory, especially regarding financial performance, which is measured in terms of ROA –return on assets- or ROI –return on investment. Some research has found a positive effect of TQM on the latter (Easton and Jarrell, 1998; Hendricks and Singhal, 2001a,b); whereas other research reports a negative incidence of TQM on these measures (Chapman *et al.*, 1997).

Total Quality Management has many definitions. Gurus of the total quality management discipline like Deming, Juran, Crosby, Ishikawa and Feigenbaum defined the concept in different ways but still the essence and spirit remained the same. According to Deming, quality is a continuous quality improvement process towards predictable degree of uniformity and dependability. Deming also identified 14 principles of quality management to improve productivity and performance of the organization. Juran defined quality as “fitness for use.” According to him, every person in the organization must be involved in the effort to make products or services that are fit for use. Crosby defines quality as conformance to requirements. His focus has been on zero defects and doing it right the first time. Ishikawa also emphasized importance of total quality control to improve organizational performance. According to him quality does not only mean the quality of product, but also of after sales service, quality of management, the company itself and the human life. Feigenbaum defined total quality as a continuous work processes, starting with customer requirements and ending with customer's

satisfaction. Definitions of quality have changed with the passage of time with changing customer's needs and requirements. But the essence has more or less been to develop an approach to problem solving, conformation to standards for customer satisfaction. With management functions getting complex, approaches to managing quality in functional areas are becoming difficult. Organizations, which have successfully use TQM principles, have customer and quality embedded in their corporate strategy. Any organization is a system of interrelated units. For TQM to succeed, all of the components within the organization must be collectively involved. Initially, organizations implemented TQM in the hope that improvement in the shop-floor activities would solve all existing productivity and quality problems. Later, they have realized that TQM is much more than just shop-floor improvements. The definitions of quality incorporate factors like top management commitment, leadership, team work, training and development, rewards and recognition, involvement and empowerment of employees etc. These critical factors are the foundation for transformational orientation to create a sustainable improvement culture for competitive advantage on a continuous basis.

The Industrial development and strength of any country depends primarily on the proper application of quality management systems in all productive stages of industrial products. Many companies promote quality as the central customer value and consider it to be a critical success factor for achieving competitiveness. Because of huge competition, market globalization, and public demand, it has become necessary for managers, engineers, crews, and other employees to know not only the methods of controlling the quality of products but also to know how to improve quality continuously. Manufacturing industry in India has been grown significantly over the last decade due to response to increasing public demand, Government's initiatives, and the investors increased interest in manufacturing sector. Haryana's manufacturing industries also have an important role to play in the country's economy in terms of employment and contribution to gain a market position. Implementation of TQM is a management decision that requires many considerations such as company's operations, strategy, staff and customers. It has been shown that a commitment to TQM is essential for industry's top management to floor level employees to compete against competitors. There is a need for properly documented study and project survey on how TQM can be properly implemented in manufacturing companies in the KSA and to find out the level of awareness of these companies in conducting TQM. Understanding the tools and techniques of TQM is considered to be significant in order to get

useful results. A better understanding is required to investigate the current status of TQM implementation.

Many manufacturing firms implement Total Quality Management (TQM) with the aim of delivering high-quality products to their customers. Some of them become successful and some are not. The concept, TQM, was largely influenced by the experience of high-quality products from Japanese manufactures. TQM is the result of a long line of developments dating back to Frederick Taylor's efforts in the 1920s to evaluate and improve the quality of manufactured goods. The importance of total quality management lies in the fact that it has been used in order to iron out the shortcomings in a particular manufacturing process.

Relation of Total Quality Management and Manufacturing:

There is a high correlation between the concepts of total quality management and manufacturing as the system of total quality management is pretty important in the context of the manufacturing industry. It has been observed in the case of a lot of the manufacturing services industry that it is extremely important to provide quality assurance by way of employing statistical means. There is a certain way in which the concept of total quality management functions in case of the manufacturing industry. The process is usually initiated by trying out a random group of products of a particular manufacturing company. The samples are collected mainly for the purpose of checking them. It is seen if they would be able to measure up to the expectations of the consumers. In this case the various shortcomings of the particular samples are analysed. After this the production processes that need to be followed at the secondary level are created. The statistical distributions of the business measures that are crucial are determined. The main stress of the application of total quality management in case of the manufacturing services industry is to make sure that the production process runs smoothly. The emphasis is also on minimizing the amount of products that are of an inferior quality. It may be opined that total quality management process is extremely important in case of the manufacturing industry.

