Managing Supply Chain for Perishables
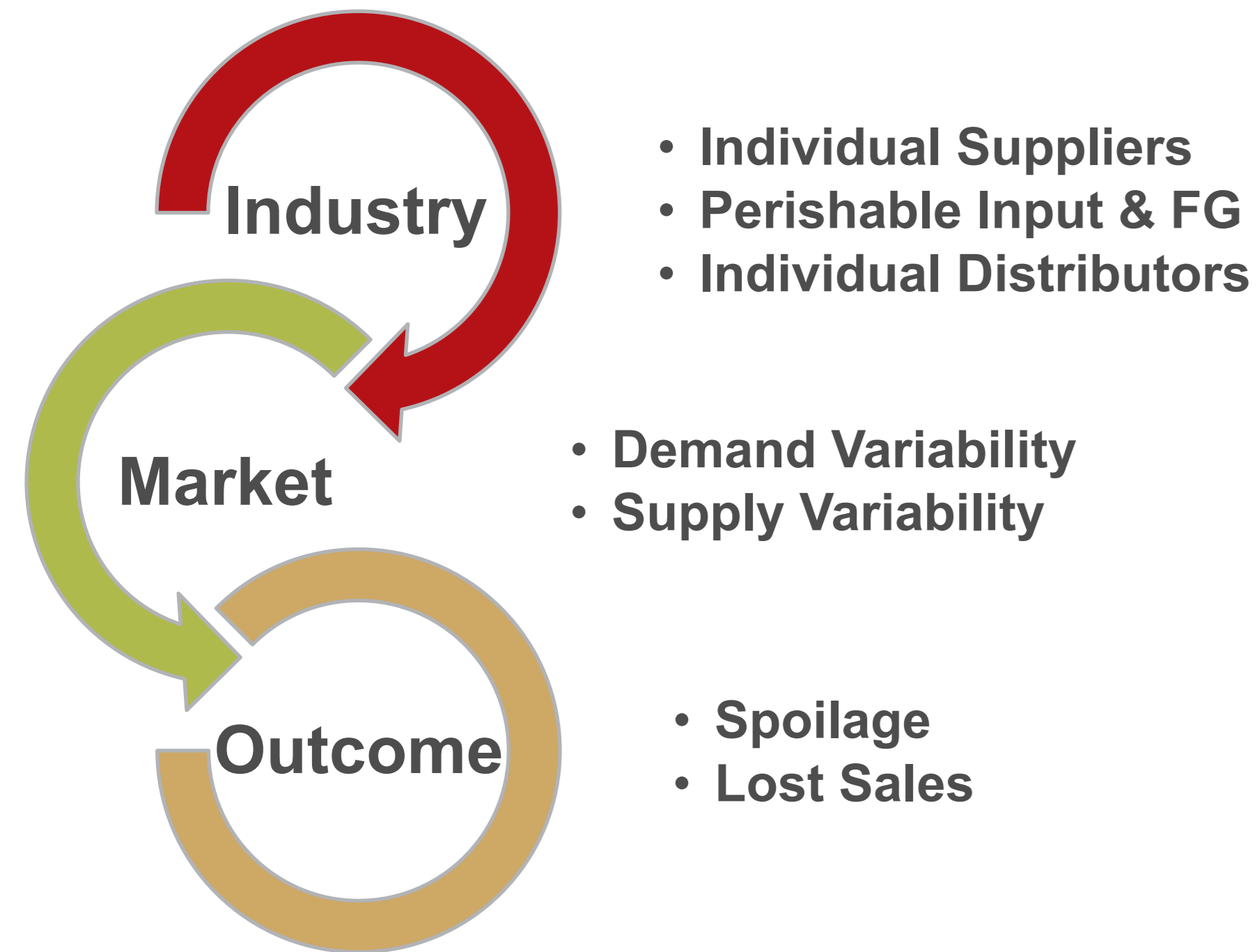
Student: Iyer N. V. Parameshwaran, SCM 2019
Advisor: Dr. Nima Kazemi
Sponsor: Milk Mantra (India)

MIT | Supply Chain MANAGEMENT

MIT GLOBAL SCALE NETWORK

Motivation / Background

- Industry
  - Individual Suppliers
  - Perishable Input & FG
  - Individual Distributors
- Market
  - Demand Variability
  - Supply Variability
- Outcome
  - Spoilage
  - Lost Sales

Key Question / Hypothesis

What is the optimal inventory policy when dealing with perishables with uncertainty in both supply and demand?

How can we handle intermittent demand-supply mismatches due to special events to reduce wastage and/or lost sales?

