

An analytical network process-based framework for successful total quality management (TQM): An assessment of Turkish manufacturing industry readiness

Ozden Bayazit^{a,*}, Birsen Karpak^b

^a*Department of Business Administration, College of Business, Central Washington University, 20000 68th Avenue W, Lynnwood, WA 98036, USA*

^b*Department of Management, Youngstown State University, Youngstown, OH 44555, USA*

Received 3 February 2004; accepted 19 December 2005
Available online 9 May 2006

Abstract

In this study, we have developed an analytic network process (ANP)-based framework to identify the level of impact of different factors on total quality management (TQM) implementation and to assess the readiness of the Turkish manufacturing industry to adopt TQM practices. ANP is a methodology recently introduced by Saaty for multiple criteria problems where there is feedback and interdependence among decision attributes and alternatives. We determined the factors that affect the level of implementation of TQM by doing literature searches and further refined those factors through a survey conducted among 250 large manufacturing companies in Turkey. We ended up with 32 factors. When we applied the model into large manufacturing companies *zero defect* and *costly and long-term study* turned out to be the most influential factors contrary to those of survey respondents' *quality improvement* and *higher revenue*. The results of our decision model show that the Turkish manufacturing industry has a readiness level of 59.2% for implementing TQM. Model identifies a number of factors for successful application; therefore, an understanding of the critical factors would help managers to advance TQM implementation. Since there is feedback and interdependence among these factors, ANP proves to be an effective framework for assessing readiness to adopt TQM and facilitating TQM implementation.

© 2006 Elsevier B.V. All rights reserved.

Keywords: Factors affecting total quality management implementation; Multiple criteria analysis; Quality management; Analytic network process; Decision analysis

1. Introduction

In the early 1980s, consumers became more powerful and started to demand high-quality goods and services at reasonable prices. The globalization

of trade has made high-quality low-cost products available throughout the world. These factors increased the pressure on companies around the world to improve their goods and services. Technologies and methodologies such as total quality management (TQM) have helped them do this (Wadsworth et al., 2002). In Turkey, manufacturing organizations represent a dynamic and important sector of the economy and they are aware of the importance to their survival of assuring quality in

*Corresponding author. Tel.: +1 425 640 1574;
fax: +1 425 640 1488.

E-mail addresses: bayazito@cwu.edu (O. Bayazit),
bkarpak@ysu.edu (B. Karpak).

their products. A considerable number of organizations have tried to implement these practices and have failed to achieve much, while many others have implemented TQM with great success.

The overwhelming volume of literature on TQM is primarily focused on the elements of TQM and the approaches taken to assure a successful implementation; however, less attention has been devoted to identify the critical success factors for the implementation of TQM program (Dayton, 2001). Black and Porter (1996) developed a model that identifies a set of critical factors of TQM, their relative importance and the interrelationships between each. Recently Conca et al. (2004) conducted a similar study to identify critical success factors of TQM and empirically tested with the answers of 108 ISO certified firms in Spain. Since these critical factors are interdependent and there is feedback among them we contend that our analytic network process (ANP)-based framework is an enhancement to earlier studies. Since the critical success factors of TQM have not been studied extensively throughout the world, it is the intention of this study to investigate these factors and identify the relative importance of each of them in a successful TQM implementation and measure the readiness of the Turkish manufacturing industry to adopt it.

The approach in this paper is to use the ANP to investigate the degree to which TQM practices were adopted in the Turkish manufacturing industry and to identify the impact of different factors on successful TQM implementation. This industry is particularly appropriate for the study of the effectiveness of TQM program implementation since the majority of organizations that have implemented TQM consist of manufacturing companies in Turkey. ANP requires expert judgments to assess the relative importance of different factors with respect to each other. In our study these expert judgments were obtained via survey of 250 manufacturing companies in Turkey. ANP is a new methodology introduced by Saaty (2001b) that extends the analytic hierarchy process (AHP) for decision making to cases of dependence and feedback. As Wang et al. (2004) pointed out, more and more researchers are realizing that AHP is an important generic method and are applying it. Whereas, ANP is relatively new and there are few applications as of yet. Some examples of ANP applications include re-engineering, supply chain performance, logistics, quality function deployment, energy policy planning, project selection decisions,

and performance measurement systems (Hamalainen and Seppalainen, 1986; Partovi and Corredoira, 2002; Sarkis and Talluri, 2002; Agarwal and Shankar, 2002; Partovi, 2001; Lee and Kim, 2000; Ashayeri et al., 1998; Meade and Sarkis, 1998; Sarkis, 1998, 1999, 2003; Karpak and Bayazit, 2001; Saaty, 2001a, c).

In this paper we developed a framework that facilitates finding the importance of different factors on TQM implementation. In addition, we applied ANP for the first time to assess the readiness of manufacturing industry in Turkey to adopt TQM based on the survey of 62 companies. Since constructing such a framework can best be approached by studying organizations that have implemented TQM, we have excluded the ones which stated that they did not implement TQM. The paper is organized into five sections and begins with a literature search for the factors affecting TQM implementation. The methodology of the study is explained in Section 3. Section 4 introduces an ANP-based framework which identifies the importance of different factors on TQM implementation and Turkish manufacturing industry readiness to implement TQM. The overall conclusion is given in Section 5.

2. Background

There is a huge amount of published literature on TQM. A dominant theme in these writings is that TQM is an approach to management that is characterized by the principles of customer focus, continuous improvement, and teamwork (Ugboro and Obeng, 2000; Wadsworth et al., 2002; Chan and Quazi, 2002; Hellsten and Klefsjo, 2000; Scharitzer and Korunka, 2000; Young et al., 2001; Woon, 2000; Fok et al., 2001). It is broadly agreed that TQM is an integrated management philosophy aimed at continuously improving the performance of products, processes, and services to achieve and surpass customer expectations.

A number of research studies have been carried out to examine the implementation process of TQM and investigate the critical success factors for implementing TQM. A common conclusion of these studies is that the way TQM is implemented is central to its long-term success within an organization (Ghobadian and Gallea, 2001). Flynn et al. (1995) surveyed 42 US manufacturing firms and measured the degree of use of quality management practices. Constructs they used were top

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات