

# Predicting Futuristic Quality Movements in Indian Manufacturing – A Literature Review

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**Abstract:** Since the mid 1980's Total Quality Management (TQM) is considered as the universal solution for a range of organization problems including organizational performance. Today, successful companies understand that quality provides a competitive advantage. Indian Industries have been adopted concepts like BPR, TQM, 6-SIGMA, QFD, Kaizan, JIT, Robust Design, ISO Certification, benchmarking, and so on, these practices have been inculcated by the Indian Industries from late eighties. In present scenario companies have to think about the new philosophy of quality practices where these technologies has to be synchronized with IT and make these philosophies more efficient to get the better efficiency at optimized cost. The main aim of the research is to predict futuristic quality movements in Indian Manufacturing sector on the basis of existing quality systems and on the basis of future expectations. A detailed review of related literature was carried out prior to the full study. This article presents some of the latest research reviewed along with the research gaps.

**Index Terms - Literature Review. Total Quality Management, Quality Systems.**

## I. INTRODUCTION

From the days of inspection to quality control to quality assurance to TQM, quality has evolved a long way in manufacturing organizations. Countries like Japan and the US are well-known for their contributions to the quality movement. Literature on the topic is widely available. Due to the huge amount of literature available on the subject it was a difficult task to select the appropriate literature for review. But once the objectives for the literature review were framed, a scheme emerged that made the task a bit easier. The objectives and guidance gave some focus to the review. The literature review was carried with the following objectives –

- To briefly review literature pertaining to evolution of movements prior to TQM like QC, ISO etc.,
- To thoroughly review literature related to TQM,
- To review literature pertaining to related topics like support of top management for quality movements, importance of human element etc.

## II. LITERATURE REVIEW

Quality Assurance (QA) embraces all the functions and activities needed to provide adequate confidence in a service or product for satisfying the given requirements for quality (Chan and Fan, 1999). It is largely a preventive function. Quality assurance is based on the philosophy that prevention is better than cure and it is always beneficial to get things right in the first place (Tang et al., 2005). All should aim at doing things right the first time and every time, thus leading to zero defect in performance (Low and Teo, 2004). To implement quality assurance, systematic and proper procedures are drawn up and followed by all concerned.

The ISO 9000 series of the IOS is a quality standard for the purposes of quality assurance (ISO, 1994). One of the latest published versions of the ISO 9000 family standard was issued in the year 2000. This version is more of a generic process-based structure. Lau (2001) recognized notable changes in the factors of 'customer satisfaction' and 'continual improvement'. It also tries to assemble a limited number of TQM elements (Tang et al., 2005), but is still largely a quality assurance model standard.

Survey carried in Australian ISO 9000 certified small and medium enterprises (SME's) found that ISO 9000 certification should be executed as a means for internal reasons such as improve efficiency, improve customer service, etc. rather than for external factors, to perceive more benefits (Van Der Wiele, and Brown, 1997).

Another study in Greek ISO 9000 certified organizations found that the ISO implementation is largely for internal reasons such as quality improvement and less in response to customer pressure and demand. Further, standards contributed higher to organizations implementing ISO 9000 for performance and quality improvement of their operations (Gotzamani, and Tsiotras, 2002).

The choice of quality management system (QMS) organizations should adopt is essentially driven by the objectives of the organization and is also influenced by the existing structure of the organization. The system for QMS Implementation should be customized to the specific requirements of the organization because there is no QMS model that provides a solution that takes care of every organization (Maguad, 2006). Models for quality management are also created on the basis of a suggested guideline of how organization can work towards quality (Maguad, 2006; Dale et al., 2007). Implementation models for a QMS usually prescribe a step-by-step approach, with incremental changes to smoothen the transition from 'old' quality management system to the 'new' quality management system (Dale et al., 2007).

Many of the cases QMS are getting procured and used in order to attain a certain quality certifications like, ISO 9001. Striving for a QMS certification is a good approach to work towards the increasing in Quality of Products and Services in an Organization. However, as (Hoyle, 1994) said about the value of ISO 9000 Certifications: “ISO 9000 certification is the beginning only; it provides a mechanism with which to bring about systematic improvement but it does not improve performance itself.”

While studying (Beckford 1998) the factors inhibiting the implementation of QMS, found that the procedures and systems; the design of the organization; the organizational culture; the employee and managerial recognition of the importance of quality and attitudes towards it; and the costs of poor quality resulting from not maintaining a certain quality level; are the important factors.

A study was conducted for analyzing the effectiveness of QMS in the Canadian contexts, wherein data from thirty-two different respondents from the Canadian Organizations was researched (Bhatia & Awasthi, 2014). The results of the research clearly indicated that organizations often implemented QMS as a catalyst for change and organizations used QMS in daily practice. The major reasons for implementation of QMS are found to be the mix of both external and internal reasons.

