

Global Technology Supply Chain Handbook

Connecting the Dots from Around the World

■ Industry Overview



- **Updated Global Technology Supply Chain Handbook** – We have updated our Global Technology Supply Chain Handbook to include several enhancements including additional bill of material product teardowns (iPhone 5, Nokia Lumia, New iPad mini, Kindle Fire HD, Samsung Galaxy 4S, Microsoft Surface), comparison of new vs. old Apple suppliers, 3D Printing and more companies (206 total companies now included; +28% increase y/y). The Handbook serves as a reference guide enabling investors to gauge the impact of incremental data points as related to specific companies within key technology sectors. Global Supply Chain diagrams provide a high level overview of a company's supply chain by mapping "upstream" suppliers and "downstream" customers of a specific company. With these diagrams, investors can connect the dots to see how data from one or more companies can affect others.
- **This publication includes:**
 - Proprietary sector overview charts, key product teardowns/bill of materials analysis and placemats from Citi technology analysts globally
 - Supply Chain charts with key suppliers, customers, competitors, geographic exposure, operating segments for 206 companies
- **Industries covered include:**
- **Equipment/Components:**
 - Semiconductor Equipment
 - Semiconductor Foundry
 - Semiconductors (Analog Semiconductor, Memory: DRAM & NAND)
 - Glass Substrate
 - Flat Panel Display
 - Cover Glass
 - Connectors
- **Hub:**
 - Electronic Manufacturing Services
 - Distribution
- **End Products:**
 - Handsets
 - PC & Tablets
 - Enterprise Storage
 - TV's
 - Set Top Boxes
 - Gaming Consoles
 - Networking & Telecommunications Equipment
 - Printing & 3D printing
 - Automotive/Aerospace
 - Solar

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Electronic Components

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Chemical and High Technology Materials

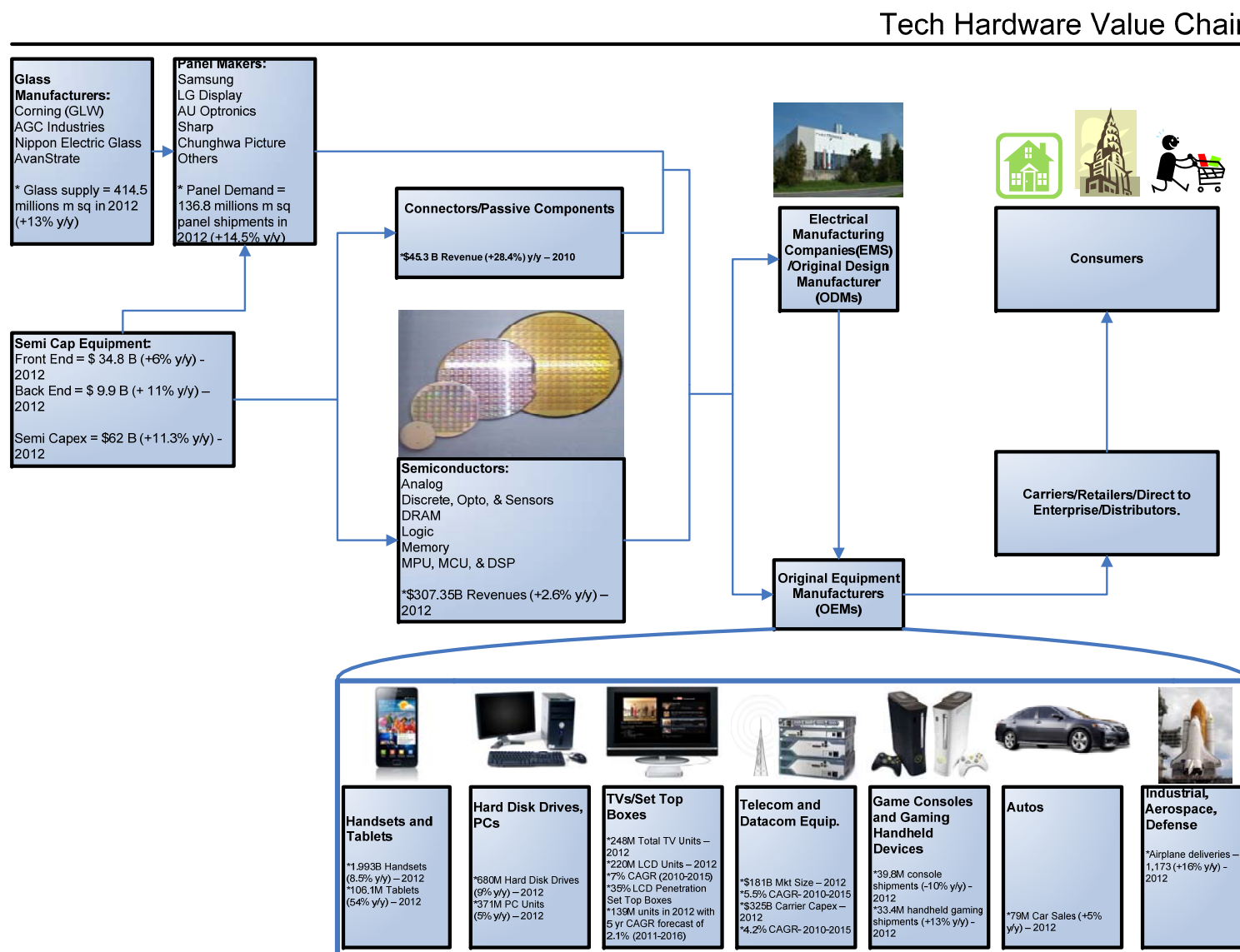
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Sources – The product, operating segment and geographic breakdown data in this publication is primarily from the latest U.S. SEC filings (10-K's, 20-F's and Annual Reports). Supply chain data regarding customers, suppliers, and competitors are from Citi Research analysts, company publications, as well as SEC filings. The SEC requires companies to disclose material customer or supplier relationships so more supply chain information is generally available for U.S. companies than non-U.S. companies. Almost all of the data are from sources that are less than a year old. Note: prices, rating, and target prices are as of May 7, 2013. All financial estimates have been retrieved from Citi's DataCentral service or factset for non-covered companies.

Please contact your Citi representative for additional details as most industry charts are summaries of much more detailed information.