Literature review

The literature presents so many definitions and descriptions of TQM that sometimes it seems as if each author has its own definition and each organisation has its own implementation (Watson & Korukonda, 1995). However, no TQM discussion is complete without acknowledging the work of the five best known TQM experts, or 'quality gurus': Deming, Juran, Feigenbaum,

Crosby and Ishikawa. In a recent study, Reed, Lemark, and Mero (2000) systematically reviewed the work and ideas of these TQM experts – Deming (1982, 1986), Juran (1974, 1988, 1989, 1992), Crosby (1979, 1996), Feigenbaum (1951, 1983, 1991), and Ishikawa (1985) – and pointed out the shared similarities on TQM elements. This review revealed that they all agreed on the importance of the following six key elements: customer satisfaction, cost reduction, leadership and top management commitment, training and education, teamwork and organisational culture. In addition to the complete agreement reflected in the above six elements, Reed et al. (2000) also found commonly shared differences regarding the other TQM elements. The role statistical tools play in improving quality control was emphasised by everyone except Crosby (1996), who implied that the use of statistical control was not a core quality management issue. Similarly, while Feigenbaum, Ishikawa, and Juran stressed product design, Deming and Crosby did not. With the exception of Crosby, all mentioned planning, but each dealt with different aspects of it. Juran covered all facets of planning; Deming was concerned mostly with the stages of planned action, while Feigenbaum and Ishikawa focused on feedback and control.

Crosby (1979) stresses motivation and planning and does not dwell much on statistical process control and the problem-solving techniques of Deming and Juran. Like Deming, Crosby has his own fourteen points that he believes to be good quality practices for a company to adopt. He believes that quality is free because the small cost of prevention will always be lower than the cost of detection, correction and failure. Armand Feigenbaum also achieves visibility through his work with the Japanese. Unlike Deming and Juran, he used a total quality control (TQC) approach that may very well be the forerunner of today's TQM. He defined TQC as "an effective system for integrating the quality development, quality maintenance, and quality-improvement efforts of the various groups in an organization so as to enable production and service at the most economical levels which allow for full customer satisfaction" (Dale, 1994). Continuous improvement of all systems and processes in an organization is essential for TQM success. A continuous improvement system gears the organization toward attainment of the vision (Richardson, 1997). The improvement system must not only be continuously applied, but also consistently, throughout the organization. This requires a disciplined continuous improvement system based on trust, with everyone in the organization striving to improve the system (Crosby, 1979). Saylor (1992) suggested a continuous system cycle that involves 5 stages as showed in Figure 2.3. The cycle starts by defining the vision or mission of the organization. Top leadership

determines the vision, with input from everyone. Then everyone in the organization ascertains his specific mission to accomplish the overall vision. In doing so this, the focus and priorities of the vision are determined, established, understood and supported by all. Reward and recognition should be appropriate to the situation by being rank ordered- the higher the achievement, the higher the reward. It could be such things as a bonus, salary increase, and change in the title, promotion, theater tickets, or perhaps a pat on the back (Besterfield, 1995). Different authors have attempted to investigate the CSFs in TQM with differing purposes and objectives. Saraph et al's [1989] main objective was to develop an instrument to measure quality management practices at the divisional level of companies. The critical factors in their instrument measured the 'extent of practice' of the elements but have not considered the perceived 'level of importance' for implementation. Garvin (1983) conducted a specific empirical study to determine the differences in quality practices between Japanese and American air-conditioner manufacturers. Based on his study, he determines certain practices, which contributed towards quality excellence, undertaken by the Japanese manufacturers. They included management commitment for quality, quality programs, policies and systems, comprehensive product design, system for vendor selection and management and workforce management and an integrated system of quality management.

