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A conceptual framework to assess supply chain risk in the apparel industry

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Along with the advent of globalization and the championing of free trade together with improved communication and transportation systems, enterprises have the ability to source supplies from a globally distributed supply chain. However, on the flip side, due to the complexities in dealing with a dispersed network of suppliers, manufacturing companies are facing risks of disruption to their supply chains. As risk is very context dependent, it is important to identify supply chain risks in different contexts and industries. Sri Lankan apparel industry plays a major role in the country's economy, making it vital for companies to engage in proper identification and assessment of these risks. Therefore, the objective of this study is to conceptualize a model to assess identified supply chain risks and thereby to generate an overall risk assessment score for an apparel manufacturing company.

The initial base for risk identification is through the use of the Ishikawa model. The cause and the effect for supply chain risks were established by analysing the initial data collected and via industry experts, a list of risk classes and sub classes were formed. Thereafter, a modified version of risk numeric analysis model is used to setup each and every class weight where industry experts' opinion is taken for calculating the appropriate weights. Instead of using Analytical Process Hierarchy (AHP) which was used in the original model, Analytical Network Process (ANP) is used to prioritize the identified risk classes. The decision to use ANP is due to its ability to consider the complex inter relationships and linkages between risk classes and sub classes during the prioritization process. Finally, an aggregate score is developed for the overall company in terms of the supply chain risks by using the scores obtained for each risk class.

The model will highlight the different types of supply chain risks that an apparel manufacturing company may face and how a proper mechanism can be developed to quantify these risks. The model would facilitate the company to directly identify the magnitude of each and every supply chain risk and the risk distribution via the overall risk score of the company. The risk score can be used by managers as a flag or an indicator that signals the company about potential risks. Apart from that, this model can be used to compare historical figures to monitor and evaluate the overall risk scores of the company. Furthermore this risk score can be used to compare the company performance with other competitors' score values and to analyse how competitive the company is within the industry.

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