

Supply Chain Management in High-tech and Capital Goods Industries

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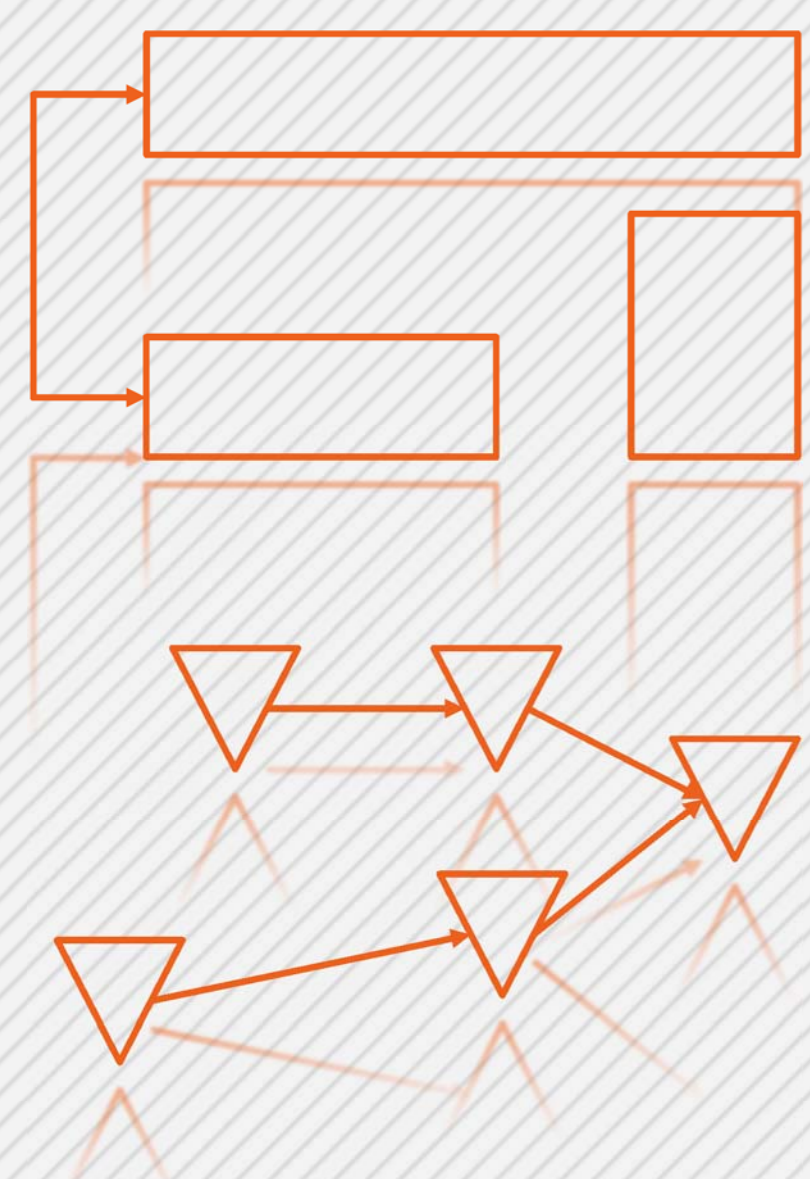
Semiconductor Industry Dynamics