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Figure 1. Overview of Tech Hardware and Supply Value Chain



Source: Citi Research, Gartner, IDC, World Bank, IMF, Thomson First Call, SIA

Figure 2. Tech Dashboard

Tech Dashboard - Apr 2013

	2009		2010		2011		2012		2013E		2014E	
	Absolute	Y/Y	Absolute	Y/Y	Absolute	Y/Y	Absolute	Y/Y	Absolute	Y/Y	Absolute	Y/Y
Global GDP Growth (Real)		-1.9%		4.2%		3.0%		2.5%		2.6%		3.1%
Global CPI		1.4%		2.7%		3.6%		2.9%		2.7%		3.0%
US GDP Growth (Real)		-2.6%		3.0%		1.7%		2.2%		1.9%		2.8%
US CPI		0.1%		1.6%		2.5%		1.8%		1.3%		2.1%
Euro vs US\$ (Q4 est)	1.43	2.4%	1.32	-7.8%	1.39	5.3%	1.28	-7.9%	1.28	0.0%	1.23	-3.9%
S&P 500 Operating EPS	\$62.05	0.4%	\$85.29	37.5%	\$97.84	14.7%	\$103.76	6.1%	\$110.0	6.0%	\$117.0	6.4%
Tech Sector Weighting (Strategy)			19.2%		20.0%		19.5%		17.7%			
S&P 500 Semis (Over-wt)			2.5%		2.9%		1.9%		1.9%			
S&P 500 Software (Over-wt)			9.8%		8.6%		10.2%		9.9%			
S&P 500 Hardware (Over-wt)			6.9%		8.6%		7.5%		5.9%			
PC												
PC WW Units (Desktop + Portable)	314.8M		357.9M	14%	363.9M	2%	350.4M	-4%	337.9M	-4%	346.1M	2%
Desktop	146.0M		157.0M	7%	154.8M	-1%	148.4M	-4%	144.1M	-3%	145.0M	1%
Portable	168.8M		200.9M	19%	209.1M	4%	202.0M	-3%	193.8M	-4%	201.1M	4%
Tablets			19.3M		72.0M	273%	128.3M	78%	206.0M	60%	266.5M	29%
Hard Disk Drive units	557.1M		651.3M	17%	622.4M	-4%	578.5M	-7%	551.4M	-5%	564.5M	2%
Comm Equipment												
Handset Units	1.39B		1.73B	24%	1.97B	14%	1.99B	1%	2.13B	7%	2.35B	11%
Smartphone Units	189M		320M	70%	487M	52%	732M	50%	1,165M	59%	1,458M	25%
Global Wireless Capex*	\$128.4B		\$137.3B	7%	\$143.8B	5%	\$150.1B	4%	\$147.8B	-2%	\$145.5B	-2%
Global Wireline Capex*	\$94.8B		\$97.8B	3%	\$103.5B	6%	\$100.9B	-2%	\$103.6B	3%	\$98.7B	-5%
Service Provider Telco Equip Sales												
Wireless	\$905.5B		\$976.3B	8%	\$1,075.2B	10%	\$1,093.6B	2%	\$1,135.9B	4%	\$1,171.5B	3%
Wireline	\$557.3B		\$557.7B	0%	\$584.0B	5%	\$570.2B	-2%	\$563.5B	-1%	\$573.4B	2%
Enterprise												
Enterprise Network Equipment Revenue			\$36.3B		\$38.2B	5%	\$40.7B	7%	\$42.8B	5%	\$44.5B	4%
Servers (x86)	6.6M		7.7M	18%	8.0M	4%	8.0M	0%	8.2M	3%	8.6M	4%
Total External Disk-Based Storage Systems			\$21.2B		\$25.1B	18%	\$26.6B	6%	\$28.1B	6%	\$29.7B	6%
Direct Attached Storage (DAS)			\$2.9B		\$2.8B	-5%	\$2.6B	-6%	\$2.4B	-7%	\$2.3B	-5%
Storage Area Networking (SAN)			\$12.5B		\$15.6B	24%	\$16.9B	8%	\$18.1B	7%	\$19.2B	6%
Network Attached Storage (NAS)			\$5.1B		\$6.0B	17%	\$6.3B	5%	\$6.8B	9%	\$7.5B	9%
Enterprise Software WW (top down)	\$225.0B		\$245.3B	9%	\$269.2B	10%	\$278.8B	4%	\$296.6B	6%	\$316.4B	7%
Citi-covered Software (bottoms-up)	\$129.0B		\$147.2B	14%	\$164.0B	11%	\$175.1B	7%	\$185.4B	6%	\$199.0B	7%
Applications	\$36.5B		\$41.9B	15%	\$46.1B	10%	\$49.6B	7%	\$52.8B	7%	\$57.6B	9%
Infrastructure	\$84.9B		\$97.3B	15%	\$108.9B	12%	\$115.9B	6%	\$122.5B	6%	\$130.8B	7%
Security	\$7.6B		\$8.1B	7%	\$9.0B	11%	\$9.6B	7%	\$10.0B	4%	\$10.5B	5%
Consumer												
LCD TV	145.4M		191.6M	32%	205.3M	7%	203.2M	-1%	213.0M	5%	230.3M	8%
Automotive												
Global Production	59.5M		74.4M	25%	77.0M	4%	81.8M	6%	83.6M	2%	88.7M	6%
Global Sales	63.9M		72.4M	13%	75.5M	4%	79.0M	5%	80.0M	1%	82.3M	3%
Components/Suppliers												
Semi Revenues	\$226.3B		\$298.3B	32%	\$299.5B	0%	\$291.6B	-3%	\$293.9B	1%	\$309.6B	5%
Glass Demand (millions sq meters)			306 mln m2	30%	302 mln m2	-1%	325 mln m2	8%	348 mln m2	7%	372 mln m2	7%

Source: Citi Research, Gartner, Dataquest, IDC, World Bank, IMF, Thomson First Call, SIA, JD Power & Associates

