

****Executive Brief — BCG X Global Supply Chain Optimization****

****Objective****

Demonstrate how data science and optimization can drive smarter, more sustainable supply chain decisions.

****Business Context****

A global manufacturer needs to balance cost, time, emissions, and supplier risk while meeting demand worldwide.

The project builds a simulated model to replicate this challenge and applies machine learning and optimization to find efficient solutions.

****Approach****

1. Simulate supply, demand, and transport data.
2. Predict supplier disruption risk using a Random Forest model.
3. Optimize shipments using linear programming to minimize cost, emissions, and risk.
4. Visualize and interpret results for a business audience.

****Key Insights****

- The optimal plan meets all regional demand within capacity limits.
- Cost and emissions can be balanced through weighting (α) parameters.
- Higher emission penalties shift allocation toward sea/rail transport.
- Clear visual dashboards make results interpretable for executives.

****Why It Matters****

This workflow mirrors how BCG X teams approach real-world client problems — translating technical models into actionable business strategies.