Industrial And System Engineering

IE3110R: System Design Project (AY 13/14)

LOCATION SELECTION FOR WAFER STORAGES

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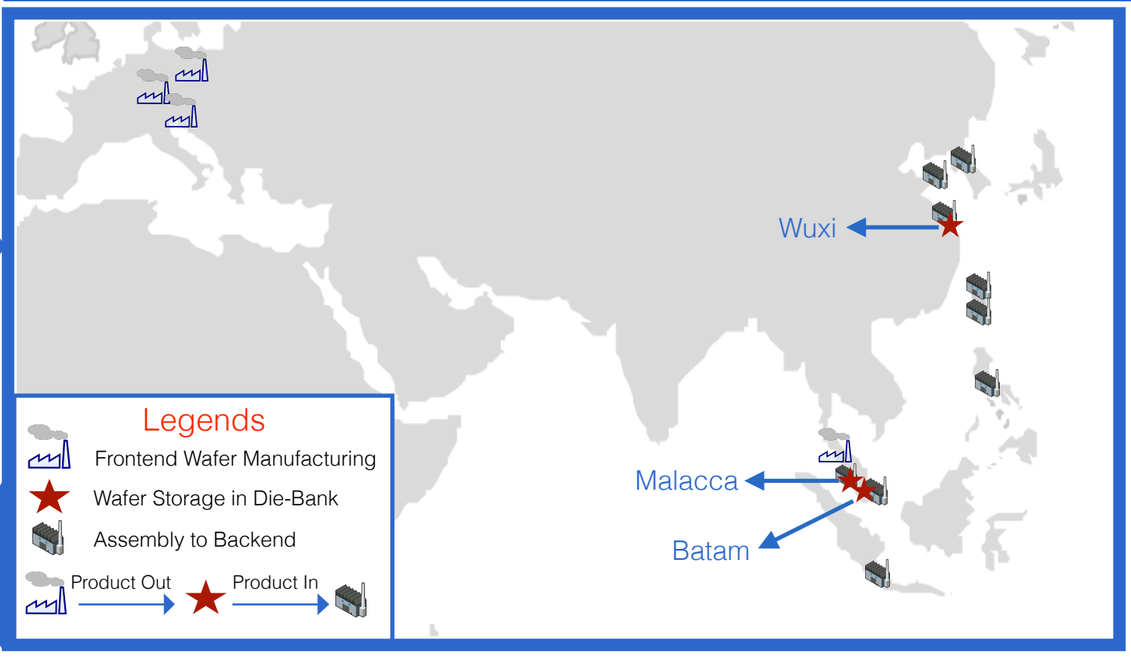
Infineon

Company Background

Infineon Technologies Asia Pacific Pte Ltd (IFAP)

- It is the regional headquarter of Asia excluding Japan
- It is the competence hub for Sales and Marketing, R&D, Supply Chain, Production Testing and Shared Services
- It achieved 1 billion pieces shipped in year 2010
- It has 40-year manufacturing history in Singapore and 27,000 sq ft wafer testing facility

Topic Definition



Current Problem

The current locations for the Die-Bank might not be optimal in terms of flexibility, speed, reliability and cost, to connect the front-end production sites and the backend production sites.

Project Objective

- Study and evaluate the existing supply chain network and landscape of wafer storages
- Explore the concepts of centralised and de-centralised locations
- Assessment should consider the countries policy such as tax, free flow of goods and commercial boundaries etc