Badri et al (1995) replicated Saraph et al's study in one middle east country to prove the viability of the developed instrument in an international context. They revealed weakness in the instrument, in which there were elements that needed further clarification, one example was the effectiveness of a quality department in improving quality. Black and Porter (1996) developed their factors from the Malcolm Baldrige award criteria, on the basis that it is the best established and recognized framework for measuring TQM. Tamimi and Gershon (1995) developed an instrument to measure quality management practices from Deming's 14 points critical factors. Ahire et al (1996) proposed a set of 12 implementation constructs (similar to factors) of quality management strategies derived mainly from the literature. Their instrument was tested and validated for manufacturing industry thus making it applicable to the particular industry. Their main purpose was to develop a reliable and valid instrument for measuring quality management practices that are affected by proper quality practices but also customer and human resources satisfaction and above all organizational quality performance. Porter and Parker (1993) have similarly argued that quality results are a measure of TQM success and customer

satisfaction is an implicit goal of the TQM process. Both of them are actually outcomes of TQM, but not critical factors. Using award criteria as success factors without proper scrutinizing them can be misleading. Critical factors should be interpreted as those circumstances or practices which already exist, or those that need to be developed in ensuring the success of TQM implementation. Research on TQM has consistently found strong link between successful TQM implementation and leadership (Ehrenberg & Stupak 1994; Rao, Raghunathan & Solis 1997; Zairi 2002). In general they have argued that top management's ability to create a vision and promote change is at the heart of successful implementation of TQM. Emphasising the need of cultural change during TQM implementation, it has been argued that TQM calls for a new way of managing business, requiring a new thinking style- the thinking for quality (Yusof & Aspinwall 2000). According to them this is the basic reason for the success of TQM in Japan. Culture has been found to be an important factor in empirically validated studies which aimed at arriving at 'critical success factors (CSF)' for successful implementation of TQM (Black & Porter 1996). It has also been corroborated by another empirical study of CSF for TQM in the Indian context (Wali, Deshmukh & Gupta 2003).

Objectives of study

1. To determine the prevalence and effectiveness of using Total Quality Management principles within the manufacturing industries in Haryana.
2. To find out the kind of TQM system used and the benefits of TQM implementation in manufacturing industries.

Research methodology

The type of data collected was predominantly qualitative in nature. The sample population consisted of employees of manufacturing industries. Descriptive data was collected through the use of survey i.e. questionnaire. Historical research was accumulated through case studies and background research on the selected industries. ISO, the quality management systems and principles implemented in their companies, and the employees' suggestions for change and improvement within those systems were recorded. The analysis of the data collected was performed through content analysis. The practice of the different core TQM principles was inserted into a chart to determine which principles are used most frequently.