Force Field Analysis (D Sandström, M Svanberg, 2011) posited factors for change and factors against change as depicted in the Fig. 1. They have also recognized that the quality department, goals and policies could not be identified as either force against or for the change towards QMS, and needs to be accounted independently.

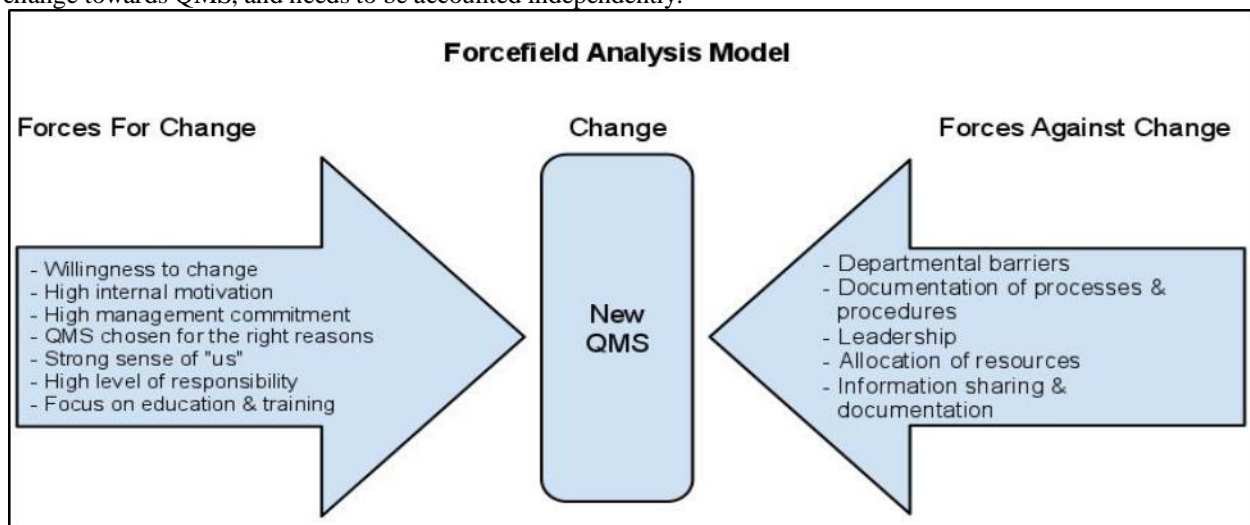


Fig 1: Force Field Analysis (D Sandström, M Svanberg, 2011)

Positive associations were found between supplier management practices and operational performance measures. The research found positive relationship between supplier assessment and quality performance. Further, strategic long-term relationship and logistics integration were found to be positively associated with flexibility, delivery and cost performance (Prajogo, et. al., 2012).

Based on the above studies we can say that the QMS Implementation certainly brings a positive improvement in the functioning of the enterprises. It is also clear that the family of ISO 9000 Standards has become a preferred tool for implementing QMS. However, it needs to be seen as to what are the findings of the QMS in the Indian context. It was discovered that implementation of TQM Practices and ISO 9000 Standards together, rather than separately, as done in many research studies. It came to light that internal motivation to implement ISO 9000 standards resulted in higher performance, whereas external motivation did not. Also, implementation of TQM resulted in both improved external and internal results (Martínez, et. al., 2008). Another research found that Quality Management methods have positive impact on product quality (Zhang, Z., 2000).

Organizations with TQM are focused on the systematic management of data in all practices and processes to eliminate waste, and strive for continuous improvement (Capezio and Morehouse, 1993). In TQM, the responsibility for quality is assigned to both individuals and teams via some evaluatory and developmental processes. This represents an approach to Quality Assurance (QA) more congruent with the ethos and structures of educational organizations than many of the more mechanistic and hierarchical processes (McCulloch, 1993).

TQM includes the following concepts:

**Total:** It connotes integration or participation of all the employees who take part together in the processes of production of a product or service (Sisman and Turan, 2002). The ‘total’ of TQM underlines the continuous development enterprise that encompasses everybody and everything in an organization (Aksu, 2002; Sallis, 2002).

**Quality:** In the context of TQM ‘quality’ can be defined as “meeting the wishes and expectations of customers in an ideal economical level and in a most suitable manner”

(Simsek, 2001) or as “a dynamic state that is meeting or exceeding customer’s needs, requirements, desires and expectations (Croker et al., 1996; Goetsch and Davis, 1997). In TQM, the quality improvement process starts and ends with the customers (Senge, 1990).

