

# Prediction of Supply Chain Disruptions via Text Mining

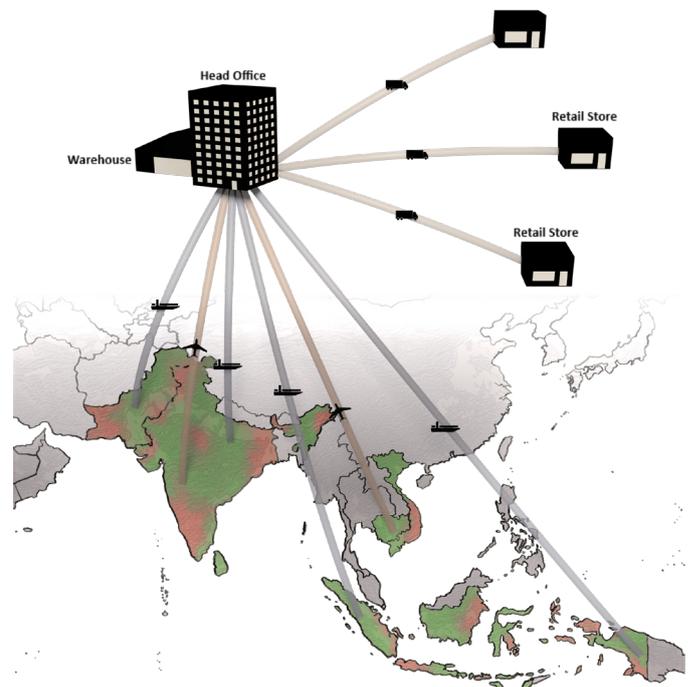
Supply Chain Risk Management (SCRM) has become one of the most important topics in global production and logistics networks. Supply chain disruptions caused by external or internal events can have a substantial financial and operational impact on firms. The risk monitoring is one of the key steps in SCRM to assess the risks and make them manageable. To perform this, there are various responsive approaches and frameworks in research as well as in practice. However, this project will identify a proactive approach relevant to industries, risks, methodologies, and then give an idea to limitations. Using this analysis, the key drivers for economic efficiency of the supply chain in the apparel industry will be linked to natural, political and economic developments as well as disasters to get quantifiable risks for the risk assessment. This leads to the development of a specific framework, which will structure the data sources, as well as to new data mining techniques. A special focus will be on the use of text mining tools to bring general textual statements to calculable numbers.

## Problem Definition

The global apparel market is valued at 3 trillion dollars and accounts for 2 percent of the world's Gross Domestic Product (GDP). Apparel companies are facing steep competition in the global market and are working in global value added chains. They have to make right decisions at different stages of supply chain operations and encounter issues at the strategic level, the tactical level and the operational level of the decision-making processes. Strategic sourcing aims to reduce the risk of disrupting the supply chain flows and the total cost of the products. Big apparel companies usually use a multiple sourcing strategy to reduce risk and to lower down cost, while at the same time, to establish close relationships between personnel on both the buyer and supplier sides.

To remain competitive in the global fashion market and to enhance quality management in supply chains, suppliers'

selection and their evaluation are important issues raised in the operations of the apparel supply chain. Companies need to continuously improve their supply chain operations, and meanwhile, add new suppliers to the existing supply chain. Even with very competitive product prices, Wal-Mart, Primark and H&M etc. are still relentlessly searching for the suppliers that can provide products with cheaper prices and better services.



## Objective

How to select new suppliers and evaluate current partners becomes critical in the management and implementation of supply chain operations of apparel industry. Retail buyers have had an important role to link between manufacturers and consumers in the complex clothing industry. Sourcing product from the right supplier in the right country for the right price is a difficult task.



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China is no longer the only option for textile and apparel sourcing, and it certainly is no longer the cheapest option. With low labor cost and domestic supply of cotton in few countries, Pakistan, Bangladesh, Sri Lanka, Vietnam, Cambodia, India, and Indonesia are new avenues for apparel sourcing. Although, fashion retailers have a range of sourcing options focusing on a number of emerging Asian countries but all these low cost countries have some additional risks. Therefore, objective of this research is to minimize the supply chain risks at low cost countries by predicting the disruptions as early as possible.

