IE3100R Systems Design Project

Department of Industrial & Systems Engineering

Influence of Demand Structure to Capacity Commitment

Project background

Type of planning capacity

Frontend *Semi-Constrained* → Backend *Constrained*

Product grouping

Planning horizons

Production planning(*short term)*
Business scenario *(long term)*

Infineon experienced planned capacity commitment variation over time.

Project objective

Capacity commitment of all ACGs → Sensitive to? (If yes, how?) → Demand structure fluctuations

Objective: To ensure stable capacity commitment over time despite fluctuating demand structures at minimum cost or waste possible

Project Roadmap

Problem Formulation	Data Consolidation	Indicator Generation	Criteria Formulation	Result Analysis	Recommendation
Understand the planning and production process and identify the problem	Consolidate the extracted data to derive information required for further analysis	Generate effective indicators to measure sensitivity of capacity commitment	Formulate criteria to evaluate and compare the degree of sensitivity	Identify the sensitive product groups and evaluate their criticalness	Propose possible methods to reduce sensitivity due to demand structure change

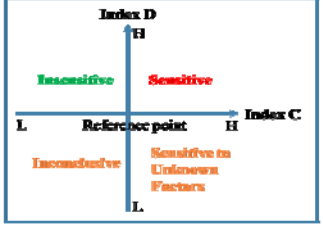
Methodology

Indices for variability of…

ACG Capacity Commitment	ACG Demand Structure
Mean & SD of semi constrained and constrained capacities across 25 weeks	Each PKN's proportion within the ACG
↓	↓
Coefficient of Variation (CV)	Mean & SD across 25 weeks
↓	↓
Average CV across the selected 8 weeks	CV * Mean (each PKN's weightage)
	↓
	Sum up the value for all the PKNs
	↓
	Average across the selected 8 weeks

CV is a better indicator of variability than SD
Coefficient of variation (CV) = Standard deviation (SD) / Mean

Sensitivity Matrix



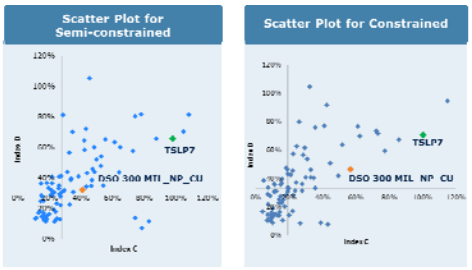
Interpretations

- Index D high, Index C low: Low sensitivity
- Index D high, Index C high: High sensitivity
- Index D low, Index C low: Inconclusive
- Index D low, Index C high: 1. very high sensitivity 2. external factors

The first quadrant (H,H) will be the focus of our project
Index D: Index for demand structure change, Index C: Index for capacity commitment

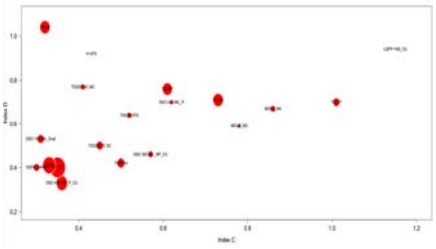
Result Analysis

Sensitivity Plots



Sensitivity ≠ Criticalness

Criticalness Plot



Recommendations

Buffer at PKC or PKN level

- Assign similar load factors to reduce moving bottlenecks
- Less sensitive to demand structure change

Enhance the skills of planners

- Improve the accuracy of forecast to achieve greater consistency in capacity planning

Restructure sensitive PKCs

- Combine PKCs to reduce the variability in planned capacities
- Remove and reallocate highly variable PKNs

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