



## MIT SCALE RESEARCH REPORT

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The Global SCALE Network allows faculty, researchers, students, and affiliated companies from all six centers around the world to pool their expertise and collaborate on projects that will create supply chain and logistics innovations with global applications.

This reprint is intended to communicate research results of innovative supply chain research completed by faculty, researchers, and students of the Global SCALE Network, thereby contributing to the greater public knowledge about supply chains.

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**Supply Chain 2020: How changing macroeconomic factors affect the supply chain network design of an apparel company**

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## **Supply Chain 2020: How changing macroeconomic factors affect the supply chain network design of an apparel company**

Mary Margaret York

### **EXECUTIVE SUMMARY**

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The performance of global supply chains is heavily impacted by changes within the macro economy. Fluctuation in factors such as the price of oil and other commodities, labor costs, and trade barriers can lead to automatic advantages or disadvantages within a company's supply chain. The challenge arises when a company tries to cope with the varying macro economic factors by proposing a supply chain network design suitable to maintaining its low cost objective in the long-term.

**Change in sourcing locations:** Unlike other industries, the apparel industry can easily move its supplier base to almost anywhere in the world in response to these macroeconomic changes. This facility in relocating comes as a result of the lower requirements in technical expertise and education level in apparel production. In fact, many developing countries use the apparel industry as a first means in their path to development. In the year 2000, for instance, twenty-three percent of the world apparel production took place in China, while in 2006 the percentage had increased to 37%. The share in apparel production of Hong Kong and the United States dropped from 15% to 10% and 5% to 2%, respectively. New countries like Thailand and Romania also emerged as world players. Most would equate these shifts driven by cost of labor advantages, as well as by favorable trade terms emerging (in the form of duties and tariffs between multiple countries).

**The model:** A scenario planning tool, in the form of a linear program, was developed to manipulate these macro economic factors and to observe production shifts that could occur. The model provides a framework into which a specific company can input its precise direct costing data, as well as the relevant macro factor data, to project how their own supply chain network design might or should look in the years to come in order to remain competitive on a minimum cost basis.

**Simulations and Findings:** The insights demonstrated by the model come from the fact that a country may appear or disappear as a sourcing candidate for a specific demand market at any given time. The more times a country maintains its sourcing status for a particular demand point, the less susceptible it is to short-term changes in macro factors. It could then be concluded that these markets are good to invest in for long-term strategic relationships or long-term facility set-ups. On the other hand, those markets that appear and disappear as sourcing points, depending on macro changes, might be better off as short-term or less strategic sourcing candidates.

Based only on the scenarios run, solid long-term candidates in the apparel industry under volatile conditions could include: China, India, Honduras and Mexico for the US; Morocco and Turkey for the European Union; Romania for Canada; and China and Indonesia for Japan. Less strategic partners would include Indonesia and Vietnam for the US; Romania for the EU; Hong Kong and Honduras for Canada; and Korea and Thailand for Japan.

If companies could implement this scenario planning tool as a part of their long term supply chain network strategy, it would give them a better understanding of how their design might face up to the challenges of the changing macro economic factors affecting today's apparel industry.