

# Quality tools and techniques: Are they necessary for quality management?

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## Abstract

Total quality management (TQM) has been developed around a number of critical factors. However, TQM is much more than a number of critical factors; it also includes other components, such as tools and techniques for quality improvement. In this paper, we carry out an empirical study in order to verify the importance of these tools and techniques for TQM improvement and their effect upon TQM results. For this purpose, we use the answers provided by the person in charge of quality in 106 ISO-certified firms in Spain.

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## 1. Introduction

The importance of total quality management (TQM) has considerably increased over the last years, on both a practical and theoretical level. TQM has been developed around a number of critical factors which vary from one author to another, although the core factors are leadership, quality planning, human resources management (training, work teams, employee involvement, etc.), process management, cooperation with customers and suppliers, and continuous improvement. According to the literature, the elements of TQM may be grouped into two dimensions: the management system (leadership, planning, human resources, etc.) and the technical system (TQM tools and techniques) (Evans and Lindsay, 1999);

or into the ‘soft’ and ‘hard’ parts (Wilkinson et al., 1998).

Thus, TQM is much more than a number of critical factors; it also includes other components, such as tools and techniques for quality improvement (Hellsten and Klefsjö, 2000). In fact, techniques and tools are vital to support and develop the quality improvement process (Bunney and Dale, 1997; Stephens, 1997).

The critical factors of TQM are the elements that may lead to satisfactory performance, as has been proved by other studies (Saraph et al., 1989; Badri et al., 1995; Powell, 1995; Ahire et al., 1996; Adam et al., 1997; Hendricks and Singhal, 1997; Grandzol and Gershon, 1998; Quazi et al., 1998; Das et al., 2000). However, on the one hand, although the data show the existence of connections between the factors of TQM and a firm’s performance, it cannot be strictly proven that TQM leads to increased performance, but simply

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that such relationship exists (Powell, 1995) and also that, as many respondents answered, quality may influence part of the firm's performance. On the other hand, in some cases, the impact of TQM practices on a firm's performance is weaker and not always significant (Sousa and Voss, 2002).

Thus, TQM does not always improve performance. In spite of its advantages (Sohal et al., 1991; Kanji, 1998), we can also find problems in its implementation (Kanji, 1998). Firstly, in order to have a positive performance in a firm, it is necessary to develop its intangible resources (Powell, 1995). Secondly, firms that implement an effective TQM programme improve their operating performance (Hendricks and Singhal, 1997). Thirdly, experience has shown that some firms fail when they implement TQM (Boje and Winsor, 1993; Spector and Beer, 1994) because the implementation of TQM cannot be successful without the use of suitable quality management methods (Sitkin et al., 1994; Wilkinson et al., 1998; Zhang, 2000) such as tools and techniques for quality. According to this view, the management system of TQM may only have a positive effect on performance if a technical system has also been established (Sousa and Voss, 2002). In addition, these techniques, amongst others, are important for business survival and continuation (Zackrisson et al., 1995).

What has been missing from the literature is an assessment of how quality tools have affected TQM. In our opinion, the situation makes it necessary to carry out an empirical study in order to verify the importance of these tools and techniques for TQM improvement and their effect upon TQM results.

Our study analyzes the relationship between the use of these techniques and tools for TQM improvement and TQM itself, and will attempt to check if those firms with a higher TQM level (higher implementation of critical factors) and best TQM results, do show a higher interest in the use of these tools and techniques. For this purpose, we use the answers provided by the person in charge of quality in 106 ISO-certified firms in Spain. Our results are part of a wider research process, aimed at analyzing quality practices in certified firms by using TQM elements, which identifies the factors

and results of these firms, classifies them and establishes different TQM levels.

This paper will be structured as follows: in the next section, a review is made of the literature, on the one hand, concerning TQM results and critical factors, and on the other, regarding the tools and techniques for quality improvement. The following section reflects the methodology used for this paper; this is followed by a presentation and discussion of the results. A number of conclusions will be suggested in the final section.

## 2. Literature review

### 2.1. Critical factors of quality management

Quality management theory has been influenced by the contributions made by quality leaders (Crosby, 1979; Deming, 1982; Ishikawa, 1985; Juran, 1988; Feigenbaum, 1991). The research by all these authors shows both strengths and weaknesses, for none of them offers all the solutions to the problems encountered by firms (Dale, 1999), although some common issues can be observed, such as management leadership, training, employees' participation, process management, planning and quality measures for continuous improvement.

These ideas have exerted an influence upon later studies, in such a way that the literature on TQM has progressively developed from these initial contributions, identifying different elements for effective quality management: customer-based approach, leadership, quality planning, fact-based management, continuous improvement, human resource management (involvement of all members in the firm, training, work teams, communication systems), learning, process management, cooperation with suppliers and organizational awareness and concern for the social and environmental context.

Alongside these studies, we may mention the development of formal evaluation models, such as the Malcolm Baldrige National Quality Award model in the USA, the European Foundation for Quality Management (EFQM) model in Europe and the Deming Application Prize model in Japan.

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