



Santur
Corporation[™]

**Our Profitless Prosperity:
Are there lessons after 40 Years of Semi IC Manufacturing?**

March 11, 2010

Where are we?



OAXACA



sabbia



As the Oracle of Omaha has says...

...when a management team with a reputation for
brilliance

tackles a business with a reputation for
bad economics

it is the reputation of the business
that remains intact

After 40 Years: 4 year survey 2005 – 2009*

81 Companies: 38 IDM's and 43 Fabless.

3 groups:

	<u>IDM</u>	<u>Fabless</u>
– Large > \$750 million per year	25	8
– Small < \$200 million per year	5	19
– Medium – the rest	8	16

Revenue: less than \$200 million a year

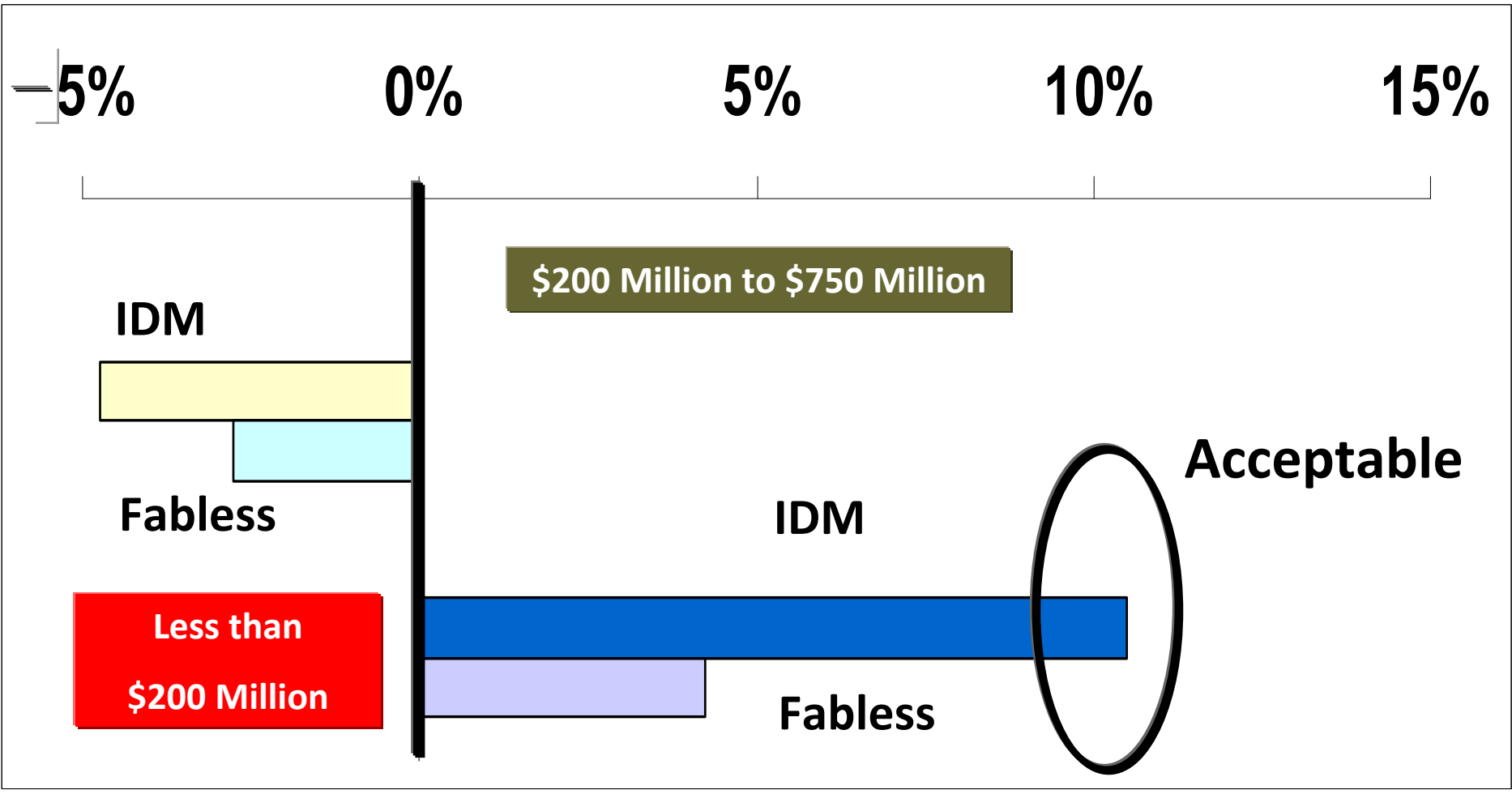
	Integrated Device Manufacturer	Fabless Chip Company
GM%	42%	51%
RDE%	22%	29%
SGA%	25%	25%

Revenue: \$200 million - \$750 million a year

	Integrated Device Manufacturer	Fabless Chip Company
GM%	36%	48%
RDE%	11%	23%
SGA%	15%	21%

• Note: Each number is an average over the four years

Incomes of Small and Medium IDM's and Fabless Co's



Note: IDM success not enabled by consolidation

•Note: Each number is an average over the four years


*The Fables manufacturing model
does not fix the profit problem*

Crap

So what has been the value?

