Planning for Promise (PFP)

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Research Objectives
- Development of global supply chain optimization model for tactical-level decision support
- Use of model to investigate operational policies and business strategy

Model Considerations
- Objective Functions
  - Profit, Order Fill-Rate, minimum fill rate, cost, denied orders
- Decision variables
  - Demand commitments for the jth product in sales \( x_{ij} \)
  - Product delivery from the ith manufacturer to the jth sales \( z_{ij} \)
  - Production of the jth product in time period \( r_{ij} \)
  - Material delivery from the ith supplier to the jth manufacturer \( c_{ij} \)
- Constraints
  - Supply chain capability constraints
  - Transshipment of material, semi-finished and finished goods
  - Material constraints
  - Material substitutions
  - Material compatibility
  - Global bill of material (BoM)
  - Production capacity
  - Transportation capacity
  - Business priority
  - Duty (tax) constraints
  - Currency constraints
- Research issues:
  - Effective modeling for large global supply chain systems
  - Efficient algorithms for solving mixed integer programs
  - Business policy analysis

Experimental Results

Business Focus vs Performance
Tradeoff analysis of two most important business performance measures, profit and fill-rate, when the business objective changes (alpha is weight of profit).

Resource Sensitivity Analysis
Relationship between extra resource input (S) and overall fill-rate increase subject to fixed total profit and fill rate.

Business Priority Analysis
Comparison of performance measures subject to prioritized and un-prioritized sales subsidiaries.

Profitable Analysis
Analysis of profitability of supply chain paths and profitability changes with respect to supplier raw material discount.