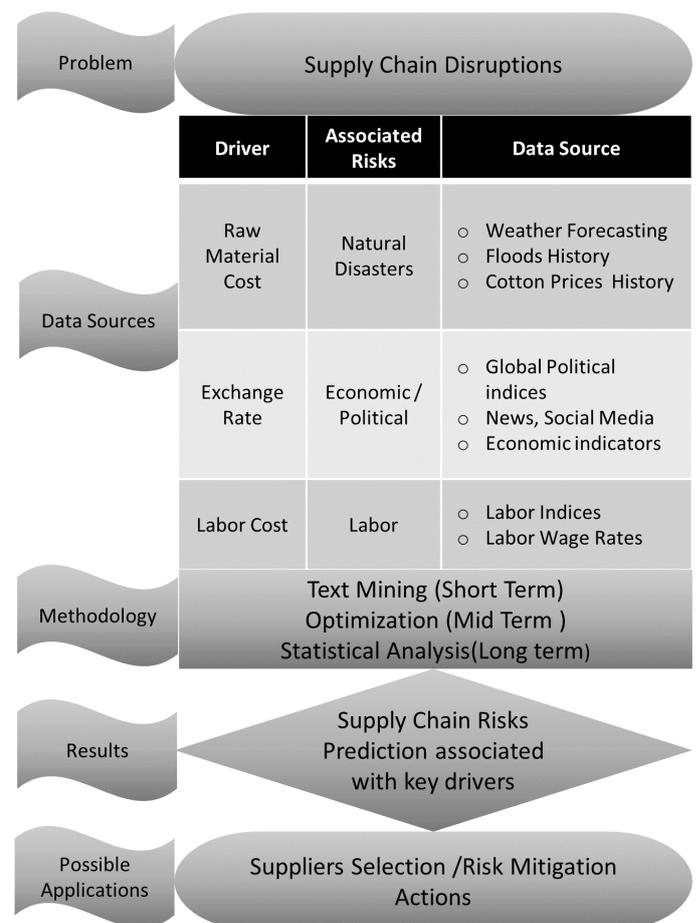
### Solution Approach

Predictability tools are required to build a system that can help to monitor the uncertainties in global supply chains. To do so, dynamic risk indices and intelligent search agents are utilized at different nodes in the supply chain. However, tools are not human independent rather require human intervention. Subsequently, the need for a search agent is emerging that can help managers to search web pages, reports, documents and highlight specific patterns related to supply chain disruption.

By now, new methods for a proactive warning-system, which contains innovative aspects of the proactive SCRM framework, including data mining, big data and predictive analytics, were applied only to some limited industries. Apparel industry is vastly dependent on the performance of suppliers and the supply chain. Therefore, the impact and probability of supply chain risk occurrences could be minimized with proactive SCRM systems. In order to design the framework,

- it is important to identify the different risks in the apparel industry,
- we need to identify sources of information,
- after gathering the data, we can conduct Test Mining, Optimization and Statistical Analysis,
- access data for sufficiency, applicability, and veracity. For this study, the experts will be the top and middle level managers of the top five apparel firms.

According to McKinsey Apparel Chief Purchasing Officers Survey 2017, cost of raw materials, exchange rates, labor cost, change in trade agreements, compliance cost, shift in purchasing power, transport cost, cost of dyestuff and financing costs will be major drivers of sourcing costs in the year ahead. Among these, the first three are expected to be key drivers of sourcing cost for upcoming time. Therefore, by utilizing the top three drivers from this survey, the framework for our solution approach would be as follows:



Fashion wear sourcing executives in apparel companies are constantly in search of new suppliers in the next sourcing destination. This project will assist the Chief Purchasing Officers, Production Planning Managers and Supply Chain Managers of world's leading apparel companies to be in good command when selecting new suppliers and deal with supply chain disruptions proactively. It will also help managers or researchers to quantify the findings at comprehensible scale so that they can easily understand the insights and take the appropriate actions accordingly.