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Supply chain risk assessment model for a small scale apparel manufacturer

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Abstract

The adoption of free trade, and advances in communication and information technology and transport systems have propelled globalization of trade. Local supply chains have rapidly become complex intertwined international supply chains, facilitating efficient manufacture at very competitive rates. However, this benefit is somewhat offset by the increased risk of the complexity of such supply chains. Any disruption to them will have a major ripple effect beyond the initial direct user and have a crippling effect on the company and the national economy. Supply Chain Risk Management (SCRM), has focused on developing models and frameworks using varying techniques and tools. As a risk, it is very contextually dependent, it is a necessity to analyze risks related to different industries and organizations. The objective of this study was to develop a framework to assess supply chain risks, through a case study of a small scale Sri Lankan apparel manufacturer. A modified version of Risk Numeric Analysis model is used as the basis for developing the framework. Initially, supply chain risks were identified from the literature, using a cause and effect diagram. These risks were then narrowed down with the use of industry expertise from the apparel sector. Then, the risk assessment phase was conducted with the Analytical Network Process (ANP) as the tool. The output revealed a list of risk factors with the most critical risk at the top. The critical risk factors identified were supplier quality problems, human errors, referring to one supplier and lack of production flexibility. These factors were used to calculate a total risk score for the customer order in consideration, with reference to the output from ANP and the relevant probabilities of risks. The initial validation of the framework was done using two contrasting customer orders. i. e. successful versus unsuccessful order. The developed framework was able to discriminate the two orders with varying risk scores, making it a viable and effective methodology for assessing risks in supply chain in the apparel industry.

Keywords: Analytical network process, Apparel industry, Supply chain risk assessment

Introduction

Due to the complexities in dealing with a dispersed network of suppliers, difficulty in satisfying demanding customers, increasingly complex and unique processes, and global competition, both manufacturing and service companies are facing increasing risks of disruption to their Supply Chains (SC). This makes the term SC risk more important and significant for those companies. SC risks can be defined as an event that adversely affects supply chain operations and hence its desired performance measures, such as chain-wide service levels and responsiveness, as well as cost (Choi and Krause, 2006; Zsidisin et al., 2004). Therefore, a critical analysis of SC risks is a must for controlling the aforementioned risks. This leads to the term SCRM that can be defined as the management of SC risks through coordination or collaboration among the supply chain partners so as to ensure profitability and continuity (Tang,