Figure 3. IT Dashboard in US\$ terms

	2008	2009	2010	2011	2012	2013	2014	2015	2011	2012	2013	2014	2015	CAGR '09-'13	CAGR '10-'13	CAGR '10-'14	CAGR '10-'15
Personal Computers	\$242	\$219	\$243	\$246	\$231	\$214	\$207	\$209	1.0%	-6.0%	-7.3%	-3.3%	0.8%	-0.6%	-4.2%	-3.9%	-3.0%
Servers	\$57	\$46	\$50	\$57	\$56	\$58	\$60	\$62	14.1%	-0.8%	3.4%	2.7%	3.1%	5.8%	5.4%	4.7%	4.4%
Printers / Copiers	\$60	\$49	\$53	\$52	\$51	\$49	\$49	\$47	-1.5%	-1.7%	-2.9%	-1.6%	-2.4%	0.2%	-2.1%	-2.0%	-2.0%
Storage Systems	\$22	\$20	\$24	\$27	\$28	\$29	\$31	\$34	9.1%	4.8%	4.1%	7.2%	8.9%	9.4%	6.0%	6.3%	6.8%
Networked Storage Systems (SAN + NAS)		\$14.9	\$18.8	\$21.5	\$23.1	\$24.9	\$26.6	\$28.4	14.3%	7.3%	7.6%	7.0%	6.6%	13.7%	9.7%	9.0%	8.5%
Software	\$231	\$225	\$244	\$269	\$279	\$297	\$316	\$337	10.2%	3.5%	6.4%	6.7%	6.6%	7.1%	6.7%	6.7%	6.7%
Storage Management Software		\$11.6	\$12.3	\$14.0	\$15.0	\$16.2	\$17.5	\$18.8	13.8%	7.3%	7.8%	7.9%	7.2%	8.8%	9.6%	9.2%	8.8%
IT Services	\$811	\$769	\$793	\$865	\$878	\$918	\$963	\$1,012	9.1%	1.5%	4.5%	4.9%	5.1%	4.5%	5.0%	5.0%	5.0%
Networking / Telecom Equipment	\$185	\$168	\$178	\$56	\$59	\$61	\$63	\$64	-68.2%	3.8%	3.8%	3.2%	2.0%	-22.5%	-30.1%	-22.9%	-18.5%
Data Networking		\$31.1	\$37.3	\$39.0	\$42.7	\$46.3	\$49.6	\$52.7	4.4%	9.4%	8.6%	7.1%	6.2%	10.4%	7.5%	7.4%	7.1%
Mobile Handsets	\$214	\$206	\$235	\$286	\$342	\$397	\$433	\$468	21.8%	19.8%	15.8%	9.2%	8.1%	17.8%	19.1%	16.5%	14.8%
Mobile Telecom Services	\$857	\$848	\$910	\$992	\$1,015	\$1,059	\$1,109	\$1,158	9.0%	2.3%	4.4%	4.7%	4.5%	5.7%	5.2%	5.1%	4.9%
Fixed Telecom Services	\$723	\$688	\$693	\$670	\$640	\$629	\$619	\$610	-3.3%	-4.4%	-1.8%	-1.6%	-1.5%	-2.2%	-3.2%	-2.8%	-2.5%
All IT	\$3,403	\$3,239	\$3,423	\$3,520	\$3,579	\$3,711	\$3,849	\$4,001	2.8%	1.7%	3.7%	3.7%	4.0%	3.5%	2.7%	3.0%	3.2%
IT Hardware	\$780	\$709	\$782	\$723	\$767	\$808	\$842	\$883	-7.5%	6.1%	5.3%	4.2%	4.9%	3.3%	1.1%	1.9%	2.5%
IT Hardware ex-Handsets	\$567	\$503	\$548	\$437	\$425	\$411	\$409	\$416	-20.1%	-2.9%	-3.1%	-0.5%	1.6%	-4.9%	-9.1%	-7.0%	-5.4%

Source: Citi Research

Figure 4. IT Services Forecast

	2011	2012	2013	2014	2015	2016	CAGR
BPO	153,224	160,851	169,574	179,130	189,452	200,269	5.5%
IS Outsourcing	122,453	124,896	128,184	131,690	134,761	136,459	2.2%
Systems Integration	112,068	114,932	119,262	124,725	130,669	136,661	4.0%
Business Consulting	74,861	78,583	83,549	89,431	95,936	102,688	6.5%
Software deploy and support	68,555	70,393	72,808	75,635	78,663	81,649	3.6%
Hardware deploy and support	62,130	63,209	64,970	66,967	69,166	71,447	2.8%
Network and Desktop Outsourcing	46,979	48,742	50,934	53,542	56,305	59,086	4.7%
Application Management	48,421	51,103	54,061	57,274	60,470	63,273	5.5%
Custom Application Development	37,579	39,384	41,550	43,917	46,364	48,871	5.4%
Network Consulting and Integration	34,273	36,392	38,867	41,608	44,416	47,336	6.7%
IT Consulting	30,747	31,311	32,368	33,754	35,305	36,962	3.8%
Hosting and Infrastructure Services	31,025	33,306	35,952	38,855	41,710	44,623	7.5%
IT Education and Training	23,378	23,855	24,629	25,575	26,622	27,672	3.4%
Hosted Application Management	9,527	10,368	11,332	12,421	13,630	14,917	9.4%
Total	\$855,220	\$887,325	\$928,039	\$974,523	\$1,023,468	\$1,071,912	4.6%
yr/yr growth	6.8%	3.8%	4.6%	5.0%	5.0%	4.7%	

Source: IDC

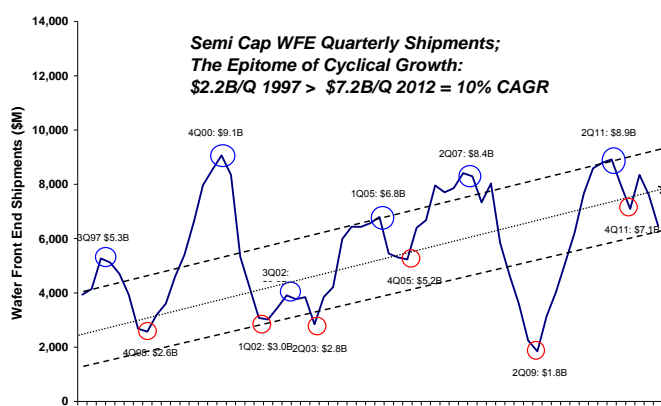
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Sector Charts

Semiconductor Capital Equipment

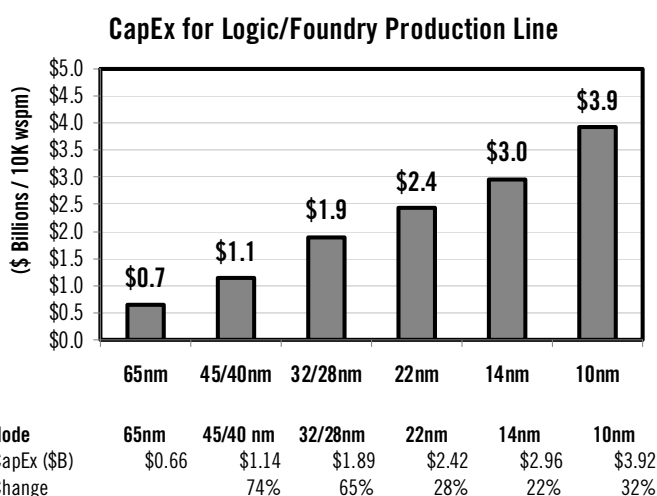
Semiconductor capital equipment suppliers provide equipment to chip or device makers like Intel, TSMC, Samsung etc. Semiconductor equipment suppliers include both front-end or wafer fab equipment and back-end or test and packaging suppliers. Wafer fab equipment is used to manufacture semiconductor device on a silicon substrate or wafer. Major wafer fab equipment suppliers include Applied Materials, ASML, Tokyo Electron, Lam Research, KLA-Tencor etc. Packaging and test equipment is used to final test a chip electrically before it is packaged in the OEM box. Major test and packaging equipment suppliers include Teradyne, Advantest, and Kulicke and Soffa.