Methodology

Re-select the Wafer Storage Locations

1. Candidate Location Selection
2. AHP Method to Select the top 5
3. Simulation Method to finalise the result

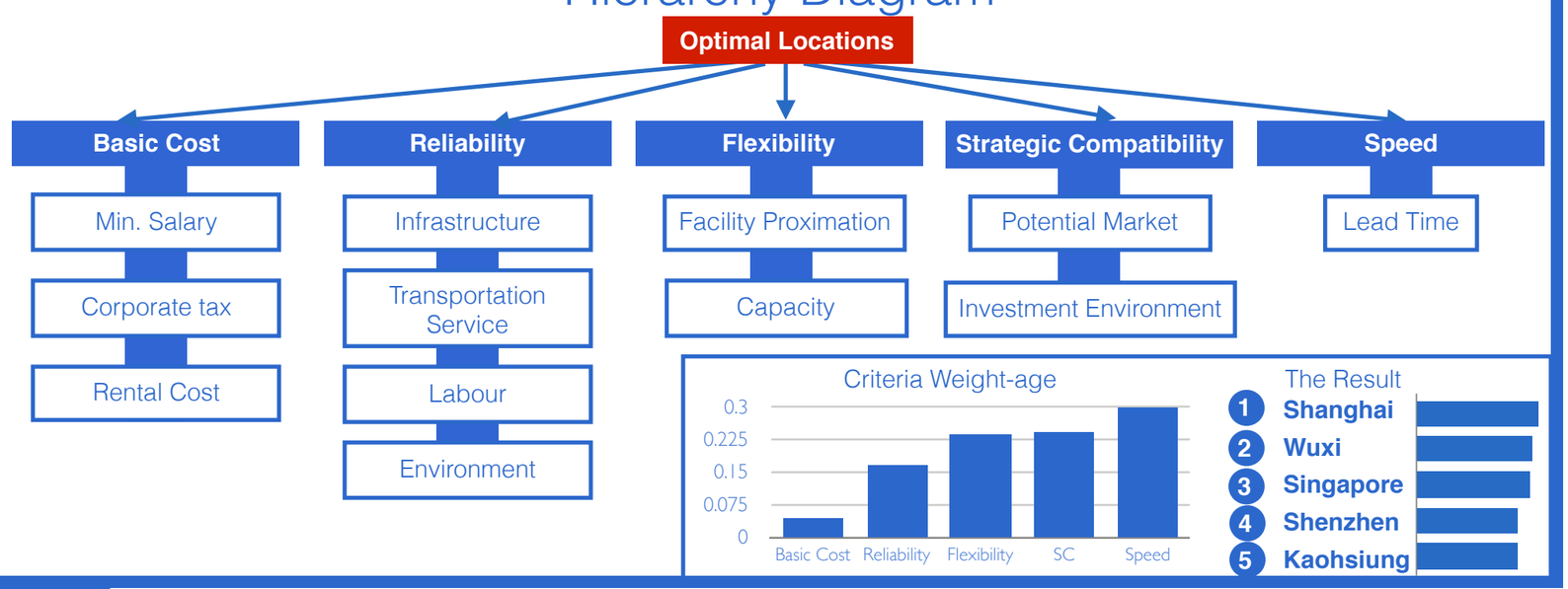
1. Candidates for Wafer Storage Selection

Name of the Region	Name of the City
China (mainland)	Shanghai, Wuxi, Shenzhen Xiamen
Malaysia	Malacca
Philippines	Manila
Singapore	Singapore
Taiwan	Kaohsiung
Indonesia	Batam
Hongkong	Hongkong

Based on the distance to backends and the transportation conveniency

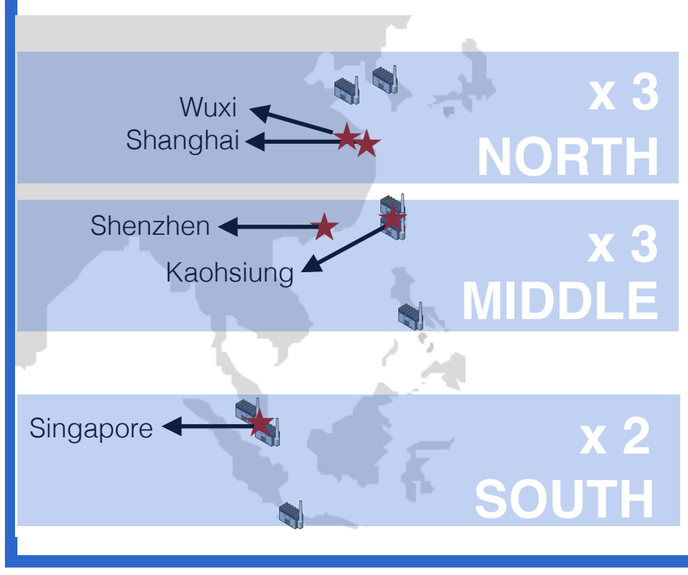
2. Analytic Hierarchy Process - First Screening

Hierarchy Diagram



3. Simulation Model - Second Screening

Geographical Allocation

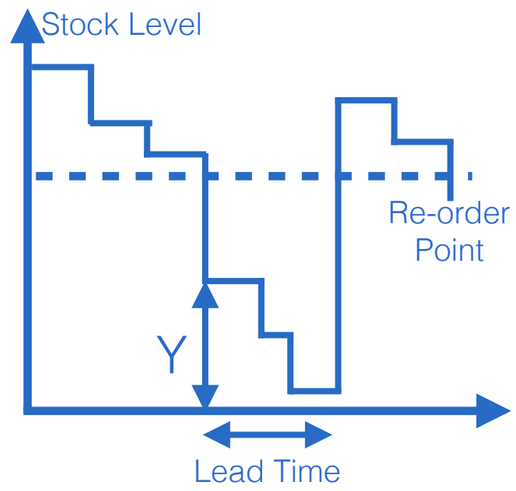


The locations have been divided into three regions: North, Middle and South. Backends seek supply starting from its nearest storages. It is redundant to have two storages in the same region