Relevant Literature

Literature Review of Inventory Models for Perishables
(Chaudhary, Kulshrestha, Routroy, 2018)

Inventory Management of Blood as Perishable Commodity
(Dillon, Oliviera, Abbasi, 2017)

Review of Quantitative Models in Areas of Dairy Supply Chain
(Sel and Bilgen, 2015)

The Problem

Common causes of variation in demand/supply:
> Aggregation across multiple data points may smoothen this

Special causes of variation in demand/supply:
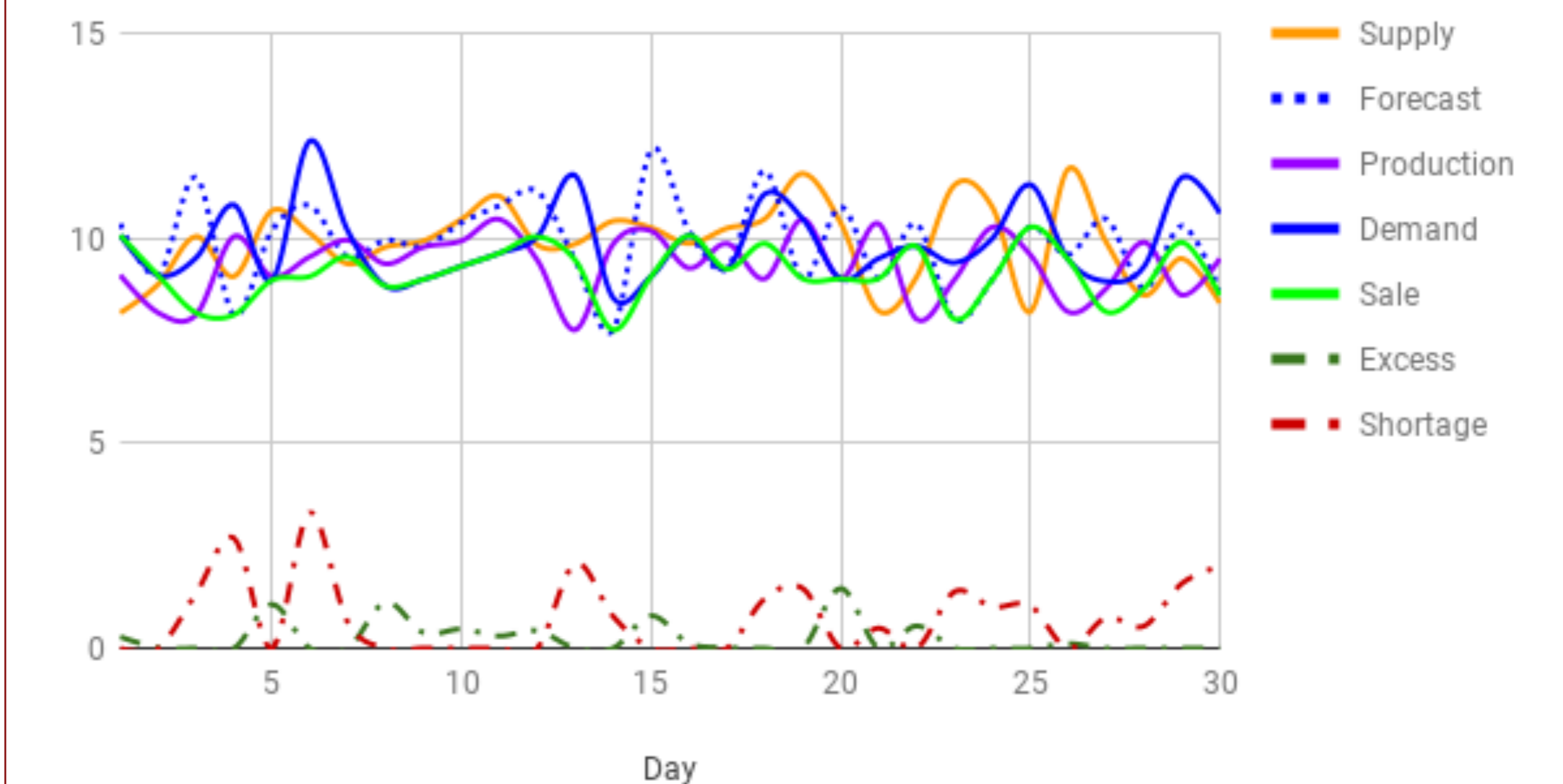> Intermittent demand-supply gap needs an inventory strategy

Perishable raw material & finished goods: buffering is counter-productive

Methodology

- Qualitative Analysis
- Quantitative Analysis
- Simulation & Validation
- Stakeholder Feedback

Initial Results

Demand Supply Pattern for Perishables

Legend: Supply, Forecast, Production, Demand, Sale, Excess, Shortage

Day

Expected Contribution

- Reduced Spoilage
- Increased Availability
- Reduced Lost Sales
- Increased Profitability

Competitive Advantage & Brand Loyalty

Thesis Contribution

Perishable — Variance — Mismatch

Param