Figure 5. Semi Cap: Cyclical Growth Mistaken for Mature Cyclical



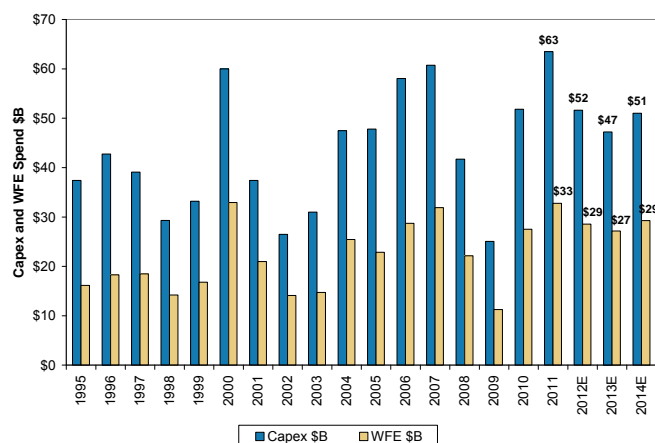
Source: Citi Research

Figure 6. Rising Capital Intensity



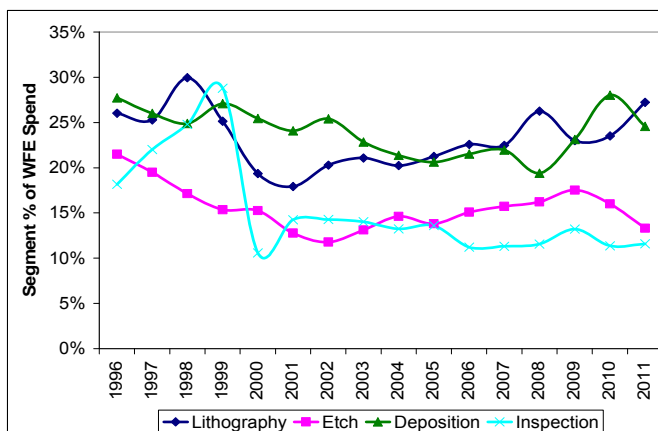
Source: Citi Research

Figure 7. Capex & WFE Spend Forecast



Source: WWSEMS, Citi Research

Figure 8. Litho and Inspection Spend Outperforming

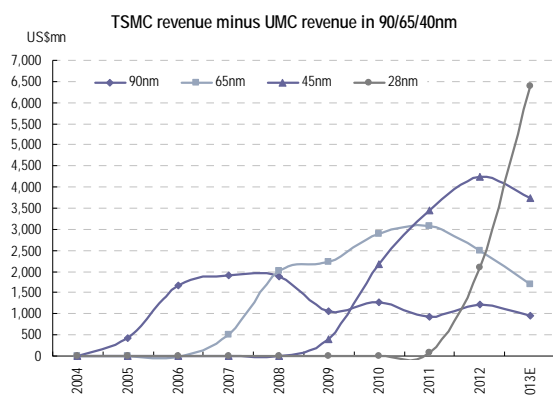


Source: WWSEMS

Semiconductor Foundry & Backend

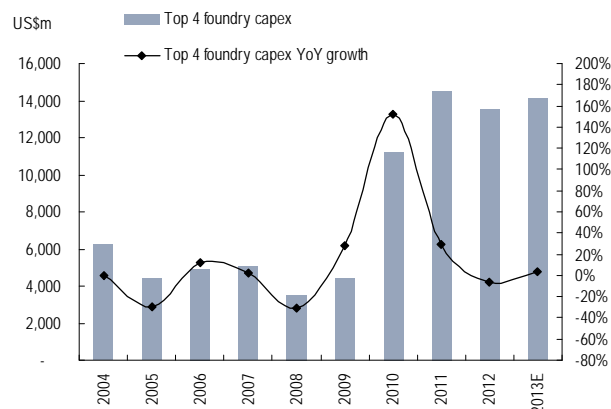
Semiconductor foundry and backend companies are contract manufacturers; foundries provide front-end wafer processing services for their customers (including IDMs, system makers and fabless companies), and backend suppliers provide IC assembly and testing services. The major players providing foundry services include TSMC (50% market share), Globalfoundries, UMC, SMIC, and Samsung. The major backend service providers include ASE, Amkor, SPIL, STATS ChipPAC and Powertech.

Figure 9. Advanced-Node Revenue Difference between TSMC and UMC



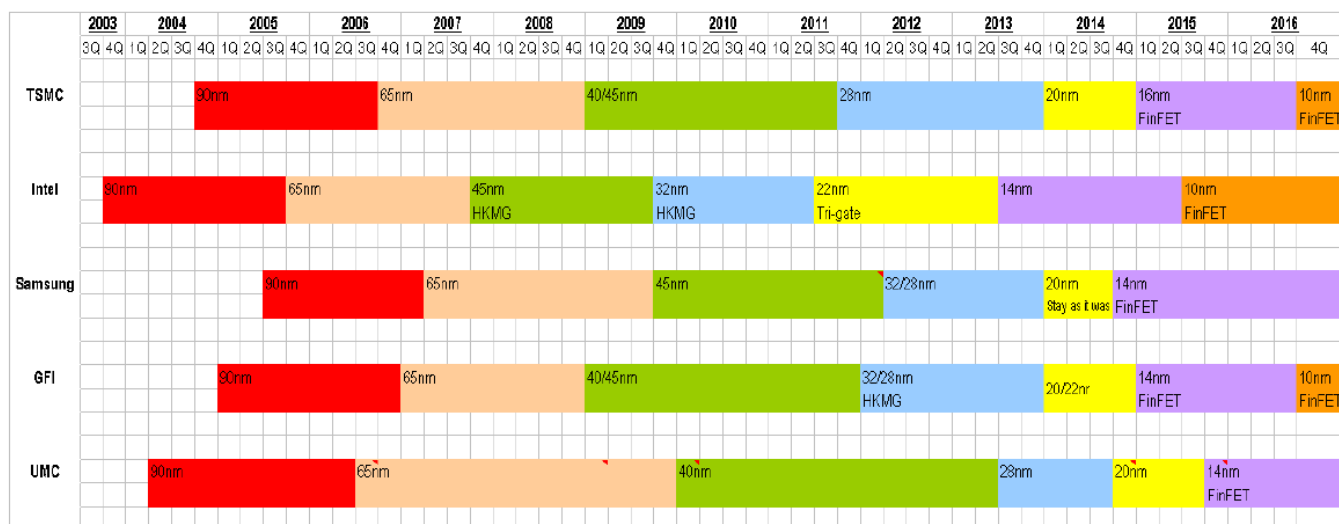
Source: Company, Citi Research

Figure 10. Top 4 Foundry Capex Trend



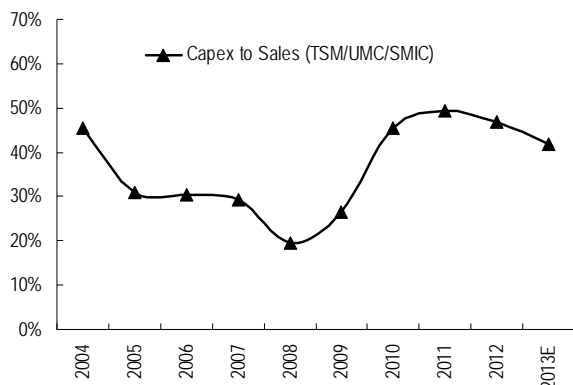
Source: Company, Gartner, Citi Research

Figure 11. Mass production roadmap of key technologies in TSMC, Intel, Samsung, Globalfoundries and UMC



