Business Continuity Plan (BCP) is a Competitive Advantage

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Risk Management
TSMC

Turn Risk into Opportunity
Outline

- Overview of Electronic Supply Chain
- TSMC’s Enterprise Risk Management
- TSMC’s BCM (Biz Continuity Management)
Electronic Supply Chain Overview in 2011
- From Electronic Service, System to Semiconductor

- Worldwide Semiconductor Sales
  - Electronic Services
    - > $5,000B
  - Electronic Systems
    - > $1,400B
  - Materials & Equipments
    - $307B *
  - ~$90B *

- Telecom, Internet, Broadcast ...
- Communication
  - Consumer, Computer ...

* Source: SEMI and Gartner report

- tsmc
  - Pioneer of Dedicated IC Foundry business model (1987)
  - 2011 revenue: US$ 14.5 billion
    Profit: 4.6 billion
  - Manufacturing more than 8,800 products (IC) for 457 customers.

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Foundry Model Enables Fabless Prosperity

Before 1986

1990s

2000s

1000+ IC Design Co.
TSMC - Enabler of Mobile Computing

1. TSMC supplies 40% of logic IC
2. Earns $7 of revenue for every smartphone shipment

Rich functionalities are enabled by ICs...

Designed by a plethora of IC vendors...

Application Processor
Baseband
BT/WiFi/FM
Power Management
CMOS Image Sensor
LCD Driver
RF Transceiver
GPS
Touch screen Controller
Touchscreen Driver
Audio Codec
MEMs/Other Analog
Memory
Discrete
TSMC – Foundry Capacity Leader

2011 6/8-inch capacity
- GF 12%
- SMIC 14%
- UMC 25%
- TSMC 49%

6/8-inch: 12.1M wafers (8” eqv.)

2011 12-inch capacity
- GF 22%
- SMIC 6%
- UMC 17%
- TSMC 55%

12-inch: 6.0M wafers (13.4M 8” eqv.)

2012 YoY Capacity Growth Rate

Source: TSMC, company data, TSMC estimates
TSMC’s Risk Management

● Enterprise Risk Management (ERM):
  ■ TSMC established its Enterprise Risk Management (ERM) program based on both its corporate vision and its long-term sustainability and responsibility to both industry and society. ERM seeks to provide for TSMC’s adequate management of risks on behalf of all stakeholders.

● ERM Strategy on Risks Control and Contingent (BCM)
  ■ Risk avoidance, risk transfer, risk mitigation and risk reductions are means to reduce corporate risks.
  ■ TSMC Business Continuity Management (BCM) is established to maintain wafer production or services delivery when a catastrophic incident occurs.
TSMC ERM Scope & Organization

2006: First foundry to embark on holistic Enterprise Risk Management (ERM) as its long term sustainability & responsibility to both industry and society.

ERM Scope: Operational, Hazard, Financial, & Strategic Risks

- **RM Steering Committee:**
  * Reports to Audit Committee
  * Is composed of functional heads;
  * Reviews risk control progress; and
  * Identifies and approves the prioritized risk lists.

- **RM Working Committee:**
  * Is composed of representatives from each function;
  * Aligns functional ERM activities; and
  * Follows up the risk control action plan.
ERM : Risk Quantification
“Risk Map” & Risk Treatment Strategies

<table>
<thead>
<tr>
<th>Risk Metrics</th>
<th>Insignificant 1</th>
<th>Minor 2</th>
<th>Moderate 3</th>
<th>Major 4</th>
<th>Catastrophic 5</th>
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<tbody>
<tr>
<td>Almost certain 5</td>
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<td>Likely 4</td>
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<td>Possible 3</td>
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<td>Unlikely 2</td>
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<tr>
<td>Rare 1</td>
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</table>

- **Reduction**: Low “S” & High “L”
- **Avoidance**: High “S” & “L”
- **Retention**: Low “S” & “L”
- **Transfer**: High “S” & Low “L”

Example : Risk D, earthquake’s Intensity > 6
### TSMC’s BCM Introduction

#### Objective
- BCM includes guidelines and procedures to be applied by companywide emergency and nature disasters through risk control, emergency response, crisis management and business continuity.

#### Scope
- Potential accidents or incidents which could cause significant production losses to the company, such as fire, chemical/gas leakage, **earthquake**, flood, incoming utility supply shortage, process excursion, product contamination, **supply interruption**, strike, sabotage, pandemic and IT unavailable, etc..

#### Strategy
- A framework with clear ownership of related function/department to safeguard customers and key stakeholders’ interest. Periodic review on threat identification, exercise and update on BCM.
BCM Organization Chart

- VP or committee chairman will host a business continuity meeting for catastrophe events.