Semiconductor Equipment Supply Chain

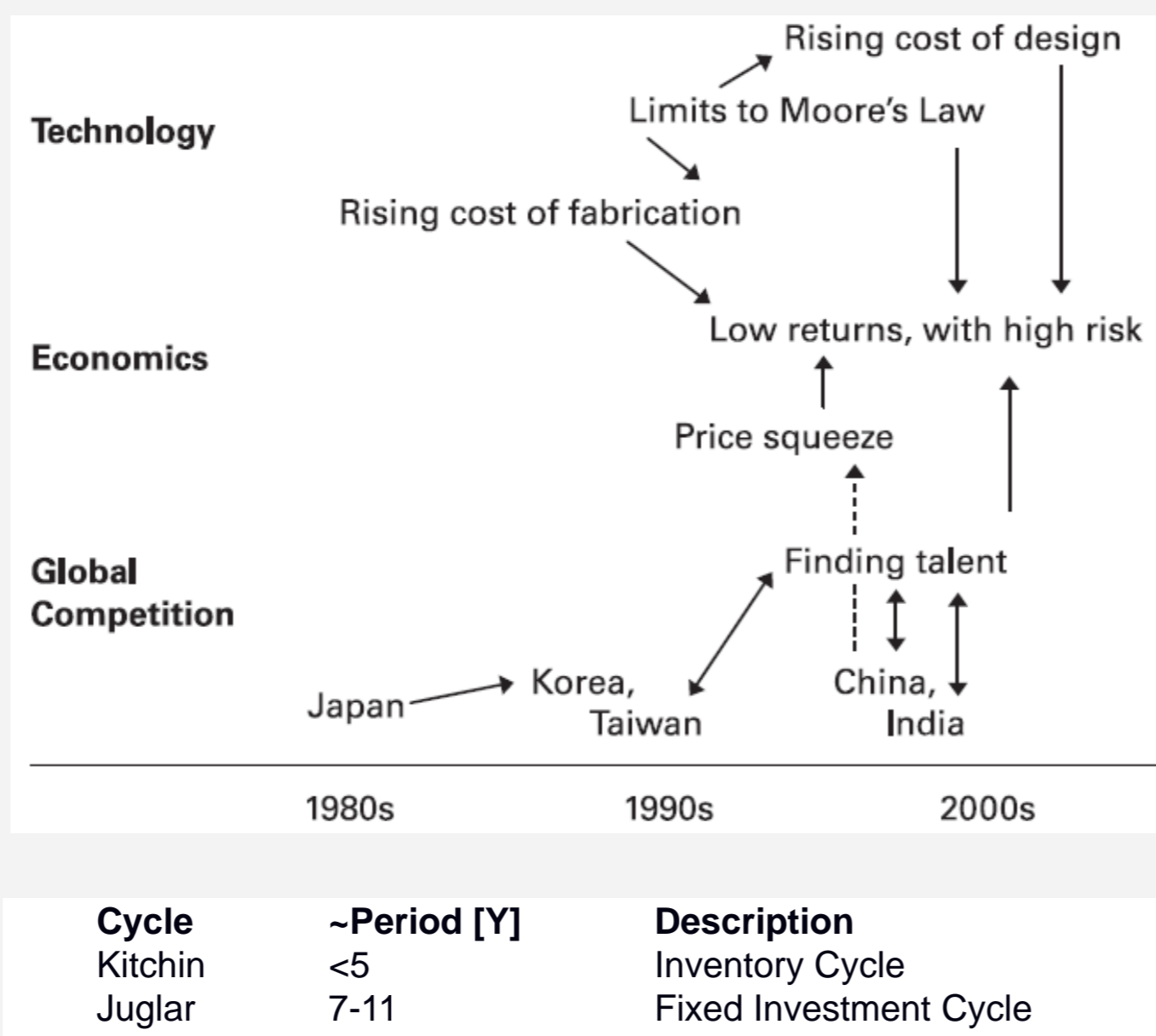


Research Topics