Management: As a broader concept, 'management' includes the other two components. It may not be possible to get the desired quality without good leadership and management (Sisman and Turan, 2002). As in the total concept, the concept of management in TQM includes all, because everybody is the manager of her or his responsibilities, whatever the roles, positions and status in the organization (Sallis, 2002). In TQM, the job of management is not just supervision, but leadership. Rather than concentrating on outcome (work standards, management by numbers, zero defects, meet specifications, appraisal of performance), leadership should be put in place (Deming, 1986).

Feigenbaum initiated the concept of Total Quality Control (TQC) in 1956. His seminal paper on TQC was first published in 1957 and was then followed by his book titled TQC: Engineering and Management in 1961. Feigenbaum emphasized three critical areas for quality: quality control participation by all employees, quality control participation by all divisions of the enterprise, and the integration of quality control. Reed et al. (2000) provided a great account of the theoretical under-pinning of TQM. TQM is an important strategy for maintaining competitive advantage and is a way of managing enterprises to improve their overall effectiveness and performance towards achieving world-class status (Zhang, 2000; Chapman and Al-Khawaldeh, 2002). Various studies have been carried out for the recognition of the factors of successful quality management, from three different perspectives: formal evaluation models, contributions from quality leaders, and empirical research. Further, researchers have identified a number of techniques and tools for quality improvement that are necessary for TQM success. Deming (1982, 1986) emphasized the use of statistical techniques for quality control, and proposed his fourteen principles to improve quality in organizations, based on the ideas like an improvement philosophy, leadership, training for managers and employees, internal communication aimed at the elimination of obstacles for cooperation, the right production from the beginning and the suppression of quantitative objectives. Juran (1986) pointed out the importance of both managerial and technical aspects, and identified 3 basic functions of the quality management process: planning, organization & control, as the stages for quality improvement. According to some authors, TQM is rather more than a mere set of elements, a well-knit network of interdependent components, a management system consisting of critical factors, tools and techniques (Hellsten and Klefsjo, 2000).

One area that has received focus in studies is the influence of TQM practices on performance (Hendricks and Singhal, 2001; Kaynak, 2003), which is attained through changes brought about in areas such as leadership, process management, human resource management, information management and supply chain management (Shieh and Wu, 2002). One of the studies has considered the influence of TQM on project performance, though this study, by Shieh and Wu (2002), was restricted to evaluating the impacts on the processes in the architectural planning stage of construction tasks, instead of on achievement of the end objectives across a variety of projects. There is a need for further systematic investigation into the relationship between TQM and project performance to ascertain if the introduction of a TQM approach results in changes in actual project management practices relating to performance management.

The TQM literature concurs that its practices and concepts have been shaped by a number of icons who are recognized as 'quality gurus', such as Deming, Crosby, Juran, Ishikawa, Feigenbaum, and Imai (Hackman and Wageman, 1995; Plenert, 1996; Lau and Anderson, 1998). These TQM experts developed their concepts largely based on their experience in industry. Grant et al. (1994) have argued that the prescriptive approach developed by these experts has created a perception that TQM involves no explicit theory, and led business schools to dismiss TQM as intellectually inadequate and to consider it as but one of a number of kind of management fads.

The impact of TQM on organizational performance has been investigated by many researchers (Flynn et al., 1994; Samson and Terziovski, 1999). These studies typically conclude that TQM has significant and a positive relationship with organizational performance. However, not all TQM implementation leads to satisfactory results promoted by its advocates (Brown, 1993; Harari, 1993). There have been numerous researches and studies in literature reporting on the problematic factors relating to the implementation process and how they affect its outcomes. Among the several factors, which have been attributed as key determinants of its success, organizational culture is often among those listed at the top.

At the advent of industrialization, quality was synonymous with inspection. From that point forward, with every stride made in the technological development, product quality has equally experienced an evolutionary growth. Inspection of product composition or dimensions and observed variance from design parameters has been applied to define product quality. Traversing through decades, quality has reached a zenith known as TQM, a term coined for the contemporary quality movement set across the industrial world. TQM is a theory, practice and a philosophy, and many practitioners and theorists are contributing toward its growth. However, TQM is still considered to be in its early stage of development (Dale et al., 2001). The quality paradigms are changing rapidly from developed to developing countries and from east to west (Dahalgaard et al., 1998). Differences in technological, economic, cultural and social achievements underlie these variations. However, the measure of advances attained in the area of TQM has universal acceptability determined by the performance levels of identified critical factors (Badri and Davis, 1995; Motwani, 2001). McAdam and Henderson (2004) provided a detailed analysis, along with external and internal driving factors, of the perceived future of TQM. Wankhade and Dabade (2005) have detailed out the mechanism of quality uncertainty due to information asymmetry. The concept has been made clearer by considering the ideal market with non-information or with complete information of quality product.