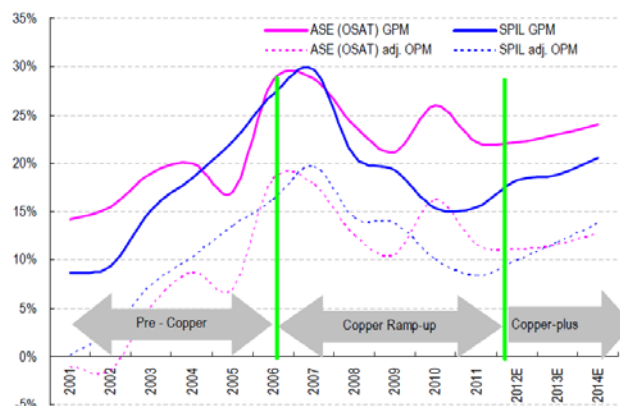
Source: Companies, Citi Research

Figure 12. TSMC+UMC+SMIC foundry capex to sales ratio



Source: Company, Bloomberg, Citi Research

Figure 13. OSATs entering the "copper plus" era



Source: Company, Citi Research

Figure 14. Capacity expansion of foundries

(8"-equivalent)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013E
TSMC	4,791	5,955	7,064	8,294	9,376	9,952	11,327	13,222	15,089	16,257
UMC	3,158	3,855	4,017	4,308	4,507	4,586	4,792	5,323	5,514	5,716
CHRT/Globalfoundries	1,289	1,501	1,784	1,960	2,443	3,341	3,767	4,219	5,805	6,548
SMIC Total	1,097	1,697	2,050	2,135	1,909	1,922	2,010	2,286	2,423	2,776
Top 4 Capacity	10,336	13,008	14,914	16,697	18,235	19,802	21,895	25,050	28,830	31,296
YoY		26%	15%	12%	9%	9%	11%	14%	15%	9%
Samsung							878	1,890	3,476	4,725
Top 4 + Samsung	10,336	13,008	14,914	16,697	18,235	19,802	22,772	26,940	32,307	36,021
YoY		26%	15%	12%	9%	9%	15%	18%	20%	11%
Total Foundry Capacity (Gartner)	19,459	23,512	26,210	29,527	32,775	34,939	37,906	42,970	46,229	49,629
YoY		21%	11%	13%	11%	7%	8%	13%	8%	7%

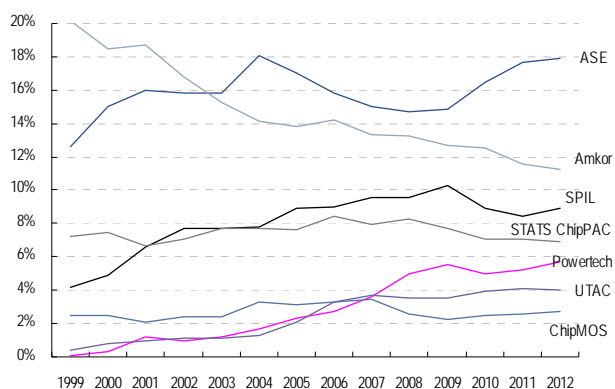
Source: Citi Research

Figure 15. Total Incremental Wafer Demand from Key New Products

(Unit: '000 of 8" equivalent)	iPhone	Samsung smartphone	Other smartphone	Feature phone	iPad / Tablet	NB	Total
Total incremental wafers (2011E)	1,888	2,987	2,027	1,158	3,264	624	11,948
Total incremental foundry addressable (2011E)	999	1,049	1,227	688	2,087	246	6,294
As % of 2010 top 4 foundry capacity	5%	5%	6%	3%	10%	1%	29%
Total incremental wafers (2012E)	1,767	4,752	3,607	(3,450)	3,495	(542)	9,630
Total incremental foundry addressable (2012E)	935	1,668	2,184	(2,049)	2,234	(213)	4,759
As % of 2011 top 4 foundry capacity	4%	7%	9%	-8%	9%	-1%	19%
Total incremental wafers (2013E)	165	4,759	12,971	(4,628)	6,478	(405)	19,340
Total incremental foundry addressable (2013E)	87	1,671	7,852	(2,749)	4,141	(160)	10,843
As % of 2012 top 4 foundry capacity	0%	6%	27%	-10%	14%	-1%	38%

