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# A framework for quality management research and an associated measurement instrument

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### Abstract

Research on quality incorporates a range of concerns, including quality definition and management, and such specific mechanisms as statistical quality control (SQC). However, though research in statistical quality control has evolved in a scientific and rigorous fashion, based on the early works of Shewhart, Juran, Deming and others, the study of other aspects of quality, particularly quality management, has not evolved in a similarly rigorous fashion. Theory development and measurement issues related to reliability and validity are particularly weak in the quality management literature. Starting from a strategic perspective of the organization, this paper identifies and substantiates the key dimensions of quality management, then tests the measurement of those dimensions for reliability and validity. In doing so, it establishes a clear framework for subsequent research and for evaluation of quality management programs by

practitioners.

In order to specify the important dimensions of quality management, a thorough search of the relevant literature was undertaken. Quality management is defined as an approach to achieving and sustaining high quality output; thus, we employ a process definition, emphasizing inputs (management practices) rather than outputs (quality performance) in our analysis. Quality management is first viewed as an element of the integrated approach known as World Class Manufacturing; quality management supports and is supported by JIT, human resources management, top management support, technology management and strategic management. The key dimensions of quality management are then articulated. Top management support creates an environment in which quality management activities are rewarded. These activities are related to quality information systems, process management, product design, work force management, supplier involvement and customer involvement. They are used in concert to support the continuous improvement of manufacturing capability. As manufacturing capability and quality performance improve, a plant achieves and sustains a competitive advantage. This, in turn, provides feedback, reinforcement and resources to top management, which stimulates continuous improvement.

Based on the seven dimensions of quality management identified in this paper, a set of 14 perceptual scales was developed. The scales were assessed for reliability and validity with a sample of 716 respondents at 42 plants in the U.S. in the transportation components, electronics and machinery industries. Reliability is broadly defined as the degree to which scales are free from error and, therefore, consistent. The use of reliable scales provides assurance that the obtained results will be stable. Application of Cronbach's alpha both across the board and by industry and nationality subsamples refined the original group of 14 scales to 11 internally consistent scales.

Validity refers to the degree to which scales truly measure the constructs which they are intended to measure. This provides academic and industry users with confidence that the scales measure important constructs which are related to independent measures of the same constructs, and that each scale measures a single construct. It was concluded that the scales, and the instrument as a whole, are valid measures of quality management practices. Thus, the scales may be used with confidence by both researchers and industry users to measure quality management practices, with the ability to generalize beyond the immediate sample.

This paper makes several important contributions to the area of quality management. It

This paper makes several important contributions to the area of quality management. It proposes an emergent theory of quality management and links it to the literature. Because the proposed scales are reliable and valid, they may be used by other researchers for hypothesis testing and by practitioners for assessing quality management practices in their plants and for internal and external benchmarking. Finally, the paper provides a step-by-step approach and criteria for conducting reliability and validity analysis of a measurement instrument.



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