Analysing TQM in the Manufacturing Industry

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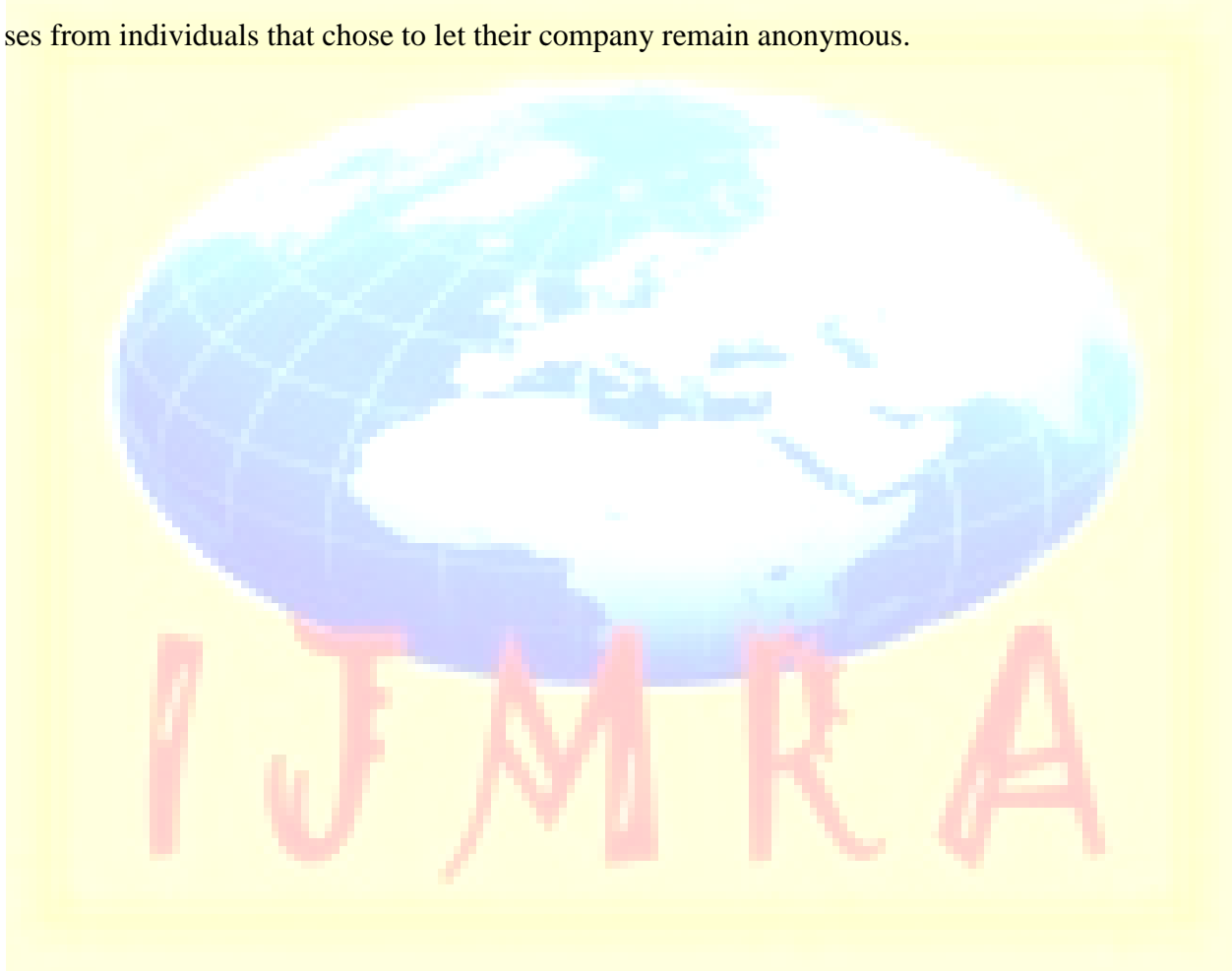
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In this study, extensive survey/interview questionnaire was developed and distributed to 107 employees belonging to various manufacturing industries of Haryana. There were two main categories of questions: the first set was demographic in nature, while the remaining questions inquired for subjective and descriptive information/opinions on Quality Management System.

Demographics

The survey yielded 89 responses; 71 completed responses as well as 18 partially completed responses. They represented 11 different companies throughout the Haryana. There were also 9 responses from individuals that chose to let their company remain anonymous.