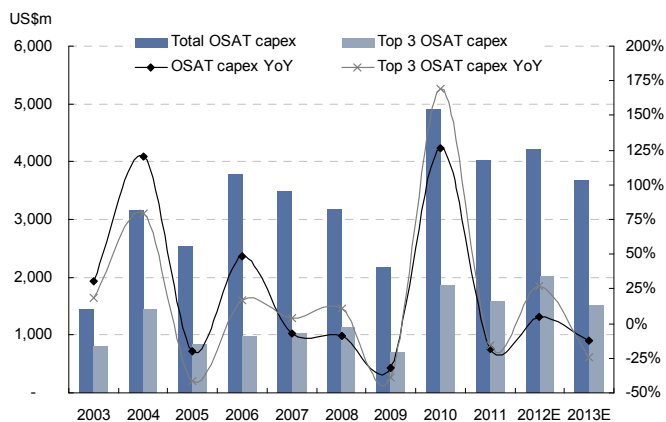
Source: Citi Research

Figure 16. OSAT market share trend



Source: Gartner

Figure 17. Top 3 OSAT capex vs total OSAT capex

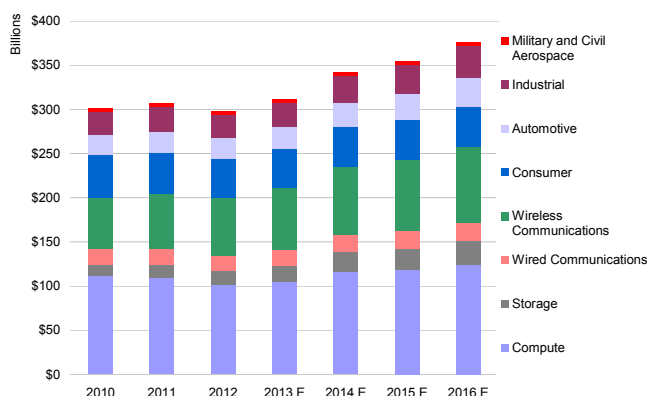


Source: Gartner, Citi Research

Semiconductor

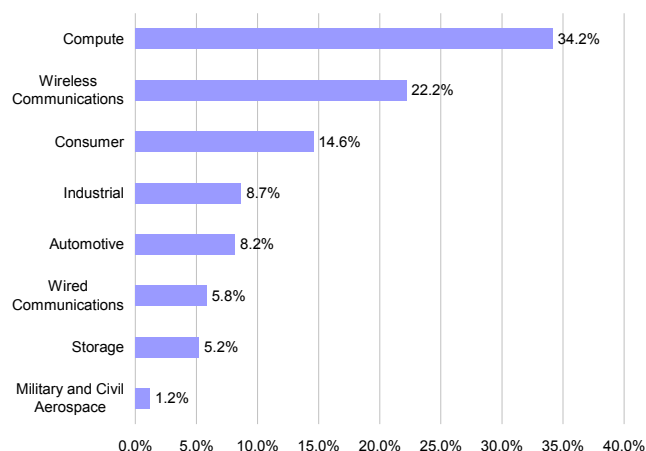
Semiconductor companies design devices (chips) used in a variety of applications worldwide. Chip companies can be characterized by the degree to which they outsource the manufacturing of the chips they design. Outsourcing to foundries is a growing trend due to the exponentially rising cost of building chip fabrication plants (fabs). Smaller chip companies can avoid the capital intensive costs and burdens they impose by going “fables.” On one end of the spectrum, integrated device manufacturers (IDMs) design chips and build their own fabs to manufacture the devices—Intel is an example of a pure IDM company. On the other end of the spectrum, fabless chip companies contract all of their production to external foundry partners like TSMC, UMC, or GlobalFoundries—Qualcomm and Broadcom are examples of pure fabless companies. Several chip companies fall in between the two extremes, operating their own fabs in addition to outsourcing to foundry partners—Texas Instruments outsources a small portion of its production, mainly for leading-edge chips; and Cypress Semiconductor outsources half, a so-called “fab-lite” strategy.

Figure 18. Semiconductor Revenues by Application, Historical and Forecast



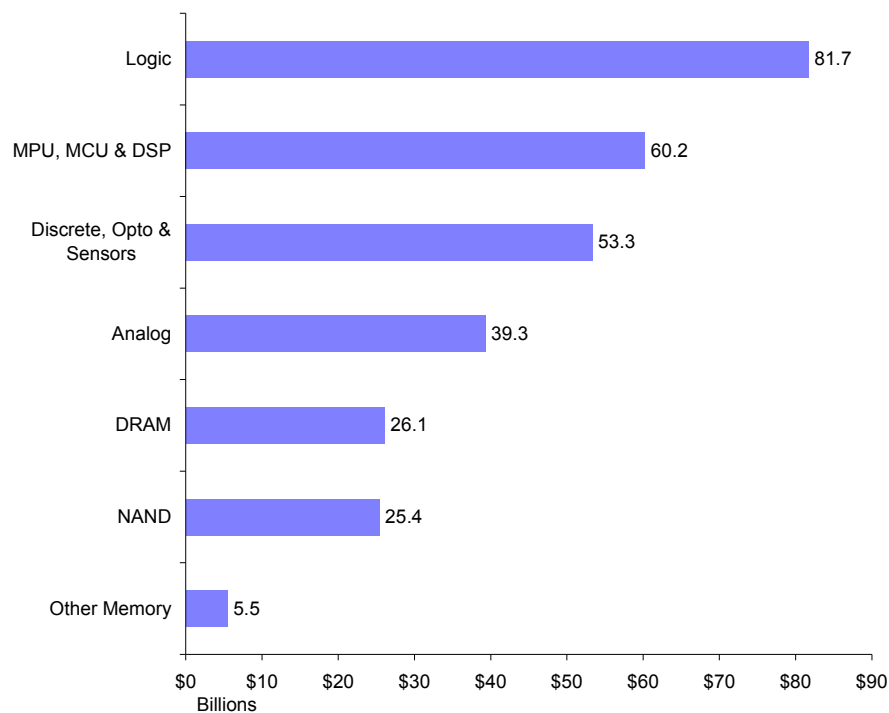
Source: Citi Research, Gartner

Figure 19. Semiconductor Revenues by Application, 2012 (% of total)



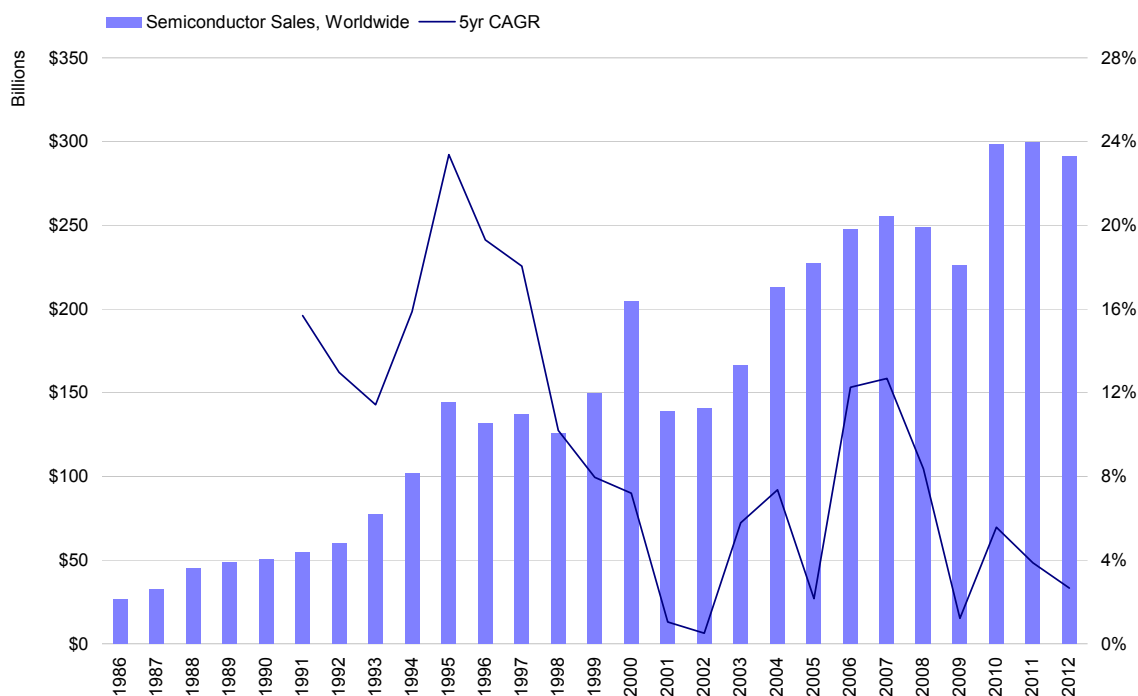
Source: Citi Research, Gartner

Figure 20. Semiconductor Revenues by Chip Type, 2012 (billions of US\$)