Some Silicon IC Foundry History

Last 20 years of silicon IC Foundries

- 80's LSI logic et al. Capacity at e.g. TI/Hitachi for gate arrays 
- Early 90's Fabs cost >\$1B – Supporting Moore's law line width scaling below 1 μ m
- Late 90's High ASP, DIFFERENT ORDER OF MAGNITUDE VOLUME, One technology
 - ASP's >\$100
 - 1000 wafers/device/customer – 100 - 200K devices per product
 - Dozens of products/customer - Hundreds of products per fab
- **What this capability enabled:**
 - Silicon devices through software design and optimization
 - Products decoupled from the underlying technology development
 - Multi-sourcing, allowing IDM's to guarantee stability of supply
 - Lower capital barrier to entry:
 - New chip companies could form
 - But ...they turned out to not be very profitable, in general

So , again,

profit does not come from the

manufacturing model.

So where does it come from?

Differentiation

Case of Maxim and Altera ~ \$1.5 B

	<u>Average Large IDM</u>	<u>Maxim</u>
GM%	38%	60%
RDE%	14%	30%
SGA%	13%	10%
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Income%	11%	20%

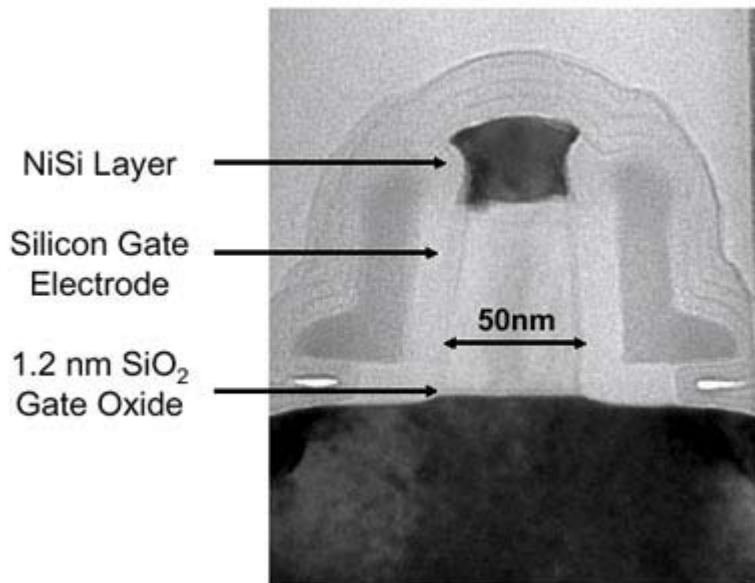
	<u>Average Large Fabless</u>	<u>Altera</u>
GM%	45%	65%
RDE%	20%	19%
SGA%	13%	21%
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Income%	13%	26%

•Note: Each number is an average over the four years

So what helps with differentiation

That has anything to do with what we're talking about

“Development Services” Faster Time-to-Market



Applied Materials:

- Needed tested gate process on new tools
- In house fab >\$100 million
- Hitachi's underused fab
 - \$25,000/lot fully tested wafers
 - Like IMEC CPFC TU/e

Customers:

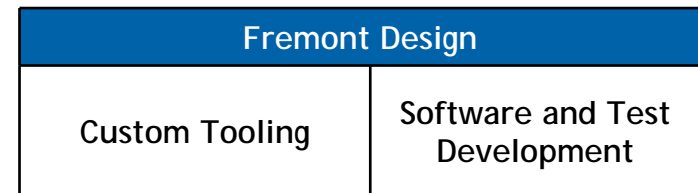
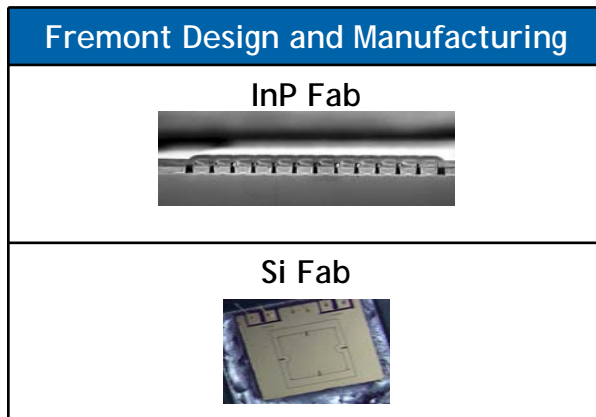
- Saved critical year off development cycle
- Enabled foundries to keep pace

Doesn't save American manufacturing jobs.
Is a tool to help make innovative companies profitable.