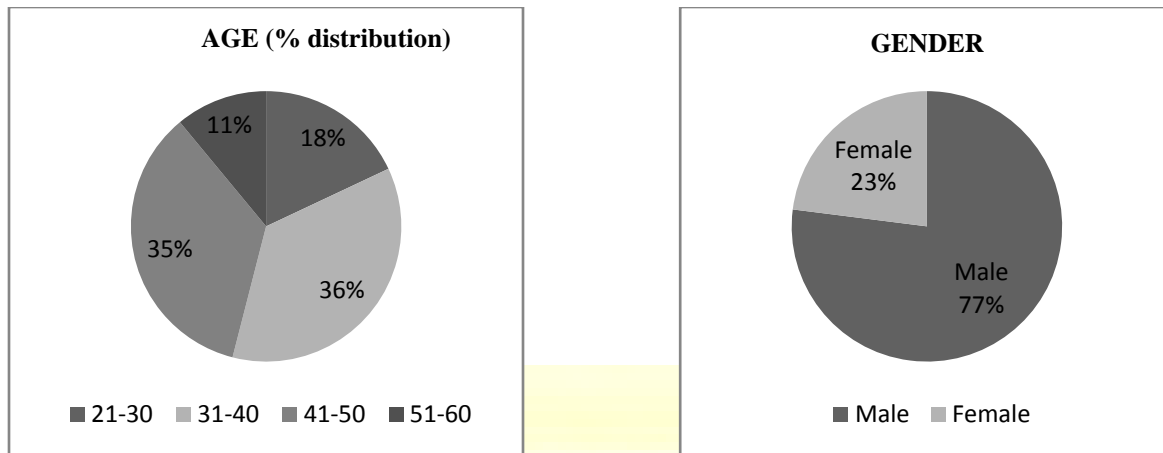
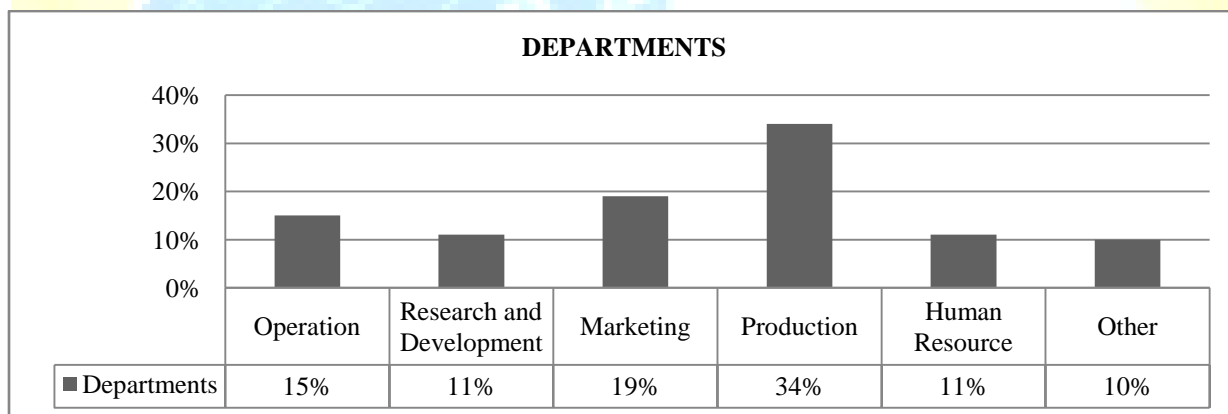


Figure (1)

Figure (2)

Out of all the respondents, the majority i.e. 36% were ages 41-50, and 77% were male. In addition maximum employees belongs to production department i.e. 34%.



Figure(3)

Quality Management Systems

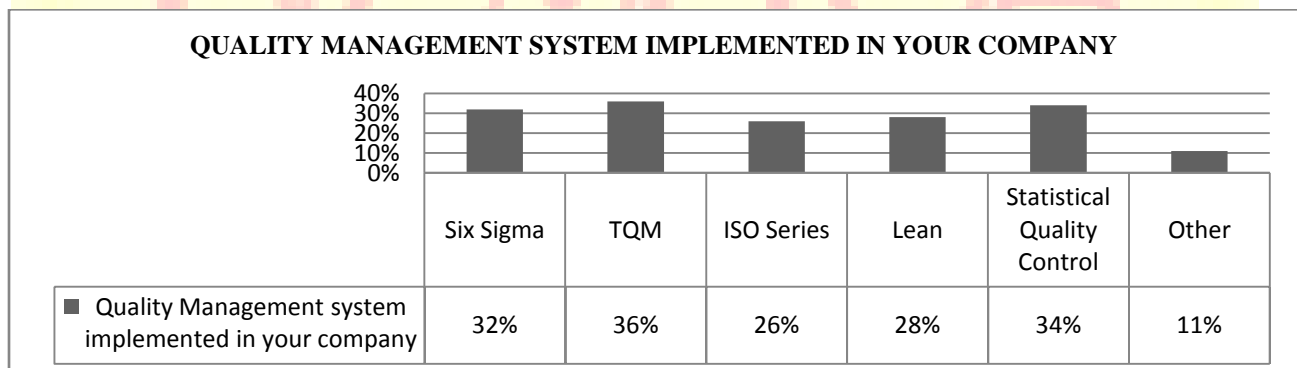


Figure (4)