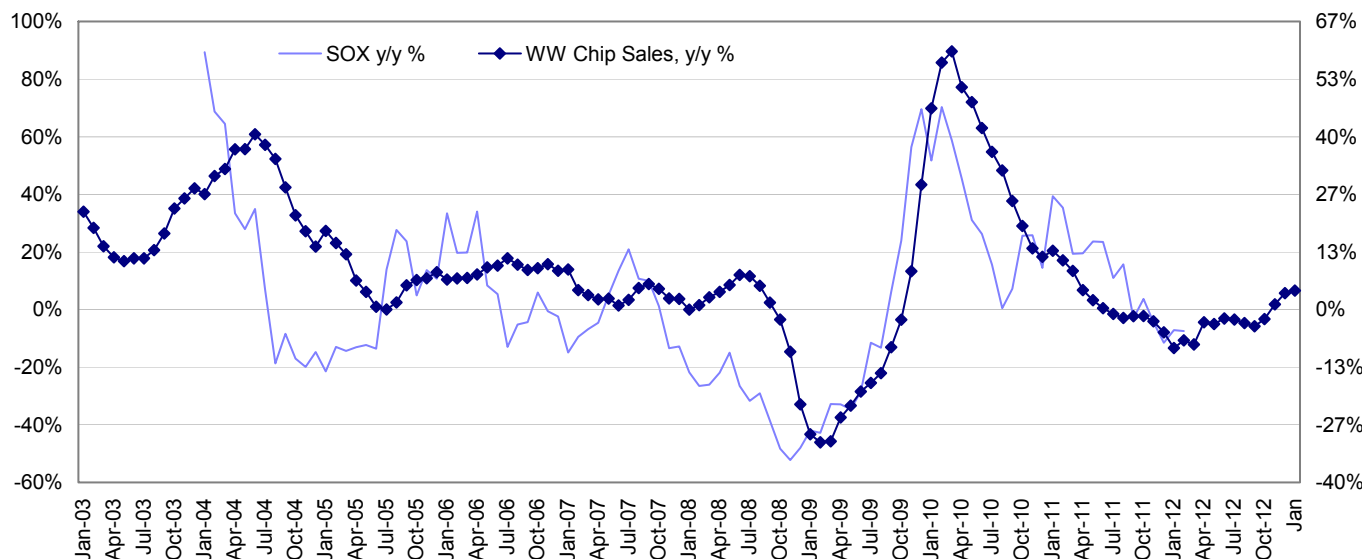
Source: Citi Research

Figure 21. Annual Semiconductor Sales, Historical



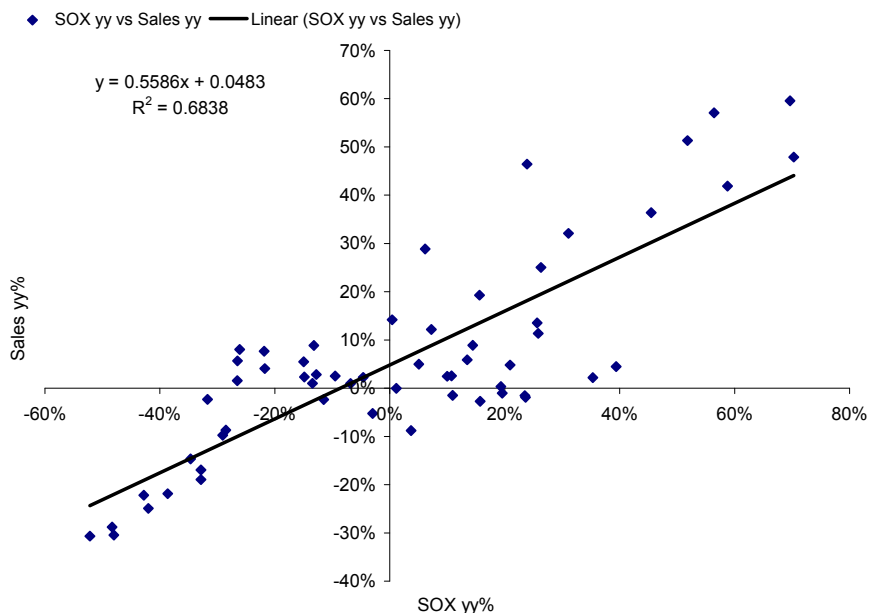
Source: WSTS, Citi Research

Figure 22. Worldwide Chip Sales y/y % vs. SOX y/y %



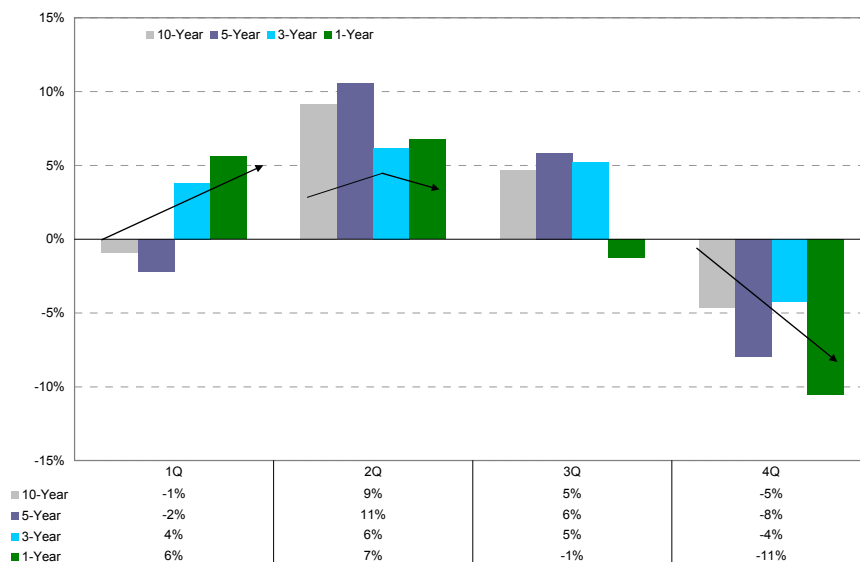
Source: Citi Research, WSTS, FactSet

Figure 23. Correlation of SOX y/y % and WW Chip Sales y/y %



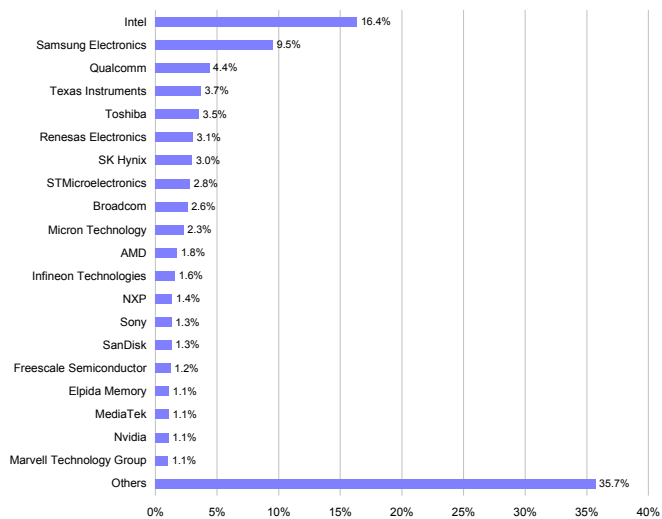
Source: Citi Research, WSTS, FactSet

Figure 24. Semiconductor Units Seasonality



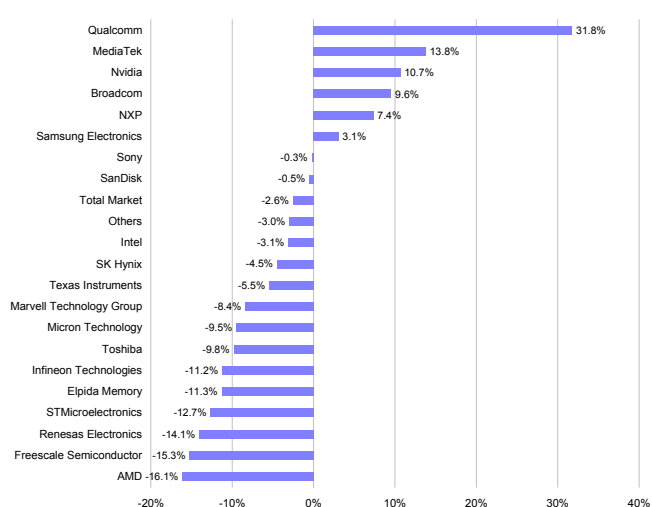
Source: Citi Research, WSTS

Figure 25. 2012 Semiconductor Market Share %, Top 20



Source: Citi Research, Gartner

Figure 26. 2012 y/y Sales Growth %, Top 20



Source: Citi Research, Gartner

Analog Semiconductor

Our 12-stock coverage group spans three analog mixed-signal markets: a) analog (all twelve companies), b) discrete (FCS, IRF, ONNN, SMTC), and c) microcontrollers (MCHP and SLAB). Analog chips regulate power and manipulate electrical signals. Discrete components are simpler 'non-integrated' single function devices, and microcontrollers blend logic, memory, and mixed signal into an embedded processing and control unit. To use an analogy, if microprocessors and memory act as the 'brains' of an electronic device, then analog mixed-signal chips makeup the cardiovascular, nervous, and endocrine systems by circulating energy, transmitting signals, and regulating basic functionality, respectively.