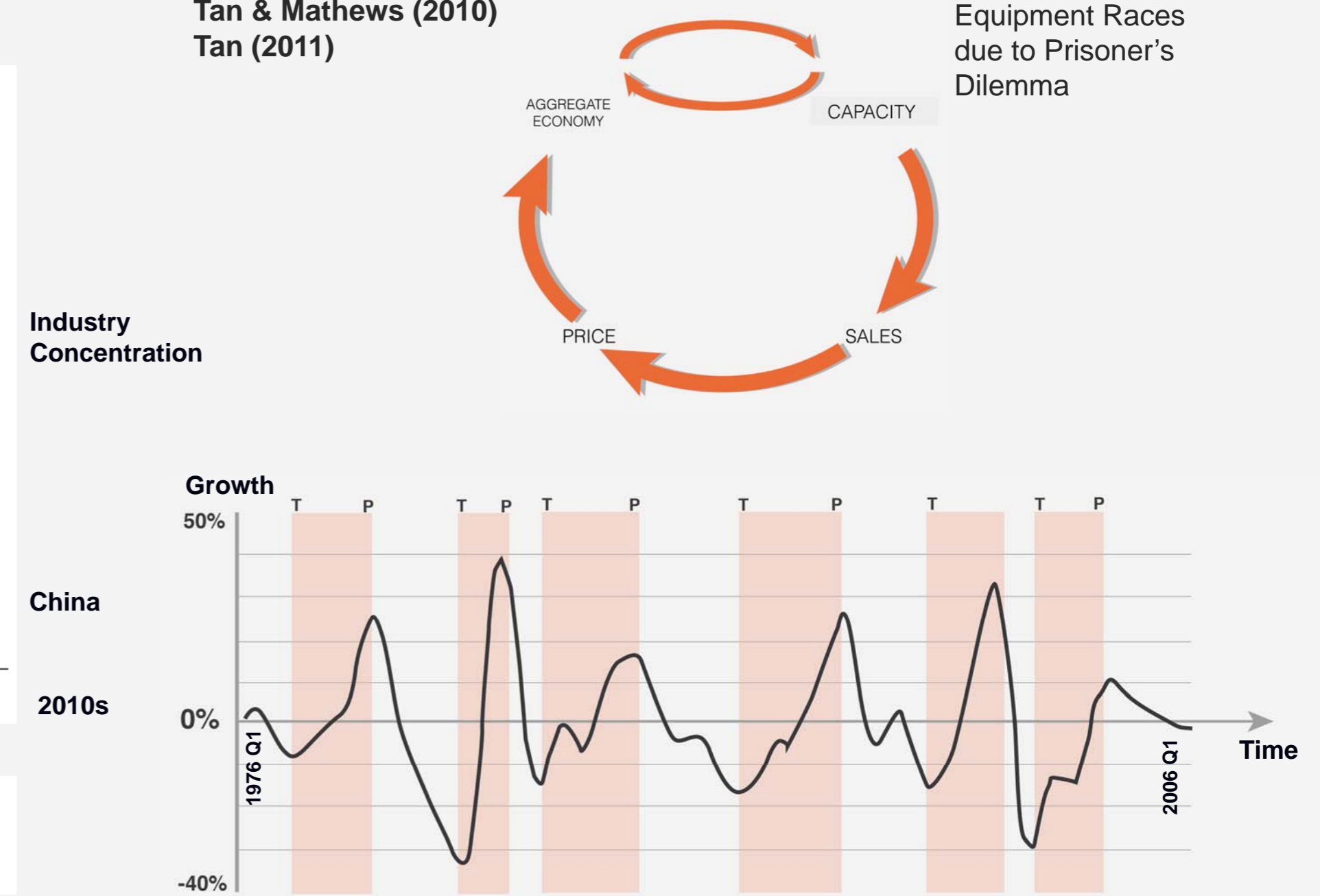
Crises* and Cycles Defining the Industry

*Brown & Linden (2009)



