

# The contribution of measurement and information infrastructure to TQM success

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## Abstract

There is currently some debate about which TQM practices contribute most to superior performance outcomes. Several proponents argue that softer TQM practices such as leadership, human resource management, and customer focus have more impact than benchmarking, process analysis or performance measurement. The evidence for which TQM factors contribute most to improved performance is not yet conclusive, and sometimes contradictory. Using data from a longitudinal study of 67 TQM firms we contribute to this debate. Our central hypothesis is that measurement of key TQM practices and performance outcomes is essential for TQM success. We examine the measurement practices of this cohort of firms, and report on the changes in their measurement behavior over time. Specifically, we analyze seven dimensions of measurement relating to customer satisfaction, employee satisfaction, process performance, impact of TQM on costs, impact of TQM on sales, self-assessment, and benchmarking. We calculate a measurement-intensity score for each firm, based on how many of these seven parameters were being measured, and we show that increased measurement intensity is strongly associated with perceived TQM success. Finally, using multivariate discriminant analysis, we identify eight variables that explain the level of TQM success with a classification accuracy of almost 90%. We conclude that to attain the highest levels of TQM success, firms need to engage in the measurement practices of self-assessment and benchmarking, but our data suggest that an appropriate measurement framework needs to be in place beforehand.

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## 1. Introduction

This paper provides further insight into a cohort of 67 firms practicing TQM. The research design is longitudinal, and has tracked their TQM implementations since 1992. The specific focus of this paper is on the measurement practices of the firms and the relationship between measurement behavior and perceived TQM success. Our core hypothesis is that, since measurement and management by fact is a key

tenet of TQM, firms that gather data on parameters such as customer satisfaction, employee satisfaction, and process performance will be likely to experience higher levels of success with TQM. In other words, measurement can be as much a driver of improvement as a mere confirmation.

In the first study of these firms in 1992 [1], we found that many were gathering very little data on which to base their judgments of the business impact of TQM, although for some, TQM was a relatively recent phenomenon. At that time the cohort comprised 113 firms. Based on our analysis of this initial data set, we questioned the sustainability of TQM in the absence of measurement and customer focus, and highlighted the need for greater organizational

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awareness of performance through the practices of benchmarking and self-assessment [2]. In the second phase of this study, we found that 37% of the cohort had discontinued TQM, largely in favor of ISO9000, leaving 67 firms where TQM was still operational. These 67 firms were achieving varying levels of success with TQM, with only 17 classifying it as very successful compared to 25 reporting less success than anticipated [3].

Subsequent analysis showed that the level of success was significantly related to five factors:

- (i) The time of adoption, with early TQM adopters achieving more success.
- (ii) Understanding of the meaning and purpose of TQM, with those who recognized that TQM was about making the customer the focus of all business processes gaining more success than those who saw it solely as an internally-focused problem solving activity.
- (iii) Understanding of the relationship between TQM and ISO9000, wherein those who understood ISO9000 to have a small but significant part to play within TQM experienced more success than the rest of the cohort.
- (iv) Treating TQM as a strategic rather than an operational business issue, with those that had written quality plans and objectives within their strategic business plans gaining more TQM success.
- (v) Senior management involvement in leading TQM, where more success was achieved than if responsibility was devolved to a quality manager or TQM coordinator.

Interestingly, our earlier investigations showed that the level of success derived from TQM was not associated with size of organization or holding ISO9000 certification. These findings have broad support in the literature [4,5].

The focus of this current paper is on the measurement practices of this cohort of 67 firms, and in particular whether measuring the effects of TQM is associated with higher levels of success; there is, as yet, little empirical evidence to support the viewpoint. We therefore revisited the cohort of firms to establish the extent of their measurement practices and to identify whether there was any noticeable change in measurement intensity over time. The three objectives of this paper are:

- (i) To identify the changes in measurement practice in each firm to see whether or not more firms were now measuring key dimensions of TQM.
- (ii) To explore whether or not there was a relationship between the intensity of measurement practice and TQM success.
- (iii) To identify which measurement practices had the most significant impact on TQM success, and what was their influence relative to the five significant influences on TQM success identified in our earlier work, and listed above.

In the next section we review the evidence supporting the need for measurement as part of TQM implementation, and its relationship with improved business performance. We then outline our research method and the analysis techniques employed. Finally we discuss the implications of our findings and conclude with some observations about opportunities for further research.

## 2. Literature review

Ten years ago, Fuchs highlighted a lack of measurement as one of the four obstacles to progress with TQM implementation [6]. The need for measurement was underlined by Voss, whose study of 202 manufacturing firms revealed low levels of measurement, such that many firms were regarded as “optimists who have little real understanding of where they stand” [7]. Indeed, one of the most widely cited TQM assessments of that period, interpreted by many as signaling the widespread failure of TQM, revealed that 50% of firms had no information with which to measure its effects on their performance [8].

Measurement is a core principle of TQM [9], emphasizing the use of data-driven approaches to evaluate customers’ needs and expectations, to energize continuous improvement and to empower employee groups and teams [10,11]. As an evaluation mechanism, measurement directs time and attention to results, facilitates the early diagnosis and correction of problems, and indicates what works and what does not. Measurement also supports the recognition of success and provides further impetus for targeted improvement [12]. Further, it enables communication between managers and employees, and contributes to an empowering environment for involving all organizational members in managing by fact [13]. The pervasive importance of information and analysis within TQM programs has also been underscored by more recent studies [14–16]. Therefore we posit that, to excel with TQM, firms need to develop a framework of measurement, data and analysis [17,18], enabling “informed management” and decision-making [2,19].

The practice of measuring is a tangible testament to a firm’s true commitment to the tenets of TQM. While many TQM programs “generate more enthusiasm than tangible improvement”, this is often because of a failure to link programs with results [20]. To espouse a customer focus without regularly and systematically measuring customer satisfaction, or to profess to be employee centered without similarly tracking employee satisfaction would undermine such claims. It is reminiscent of Vince Lombardi’s quotation that “if you are not keeping score you are only practicing”. As a football coach, Lombardi understood the need to measure:

*“In any sport, it is difficult to determine how well your team is doing unless you have complete, accurate and up-to-date information on the team’s performance. If you want to determine the team’s standing and see how far you are*

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