

# Integrating Risk: A Frontier

## Motivation / Background

Supply Chains are facing an **ever-increasing cost of risk**.

Traditional optimization models have treated these problems as deterministic. The validity of these solutions has been called into question, particularly in fast-paced industries.

Workforce optimization, schedule optimization, and risk analysis have historically been treated as three individual problems.

In high-tech capital construction projects, the installation of tools and the construction of facilities require complex project schedules.

Due to the uncertain nature of project schedules, labor optimization must include consideration for project variance, or risk.

## Problem

Optimizing resource hiring and allocation across forecasted construction schedules, with consideration for schedule variance, contract labor duration, skill levels, and task types.

Generalize the chosen methodology as a **framework and risk/flexibility frontier** for supply chain problems.



## Key Question & Hypothesis

Is there a **robust, multi-objective optimization solution** for contract labor, given a forecasted project schedule?

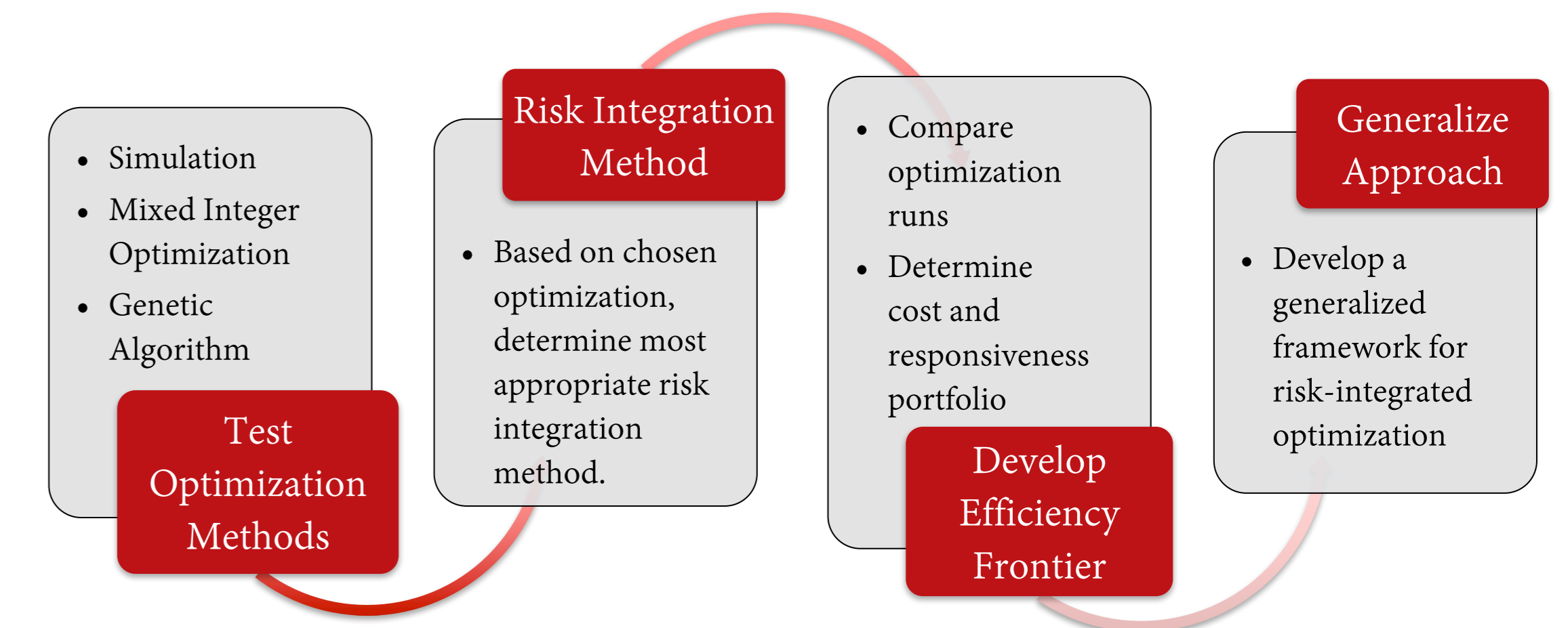
Is this solution generalizable **to create a framework** for modeling robust solutions for other supply chain problems?