Cycles and Causality

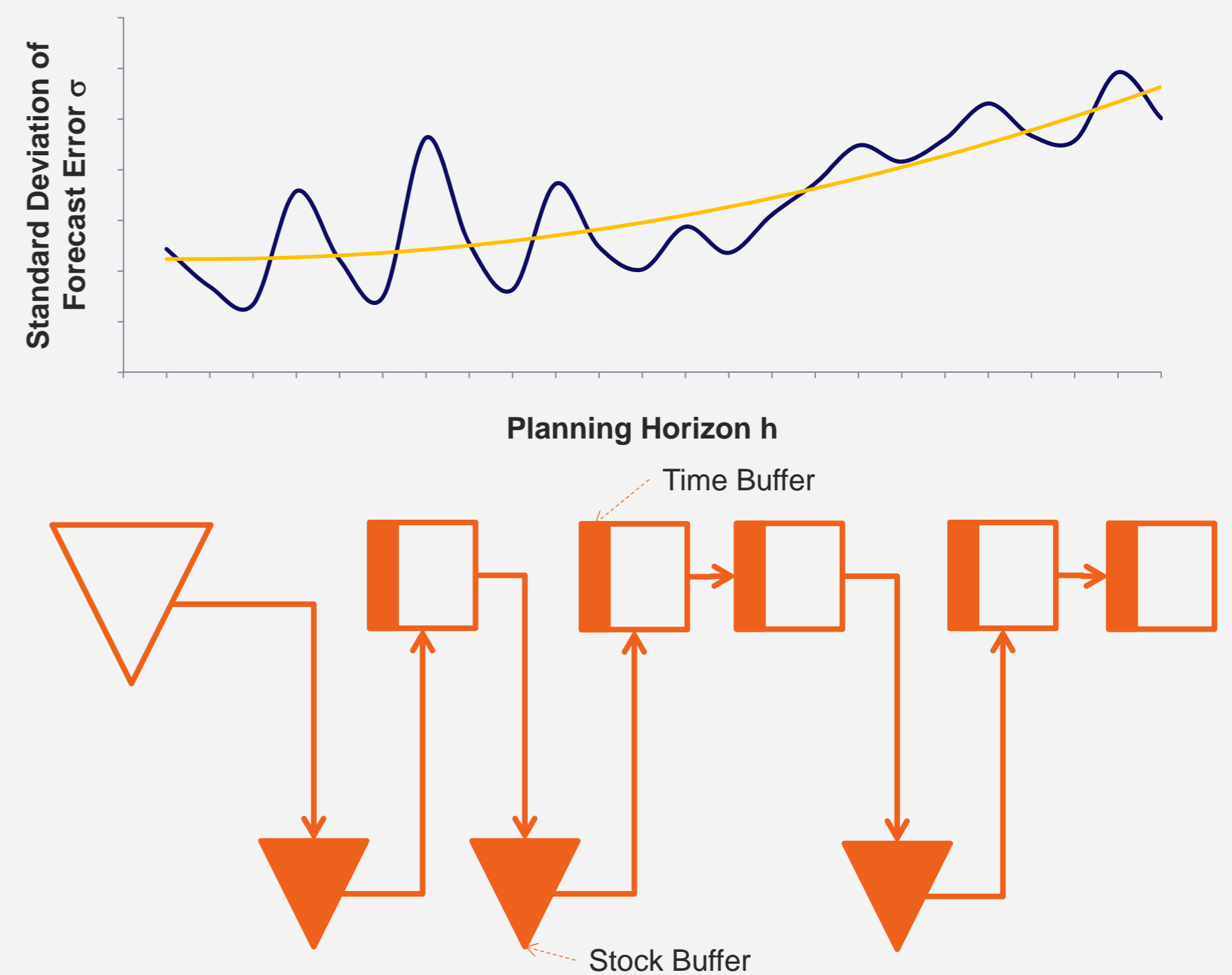
Tan & Mathews (2010)
Tan (2011)



Key Functional & Structural Attributes

- Availability of future demands: forecasted
- Demand curve: cyclical
- Products life cycle: 2-5 years
- Engineering changes during life cycle: manifold
- Number of product types: few
- Degree of customization: few
- Bill of materials: convergent
- Bottlenecks in production: capacity during upturn
- Location of decoupling points: assemble/configure to order
- Major constraints: material availability, capacity during ramp-up and cycle peak
- Type of information exchanged: forecast & orders

Other Relevant Attributes



Research Fields

- Production Control
- Inventory Management

General Problem

- How to cope with the uncertainty to achieve a desired service level with a minimum cost?

Main Uncertainties

- Demand: Business Cycles and Short Term
- Supply: Cycle Time, Quality, Suppliers

Scope

- Life cycle phase of products: Excluded discontinued or obsolete
- Uncertainties: Demand and Supply
- Stages in the chain: From suppliers to customer

Multi-item Multi-echelon Research Topics

- Production and inventory models with non-stationary demand.
- Hierarchical planning models taking into account simultaneous optimization of inventory and capacity.
- Forecast models considering Kitchin cycle oriented to smooth production.
- Fulfillment capabilities given available materials and resources.