Crisis Management and Business Continuity Task Force

- Operations VP or Committee Chair
  - AM/CSV
  - QR
  - FIN
  - IT/MM
  - Fab
  - Legal
  - PR
  - RM

Emergency Response Task Force

- Facility
- ISEP
- Fab Modules Dept.
- Fab Integration Dept.
- Fab Mfg Dept.
11

(1+3 ) Segments of TSMC’s BCM

ERM: before Disaster

Preventive Risk Management

- Risk Prevention “in advance” is the foundation for successful BCM:
  - Critical risks’ identification & improvement (Earthquake, utility, leak, fire, IT etc.)
  - Verification via scenario test.
  - Review by ERM

Typical BCM’s coverage

- 0-1 hr
  - Emergency Response
    - Life safety Protection & Contamination / damage limitation:

- 1-48 hrs
  - Crisis Management
    - Damage Assessment and Crisis Communication

- hrs to weeks*
  - Business Continuity
    - Production Recovery or Relocation:

TSMC want to prevent in advance through Risk Management
BCP (Biz Continuity Plan)

1. Identify critical process or biz
2. Define the goal of TTR & OP level
3. Plan & Drill

Example: What is the adequate TTR for different IT systems?
1. Fab MES system
2. Report system (Fin, Manufacturing)
3. Analysis system ....
Balance between Cost and Risk

Cost of Risk = “Preparedness” + “IMPACT”

Cost of Impact & downtime:
F(X) = (financial, productivity, reputation, other tangible/ intangible)
# TSMC’s BCM for Earthquake
(Continuous Drill and Improvement)

## Preparedness before Quake

**Preventive Risk Control:**

“**Intrinsic Anti-Seismic**”

## BCM Implementation after Quake

<table>
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<tbody>
<tr>
<td><strong>Evacuation Plan</strong> (by intensity)</td>
<td><strong>Assess Damage via “Visual + Simulation“</strong> (Fab –ERT )</td>
<td><strong>Assess &amp; decide reentry (Fab-ERT )</strong></td>
</tr>
<tr>
<td><strong>Assess Damage via “Visual + Simulation“</strong> (Fab –ERT )</td>
<td><strong>Drills</strong></td>
<td><strong>Notification &amp; trigger next level BCP if needed</strong></td>
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### Timeline for Quake Response

- Resume to normal.
- Rapid wafer tool recovery.
- Recovery plan.

### Intrinsic Anti-Seismic Design

- Old Building: Weak points
- New Building: Design-in.
- Tools & Facilities: Anti-seismic & min. power

### Operation Level

- Sustain with higher operation level.
- Suffer low operation level.

### tsmc’s Anti-seismic Modeling & Design

- Preventive Risk Control:
- BCM Implementation after Quake:
- Preparedness before Quake:

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Tactics of Earthquake Risk Management

- Speed-up building damage assessment. (key information for safety re-entry decision making.)

Seismic Risk Analysis

- Seismic protection in building / tool / facility:
  - Potential earthquake near science park.
  - Anti-seismic capability assessment.
  - Identification of critical building weak points.

Seismic Engineering Control

- Seismic simulation model

Post Quake Response

Before Quake: Proactive Loss Prevention

After Quake: Fast Production Resume

- Seismic hazard study through academic support:
  - Potential earthquake near science park.
  - Anti-seismic capability assessment.
  - Identification of critical building weak points.

- Seismic protection in building / tool / facility:
  - Seismic design in for new Fab.
  - Improvement for existed fab.

- Reduce 20~30% acceleration & 40~45% displacement
TSMC’s Supply-Chain Risk Management from RM, BCP to Sustainability

- **Hazardous free**
  - ESH Compliance
  - RM: Seismic/Safety + OHSAS 18001 etc.

- **S-C RM**
  - CSR
  - S-C Carbon Inventory
  - Green Manuf. (LEED)

- **Supply Chain Risk**
  - Geographic Risk
  - Financial Risk

- **BCP Capability**
  - Sustainability Forum (cross industries)
  - S-C’s BCP & Drill

- **Sustainability Forum**
  - (cross industries)
  - S-C Carbon Inventory
  - Green Manuf. (LEED)

- **CSR**
  - Carbon/ Water Footprint (Green Product)
  - Green Supplier Chain (Green supplier award)

- **Risk**
  - Regulation
  - Natural disaster
  - Conflict Metal
  - Climate change & …

- **Social**
  - Green Manuf. (LEED)
  - CSR

- **Green**
  - Carbon/ Water Footprint (Green Product)
  - Green Supplier Chain (Green supplier award)

- **2008**
- **2011**

- **RM & compliance**
- **Sustainability**
Thank you for your attention