How Japan Lost its Semiconductor Industry
Strategic Causes Behind the Long-Term Failure of Japan’s Semiconductor Industry

• Success Leads to Arrogance
• Missing the Demand Driver
• Wrong Manufacturing Strategy
• Finance and Exchange Rates
• Competitor’s Strategies

Maxim: You don’t win a market, you lose it.
Business is a game of faults.
Success Leads to Arrogance

• Japan’s Successes of the 80’s Lead to Arrogance

• Executives started to believe:
  – There was an historic spin of wealth around the globe that had gone from China to Europe, then America, and was now coming to Japan
  – There was nothing new to learn from the West
  – English, the language of business, was no longer relevant to their success
  – These beliefs set them up for failure
    • No need to work hard, learn, or understand
Missing the Demand Driver

• The “Olympic Rule” of NEC’s Ogi-san
  – Japan had always leapt ahead with each new Olympics, so it would in 1992
  – But, each leap was predicated on innovative Japanese products: the VCR, Trinitron TV, etc
  – For 1992, only HDTV was in the queue
    • But they cost upwards of $40K each
      – making them unaffordable
      – there was no demand driver
  – But Japan’s Semiconductor producers began a heavy capacity expansion with 6 inch fabs in 1991
    • This would leave them unable to build 8 inch fabs in 1993
    • Korea waited for 8 inch putting Japan at a fundamental cost disadvantage
Wrong Manufacturing Strategy

• Choice of Ultra-Clean over Yield Management in the early-90’s
  – Two directions for improving yield
    • Dr. Ohmi’s strategy of building the cleanest, or “Ultra-Clean,” clean room possible
    • KLA’s Richard Hong* development of in-line monitoring in Korea, which became known as “Yield Management”
  – Hong was right and Ohmi was wrong

* Richard Hong won SEMI’s Bob Graham Award in 2008 for this
Ultra-Clean versus Yield Management

- Korean chip makers using yield management techniques passed Japan by 1993 and held that advantage.
- Higher yields combined with lower cost-per-area due to 8 inch wafers gave Korea a fundamental cost advantage.
Finance and Exchange Rates

• Early 80’s Bonds came due in Early 90’s
  – Japan’s DRAM makers had funded DRAM expansion with bonds
  – As these came due, Japan was struggling with the profitability needed to pay them back
  – Japan’s banks went into their own crisis
  – Japan’s chip makers were reluctant to go outside their keiretsu banks for funds
  – This further constrained capital expansion

• Combined with a strengthening of the yen
  – 245 yen/dollar average from 1975-1985
  – 119 yen/dollar average from 1990-1995

• Japan’s chip makers were climbing a financial cliff
  – As Korea’s rode a water slide down
Competitor’s Strategies

• American Strategy to undermine Japan’s profitability via Korea
• TRON a new microprocessor architecture
  – By 1990 Japan was dominant in DRAMs
  – They then planned a move into Logic
• American companies saw the above strategic issues Japan faced
  – They countered by ‘gifting’ technology and support to Korea
  – Korea would pressure Japan’s profits and thus hamper their abilities in logic
Today

• Japan still faces an uphill financial battle
• It’s held down by a new generation that is not comfortable in foreign languages
• But it has an excellent engineering force
• Toshiba has proven it can be competitive via its success in Flash memory
  – Renesas in SoC
• Elpida was close to succeeding
Lessons to Learn:

• Constantly reassess your positions
  – Only the paranoid survive
    • Andy Grove
  – A show does not come off the rails in a day. It is the cumulative of the many wrong turns.
    • Peter Schneider

• Don’t over-commit to trend lines or beliefs
  – What you think you see may not be there at all
  – Look for the underlying driving forces
  – Your enemy is often yourself

• Don’t be afraid to reverse decisions
  – Fail fast, then pivot
  – Failure is a process, not an obstacle
    • Scott Adams
Addiction to additions results in inconsistency, overload, or waste; and sometimes all three

Mike Markkula

San Francisco Conservatory of Flowers
Why it Works: Colorful repeating patterns. Reference number: BA_11con_1004
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