Sustained efforts from product development to manufacturing of the product are essential for better quality of the product or service. Within the context of successful TQM implementation, there is an increasing recognition of the importance of human factors in quality management (Fok et al., 2000; Montes et al., 2003; Brah et al., 2002). Many of the core elements of TQM involve people, such as participative management teamwork, creativity, customer feedback, effective communication, employee empowerment and involvement, management and employee trust and support (Guimaraes, 1994). For an organization to realize the benefits of TQM, the consideration of human factors is critical for the successful implementation of TQM. Human factors previously identified in the TQM literature include management (leadership) style, departmental interaction, type of employees, employee's attitude toward change, management commitment, authority to empower employees, rewards/recognition for innovation and citizenship behaviors



(Mann and Kehoe, 1995; Montes et al., 2003). If the core values in Business Excellence Models (BEM) are taken as replicas of TQM values, then a considerable number of values such as 'systems perspective', 'valuing employees and partners', 'focus on results and creating value' and 'social responsibility' could also be added (EFQM, 2003). The term methodology is often used to describe activities that are performed in a certain sequence. Some methodologies applied to TQM include self-assessment, business process management, benchmarking, and Six-Sigma (SS). An important methodology within TQM is the self-assessment process on the basis of criteria in BEM. The European Foundation for Quality Management (EFQM) Excellence Model, the American Malcolm Baldrige National Quality Award (MBNQA) and the SIQ Model for Performance Excellence specify criteria based on TQM core values (EFQM, 2003; MBNQA, 2004; SIQ, 2003). Applying these criteria effectively is proven to improve economic performance (Hendricks and Singhal, 1999; Wrolstad and Krueger, 2001; Hansson and Eriksson, 2002).

TQM thus focuses not just only on the quality of product, but also on the quality of employees. Indeed, most successful TQM implementations depend largely on changes in employees' activities and attitudes. Practice is meant to represent something that is repeated regularly to improve one's skill, or doing something that is habitual, common, or as expected (Akpan, 2002). Thus, the employee's motivation for change is quite important for change to TQM to be practicable.

Juran and Gruna (1993) opined that without the human mind, tools alone would not help TQM to work. In fact, the human factor often makes change difficult and at times, outright impossible too (Esho, 1999). Hence, an investigation into factors that could influence employees' response to TQM and its practice is inevitable.

It has been found that TQM was adopted in Japan because it was generally believed that quality was a strategic and an effective weapon for improving productivity (Tari and Molina, 2002; Hasan and Kerr, 2003). While it was also agreed that TQM was an effective process for improving organizational functioning, Packard (1995) argues that its value can only be assured through a comprehensive and well through-out implementation process. Thus, of late researchers have been investigating as to how TQM implementation can be enhanced.

In fact, attempts have been made by researchers at determining what factors could foster or obstruct TQM practice in organizations. Researchers like Amar and Zain (2002) and Baidoun and Zairi (2003) have posited that without attention to contextual factors, well-intended organizational changes may not be adequately implemented. Anantharaman (2003) reasoned that the duration involved in TQM implementation might be an important factor in determining its efficacy. However in a study conducted subsequently, it was found that duration does not affect the effectiveness of quality management programs. Chang and Sinclair (2003) observe change in organizational culture, like reward systems and management styles, as relevant.

### III. FINDINGS AND RESEARCH GAP

Based on collective consideration of the research material, the following could be deduced –

- a) Huge amount of research has gone into the evolution of the quality movement. Writers in particular have shown great interest in TQM.
- b) While movements like the QA or ISO were largely confined to the production function, TQM is a much broader in its scope and encompasses elements like organizational culture, leadership, employee involvement etc.
- c) Literature generally vouches for the success of TQM in producing business results even though it has not been approved as a 100% success guarantee tool.
- d) Support of top management, employee involvement etc., are some critical factors for the success of a quality initiative like TQM.
- e) For want of adequate theoretical material, in some cases TQM has even been criticized as a management fad.
- f) Researchers however have been fascinated by the concept of TQM in so much so that they have studied factors that are enablers for successful implementation of TQM and also those are the barriers.

### IV. RESEARCH GAP

Most of the studies pertain to the west. Very little research evidence is found of the evolution of the quality movement in the Indian context. Even though we find a number of organizations adopting quality systems like the ISO 9000 and TQM very few systematic studies are on record about their successes or failures. Not much research is on record investigating the development of quality systems in the Indian manufacturing sector.

Also not much of literature is seen on predicting future quality movements. Researchers as of now are still quite engrossed with TQM. But is there anything beyond TQM, has not been explored much002E

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