When asked if their company has a Quality Management System, 78% said they do, and 75% we re currently using the designated QMS. Many companies had implemented more than one QMS i

n the past; 28% had implemented LEAN, 32% had implemented Six Sigma, 26% had implemented the ISO series, 34% had implemented the Statistical Quality Control and 36% had implemented Total Quality Management.

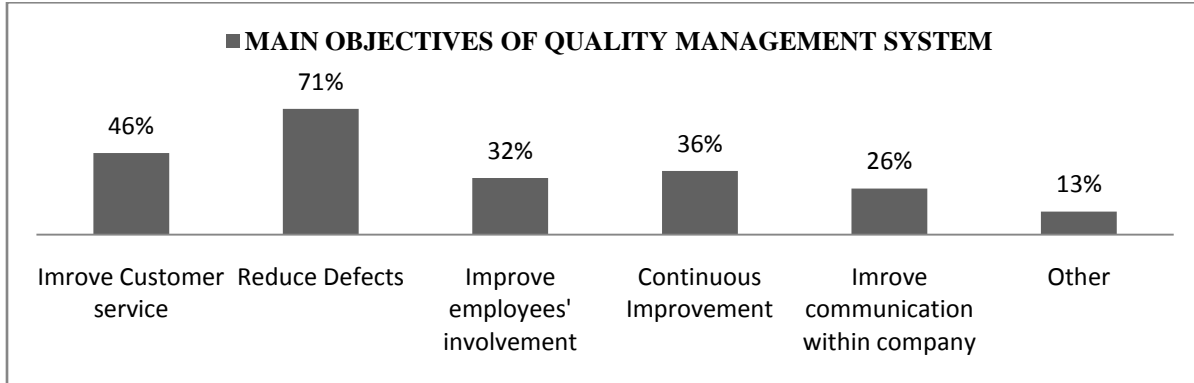


Figure (5)

The main objectives for their current Quality Management System were each very highly selected, but Continuous Improvement was the most occurring answer with 96.2%. The essay portions of the survey are less quantifiable and needed to be analysed based on content. When asked in what ways the company's Quality Management System was effective, variety of answers resulted, but there were also widespread commonalities. The highest occurring topic within the answers dealt with reducing the defects i.e. 45.5%. The second highest occurring topic was improving the customer service, with 32% of respondents including this in their response. Continuous improvement was the third most listed improvement in 36% of answers.

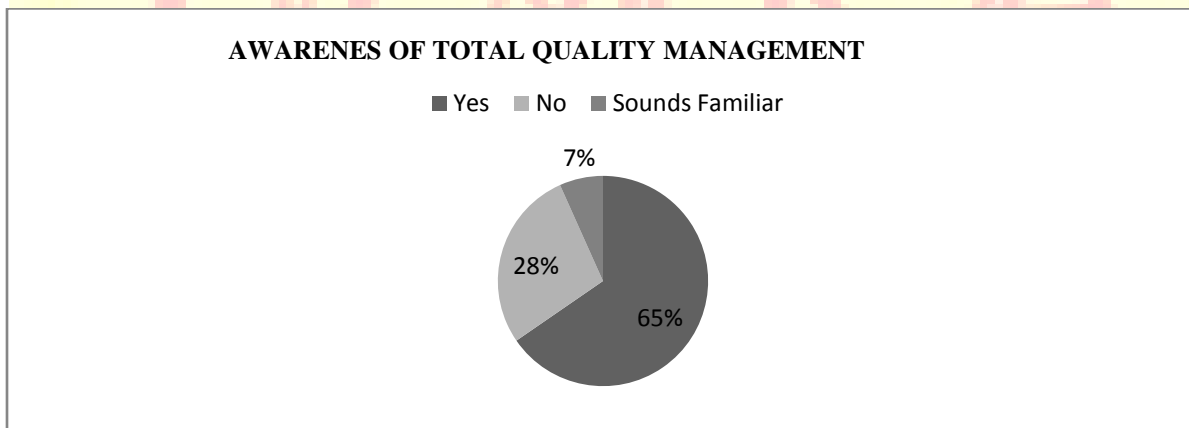


Figure (6)