**Hypothesis:** Research regarding the introduction of risk into schedule optimization will be leveraged to derive a method for introducing risk into contract labor requirements.

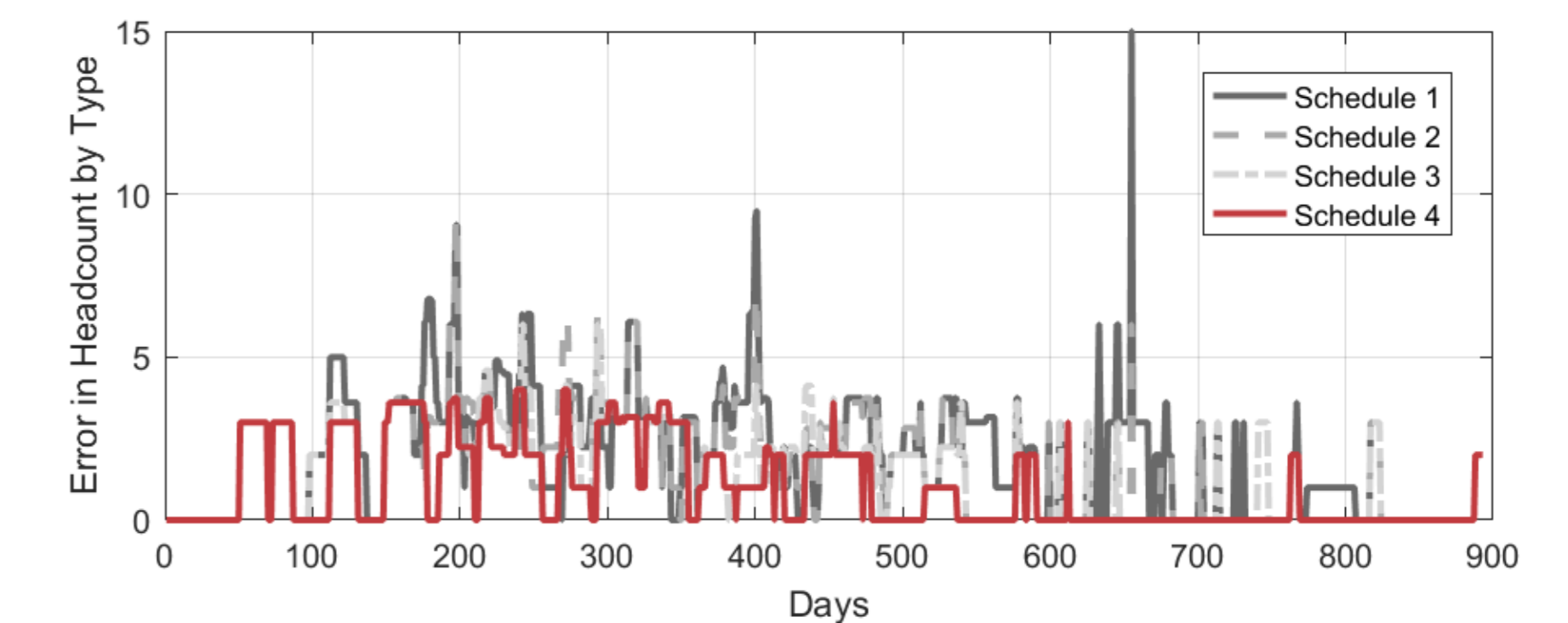
## Expected Contribution

The **introduction of schedule risk into multi-objective workforce optimization** is a territory that is almost wholly unexplored. Our research will forge a path into this area, by testing which risk-integration solutions are viable and suggesting methods for its extension to other areas.

## Methodology



## Initial Results



**Risk determination at various levels** will ultimately result in differing numbers for aggregate risk.

Establishing a Method for Considering Risk Explored Routes:

Total Error, Error by day, Error by day and task type



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