Conclusion - Santur's IDM model

Manufacturing Decisions are Tactical

- Mix of outsourced dedicated packaging with in house chip manufacturing
- Similar to Semi IC's
 - Asia packaging: Some is captive
 - Cost of packaging > cost of chip



- Effectively our factory in someone else's building
- What we're really buying:
 - Manufacturing expertise
 - Lower labor and overhead

\$100 Million Question

*If you have \$100 Million
that you want to invest
in components for optical communications*

Will you:

- 1. Invest in a foundry to support fabless chip manufacturing?*
- 2. Consolidate to eliminate capacity to stabilize pricing?*
- 3. Invest in new differentiated technology?*

(Hiding it under your mattress is not allowed)

Thank

You

IDM vs. Fabless Data Part 1

IDM				Fabless						
	< 200 Small	200-750 Medium	>750 Large		< 200 Small	Delta	200-750 Medium	Delta	>750 large	Delta
GM				GM						
2005	39%	37%	37%	2005	52%		47%		47%	
2006	43%	37%	39%	2006	53%		48%		46%	
2007	44%	36%	39%	2007	50%		48%		45%	
2008	42%	35%	37%	2008	48%		48%		42%	
Average	42%	36%	38%		51%	9%	48%	12%	45%	7%
RDE										
2005	25%	11%	14%	2005	28%		25%		17%	
2006	20%	12%	14%	2006	27%		22%		20%	
2007	20%	11%	14%	2007	27%		22%		21%	
2008	24%	11%	14%	2008	32%		23%		22%	
Average	22%	11%	14%		29%	8%	23%	12%	20%	6%
SGA										
2005	24%	15%	12%	2005	23%		20%		11%	
2006	22%	14%	13%	2006	24%		21%		13%	
2007	25%	14%	13%	2007	25%		20%		13%	
2008	27%	15%	14%	2008	28%		21%		13%	
Average	25%	15%	13%		25%	1%	21%	6%	13%	-1%

IDM vs. Fabless Data Part 2

IDM	< 200 Small	200-750 Medium	>750 Large	Fabless	< 200 Small	Delta	200-750 Medium	Delta	>750 large	Delta
	Op Inc									
2005	-10%	11%	11%	2005	1%		2%		19%	
2006	1%	11%	12%	2006	2%		5%		13%	
2007	-1%	11%	12%	2007	-2%		6%		11%	
2008	-9%	9%	9%	2008	-12%		4%		7%	
Average	-5%	11%	11%		-3%		4%	-6%	13%	2%
Capital Spending										
2005	4%	10%	13%	2005	4%		5%		4%	
2006	4%	10%	12%	2006	5%		5%		5%	
2007	4%	10%	12%	2007	6%		5%		4%	
2008	4%	11%	11%	2008	4%		4%		5%	
Average	4%	10%	12%		5%	1%	5%	-6%	4%	-8%
Market Cap: Sales										
2005	4.0	3.4	4.5	2005	6.5		3.8		5.9	
2006	5.5	2.9	4.1	2006	5.8		3.0		4	
2007	4.5	3.2	4.2	2007	5.0		2.1		2.8	
2008	3.0	2.0	1.8	2008	2.0		1.3		1.8	
Average	4.3	2.9	3.7		4.8		2.6		3.6	

Fabless: List of Companies

- **Small Fabless:**

Actions Semi, Adaptec, Advanced Analogic, Cavium, Cirrus, Echelon, Exar, GSI, Hittite Microwave, Ikanos Communications, Leadis, Mellanox, NetLogic, Pixelworks, PLX, QuickLogic, Silicon Motion, Spreadtrum Communications, Techwell

- **Medium Fabless:**

Actel, Atheros, conexant, DSP, Integrated Silicon Solution, Lattice, OmniVision, PMC-Sierra, Power Integrations, Semtech, Silicon Image, Silicon Labs, Silicon Storage Technology, Standard Microsystems, Trident Microsystems, Zoran

- **Large Fabless:**

Altera, Broadcom, Himax, LSI, Marvell, NVidia, SanDisk, Xilinx

IDM: List of Companies

- **Small IDM:**

Applied Micro, Netlist, Supertex, Zarlink, Zilog

- **Medium IDM:**

ANADIGICS, Cree, Diodes, IXYS, Micrel, Microsemi, SMART Modular Tech, Triquint

- **Large IDM:**

AMD, Advanced Semi Engineering, Analog Devices, Atmel, AU Optronics, Avago, Cypress, Fairchild, Infineon, Intel, IDT, International Rectifier, Linear Technology, MEMC, Microchip Tech, Micron, National Semi, ON, RF Micro, Skyworks, Spansion, ST Micro, Suntech, TI, Vishay

Numbers for TSMC

Revenue	Average ~ \$10B
GM%	45.0%
RD&E %	5.7%
SGA%	4.2%
Income	35.2%

TowerJazz

Pro-Forma Financial Information – Annual Report

The following unaudited pro-forma financial information assumes that the Jazz Merger occurred on January 1, 2007 (and assumes that the acquisition of Jazz Semiconductor by Jazz occurred on January 1, 2007)

(Unaudited)	Year ended December 31,	
	2008	2007
Revenues	\$ 384,044	\$ 438,502
Loss	(106,647)	(146,409)

Note: There are \$140million in depreciation on the balance sheet – is this due to all the consolidations?

Key stats and ratios – Google Finance – GAAP basis

	Q3 (Sep '09)	2008
Net profit margin	-38.01%	-42.29%
Operating margin	-24.41%	-34.72%