IMPLEMENTING TQM SYSTEM WOULD BE BENEFICIAL FOR COMPANY

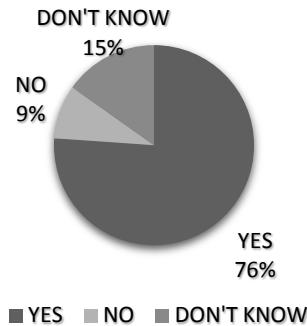


Figure (7)

According to Figures 6 and 7, 65% employees are aware about total quality management and out of that 76% employees think that implementing Total Quality Management System would be beneficial for their company.

In your opinion, in what ways is this Quality Management System effective?	
Increased production efficiency	43%
Improved data control	7%
Waste reduction	24%
Overall quality improvement	17%
Reduced defects	31%
Better consistency	3.7%
Improved safety	14%
Cost reduction	31%
Employee involvement	17%
Improved customer service	23%

Table (1)

In your opinion, in what ways is this Quality Management System defective?	
Cost reduction	7%
Not integrated in core business	3%
Lack of ISO document control	6%
Can't focus on details	2%
Hard to manage people; lack of interest	37%
Out of date	21%
Too hard; not enough time	11%

Moving too fast	3%
Corrective instead of preventative	1%
Need root cause analysis	3%

Table (2)

How would you describe Total Quality Management?	
Meeting customer needs	36%
Focus on increased profits	26%
Complete integration of processes	11%
Continuous improvement	19%
Employee involvement	16%
Plan, Do, Check, Act cycle	3%

Table (3)

As per the above tables, 43% employees believe that Total Quality Management system helps in increasing production efficiency, 31% believes that it reduces defect, 24% believes it helps in waste reduction, 23% & 17% employees think that total quality management system helps in improving customer service and employee's involvement respectively. According to employees' there are some defects also in their quality management system. According to 37% employees, it is hard to manage the people due to lack of interest, 21% employees thinks that their quality management system is out of date. In the same way, some employees have issues about cost reduction and lack of ISO documents control, etc. 36% of the employees consider Total Quality Management as a system to meet customer needs, 19% considered it as a continuous improvement system, 26% thinks that it focus upon meeting customer needs and 16% believes that Total Quality Management is a system for increasing employees' involvement.

Conclusion

The purpose of this research was to determine the prevalence and effectiveness of the core principles of Total Quality Management systems within the manufacturing industry. The main objectives were to determine if TQM principles are currently being used in the manufacturing industry, which ones are primarily being implemented, and to determine if the implementation of TQM principles were or were not proving beneficial to companies, and the reason for this. From the research, data collection, and data analysis, it can be seen that the core principles of Total Quality Management are almost always emphasized, in some way, within manufacturing companies. The companies surveyed understood that Customer Focus, Employee Involvement

and Continuous Improvement are indispensable concepts to be implemented in a quality improvement process. An interesting observation taken from this research is the clear fact that the vast majority of employees of manufacturing companies has heard of Total Quality Management – but often do not actually have a clear understanding of what Total Quality Management is. While the concepts of Total Quality Management, Lean, and Six Sigma can often overlap, many respondents confused the statistical process control and cost reduction aspects of Lean and Six Sigma with the core principles of TQM. Similarly, many manufacturing companies do not seem to realize whether or not they are actually using Total Quality Management in their company. Many companies that clearly emphasized the core principles of TQM did not see themselves as using TQM, while other companies that showed less emphasis of the core principles did regard themselves as using the process. Initially, organizations implemented TQM in the hope that improvement in the shop-floor activities would solve all existing productivity and quality problems. Later, they have realized that TQM is much more than just shop-floor improvements.

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