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A structural equation model of supply chain quality management and organizational performance

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Abstract

In this paper, we identify through the use of empirical data collected from Taiwan and Hong Kong, the factors that influence supply chain quality management. The data was collected from practicing managers. The findings for the two sets of data were consistent. The data showed that Quality Management (QM) practices are significantly correlated with the supplier participation strategy and this influences tangible business results, and customer satisfaction levels. The data also showed that QM practices are significantly correlated with the supplier selection strategy. The empirical results presented could be used to improve the management of supply chain networks in the economies studied.

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Keywords: Supply chain quality management; Organizational performance; Structural equation model

1. Introduction

There is a growing attention on global supply chain management. Supply chain management is a holistic and a strategic approach to demand, operations, procurement, and logistics process management (Kuei et al., 2002). Cross-country activities are normal and to be expected. These

activities are often influenced by a supply chain's social and technical components. Traditionally, the focus of supply chains was on specific functionalities such as purchasing, manufacturing, and shipping to support logistics operations. The competitive environment of the 21st century requires the delivery of cost, efficiency, high service levels, rapid response, and high quality of products and services. The effective management of technology and quality is the key to increased quality and enhanced competitive position in today's global environment. Kuei et al. (2002) suggest that supply chain quality management should be

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distinguished from supply chain technology management. The former deals with the social components of the supply chain while the latter addresses concerns of technical systems in managing supply chains. Of interest in this study is the influence of competitive factors in supply chain quality management. Supply chain quality is a key component in achieving competitive advantage.

Kuei and Madu (2001) defined supply chain quality management (SCQM) with three simple equations where each equation represents the letters that make up SCQM. The definition is as follows:

- SC = a production–distribution network;
- Q = meeting market demands correctly, and achieving customer satisfaction rapidly and profitably; and
- M = enabling conditions and enhancing trust for supply chain quality.

Although there has been a trend towards SCQM, the essential features that lead to achieving it have not been fully explored. A conceptual framework is developed in this study to postulate causal links between SCQM and organizational performance. This enables the use of statistical models to evaluate and identify SCQM factors or activities that may influence organizational performance. Structural equation modeling (SEM) techniques are used to test the framework. Implications for successful SCQM are derived from the statistical applications.

2. Research background

Today's global marketplace offers significant opportunities to conduct import and export operations. Bowersox et al. (2002) noted that successful international logistics operations depend on global firms' capabilities in dealing with the local operating environment and the diversity in work practices. Further, quality and operational efficiency are known as the two greatest supply chain challenges. To make high-quality supply chains a reality, those challenges must be resolved. For more than a decade, the Kellogg Company

has been using its planning system to guide future operations in the areas of production, inventory, and distribution to enhance operational efficiency. These activities involve hundreds of items from Kellogg-owned and contracted plants to distribution centers and to customers in the United States and Canada. In 1995, system-wide cost was reduced by \$4.5 million (Brown et al., 2001). Wong et al. (1999) point out that Hong Kong's critical competitive advantage is access to the low cost production capabilities in China. Hong Kong companies are highly dependent on suppliers in China. While firms in Hong Kong enjoy their prosperity mainly due to the low wages in China, Taiwan's high-tech industries have been finding their own way to prosperity through superior technology and highly educated human resources. Acer, Taiwan Semiconductors, and Phillips Semiconductors in Taiwan are examples of firms that have attempted to implement global supply chains with varying degrees of operational efficiency and success. In the past few years, much has been written concerning quality management (QM) practices in the supply chain setting. Yam et al. (2000) reported that the adoption and implementation of ISO 9000 systems in the early 1990s had a significant impact in igniting the QM movement in Hong Kong. Through the use of an in-depth case study in Total Quality Management (TQM) practice of a leading construction company in Hong Kong, Wong and Fung (1999) examined the strategy, structure, and tasks used for managing supply chain quality. This leading construction company in Hong Kong, Shui On Construction Company, had adopted TQM in 1993. Their study found that TQM practices were highly related to business results. Wong and Fong (1999) also reported that there were 80 construction companies that had obtained ISO 9002 certification. Madu et al. (1995) used Madu et al.'s (1996) instrument to study QM practices in Taiwan's manufacturing firms. They found a significant causal relationship between the quality dimensions (i.e., customer satisfaction, employee satisfaction, and employee service quality) and organizational performances. Evidence also showed that QM practices have been well received in Taiwan. In 1998, for example, Phillips Semiconductors in

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