Exploring the relationship between total quality management and information systems development

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Abstract

This study examines a series of relationships between total quality management (TQM) and information systems (IS) development. Specifically, we consider whether organizations which have more fully adopted TQM will be different in their approaches to IS development. Our findings suggest that where TQM is adopted more fully, there will be a significant impact on four areas of IS development: system goals; system design philosophy/concepts; assumptions made by IS professionals about system users and user involvement in system development. We also report evidence that both TQM and IT may require similar organizational cultures. © 2001 Elsevier Science B.V. All rights reserved.

Keywords: Total quality management; Quality maturity; Systems development; System design goals and philosophy

1. Introduction

In this study, we examine the potential relationships between two widely adopted strategies for dealing with the need to gain competitiveness by organizations throughout the US. One series of strategies involves the adoption of the many quality management programs falling generally under the total quality management (TQM) rubric, while another approach has emphasized the use of information systems (IS) or information technology (IT) as a vehicle for attaining quality. Both programs offer potential for responding to customer needs, effecting cost savings, and the like, and considerable study has been directed toward their impacts upon a variety of organizational effectiveness measures [1–5]. However, we were unable to discover

empirical evidence on their impacts upon each other in the organizational setting [6,7]. Yet research dating back to the early work in the development of socio-technical systems theory [8,9] has consistently shown that the systems comprising an organization cannot be examined in isolation, and that changes in one system will inevitably impact others. In this study, we examine the inter-relationships among three organizational factors: TQM program adoption; IS development and culture. Specifically, we consider whether organizations which have fully adopted TQM will approach IS development differently from those with less TQM adoption and the effects by and upon culture.

2. The study of IT impacts

It is almost a commonplace to describe the current business environmental setting as turbulent. The marketplace has become more global and service

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oriented; consumers' tastes have become more demanding and sophisticated; the work force has become more mature and diverse. Many US firms have found it increasingly difficult to compete under these conditions [10–15]. To survive in the current business environment, many organizations have found it necessary to look for ways to enhance productivity and responsiveness in order to restore their competitiveness and to improve their financial performance. Many have looked to IT as a panacea. IT has been used as a means to increase productivity, improve quality, enhance the organization's competitive edge, increase service, and reduce costs [10,12,16,17]. The road to success through IT has proved anything, but a universal cure for many companies, however. For many, heavy investment was made in computer hardware and software with the belief that a powerful computerized system could solve what were, in effect, organizational problems. Where organizational factors led to an inability to respond throughout the organization to the fast changing IS technology, however, the technology itself became a critical factor leading to eventual failure.

In contrast, the companies that used IT successfully were those that used it proactively and strategically. These companies used IT in all aspects of organizational functions, from order entry to after-sales services. Moreover, some companies used IT to develop distinctive competence in their industries. For example, Wal-Mart has been able to achieve an efficient reordering system through connecting their stores' point of sales terminals to their computerized inventory management system. Sears, at one point in time, used the data base developed from their catalogue business to develop their financial business. By so doing, these companies gained competitiveness [18].

Ever since IT became widely accepted as essential to organizational effectiveness, its relationship to the organization's competitiveness has been an area of interest to researchers. Many descriptive and prescriptive researches have appeared in journals in the past two decades [18,19–22]. Most research in the IS technology area, however, has tended to view IS in isolation and to concentrate on how to develop and implement successful IS systems within the organization. While a few researchers have pointed out that synergies could be achieved if IS is developed in the TQM environment [6,7], there has been very limited

effort on investigating empirically the impact of TQM on IS development.

3. The study of TQM impacts

An alternative approach to improve competitiveness has been the adoption of TQM, as many US companies have come to realize that improved quality is an essential ingredient for successful global competition [1–5]. TQM has been widely adopted as an integrative management philosophy aimed at continuously improving the quality of products and processes to meet or exceed customer expectations [23]. Under TQM, organizations began to emphasize the importance of satisfying the needs of customers, both internal and external. Companies began to evolve from vertical functional silos toward a horizontal process orientation. Under TQM, employees are asked not only to participate in decision making, they are empowered to make their own decisions. For the most part, organizations embracing concepts of quality reported that they were able to turn their previous quality problems around.

TQM success stories suggest that, if implemented appropriately, TQM has the potential to not only increase competitiveness, but also to improve organizational effectiveness and, in most cases, produce more satisfied customers as well as employees. TQM success stories have been reported in manufacturing, health care, education, banking, and government agencies [1,13,23–27]. However, not all organizations that adopted TQM were successful in their undertaking. The primary reasons cited for the failures include the lack of top management commitment, unrealistic expectations about the time frame and cost of TQM implementation, failure to develop and sustain a quality-oriented culture, and lack of employee cooperation and motivation [25,28–33]. In effect, problems such as these suggest that *qualitative* problems with TQM implementation may lead to situations where the organization claims to be "on TQM" but, in fact, TQM has not been adequately adopted. Analysis of organizations utilizing IS or TQM effectively suggests that successful adoption, in both cases, requires more than simply incorporating the "tools". In the case of TQM, the need for embracing a *qualitative* component, the TQM philosophy, is