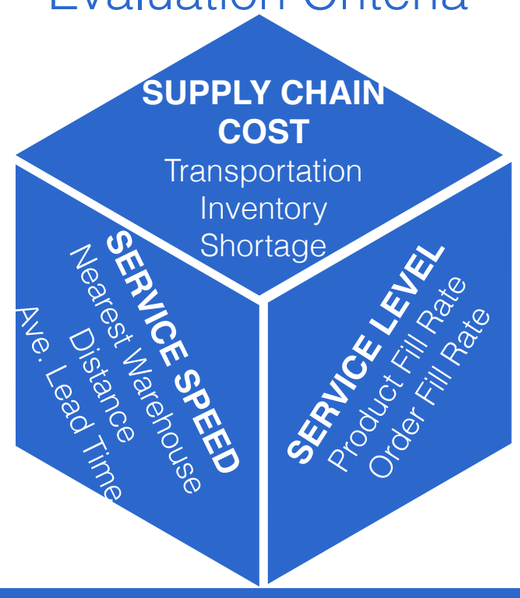
Therefore, the total number of the running scenario for this simulation is: 3 x 3 x 2 -1 = 17

Inventory Control Policy

Continuos Review Policy is adopted in the simulation model.



Evaluation Criteria



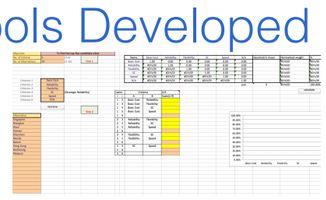
Conclusion

Location Recommendation

The outcome from the simulation suggests that the scenario 4 (SG+SH+KS) and scenario 10 (SG+SH) scores the highest ratings for Service Level, Service Speed and Supply Chain Cost. Further analysis on this 2 scenario indicates that location KS has strong benefit for Service Speed, but the site utilisation is extremely low. Hence, considering the volume weightage processed through KS location, we drop this location and prefer location selection from Scenario 10 (SG+SH)

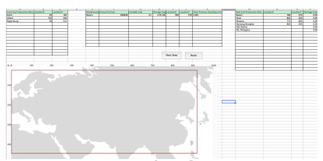
Tools Developed

AHP

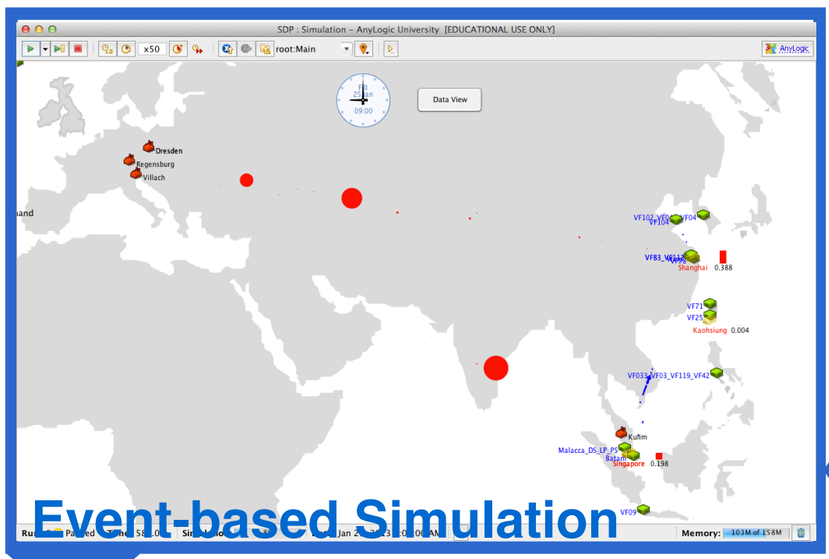


A excel simulation tool for AHP analysis

Simulation



Flexible data input for Simulation analysis



Event-based Simulation

Input Data

- Location of front-ends, warehouses and backends
- Fix cost, variable cost
- Initial Inventory, reorder point, order quantity of each product
- Backends' demand
- Transportation cost of each route

Output

Criteria units have been converted from 1 to 10

- Service Level
- Supply Chain Cost
- Service Speed