Fabless/Fab-lite Analog Companies: ADI, ISIL, SLAB and SMTC have adopted a fabless or fab-lite manufacturing process. Foundries such as TSMC, UMC, MX, etc, manufacture the chips that are designed at these fab-lite companies.

Figure 27. Analog End Market Exposure 2012

2012 Sales (\$M)	Computin	Communi	Consumer	Industrial/	Total
ADI	0	485	422	1539	2,446
AVGO	64	646	587	368	1,665
FCS	166	414	277	718	1,574
IRF	56	172	199	465	890
ISIL	218	188	95	269	770
LLTC	151	303	93	617	1,164
MCHP	129	129	396	337	990
MXIM	274	299	839	487	1,901
ONNN	395	271	461	928	2,055
SLAB	62	145	145	62	416
SMTC	48	95	85	68	295
Total	1564	3147	3600	5858	14,165

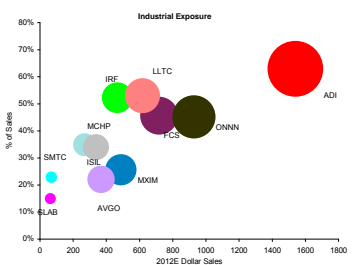
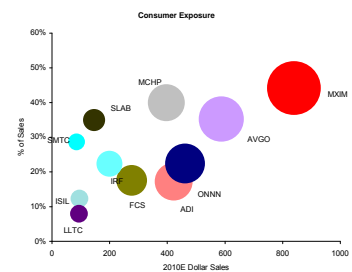
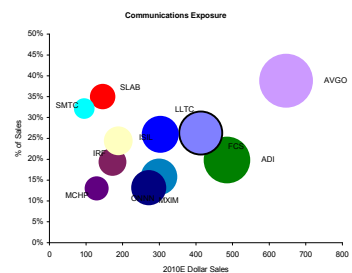
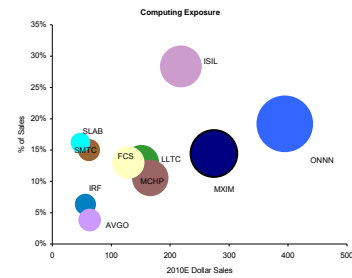
2012 % of Sales	Computin	Communi	Consumer	Industrial/	Total
ADI	0%	20%	17%	63%	100%
AVGO	4%	39%	35%	22%	100%
FCS	11%	26%	18%	46%	100%
IRF	6%	19%	22%	52%	100%
ISIL	28%	24%	12%	35%	100%
LLTC	13%	26%	8%	53%	100%
MCHP	13%	13%	40%	34%	100%
MXIM	14%	16%	44%	26%	100%
ONNN	19%	13%	22%	45%	100%
SLAB	15%	35%	35%	15%	100%
SMTC	16%	32%	29%	23%	100%
Average	13%	24%	26%	38%	100%

End Market Exposure versus Group Average

2012 % of Total	Computin	Communi	Consumer	Industrial/	Total
ADI	0.00	0.83	0.67	1.67	
AVGO	0.30	1.62	1.37	0.59	
FCS	0.83	1.10	0.68	1.21	
IRF	0.50	0.81	0.87	1.39	
ISIL	2.23	1.02	0.48	0.93	
LLTC	1.02	1.08	0.31	1.41	
MCHP	1.02	0.54	1.55	0.90	
MXIM	1.14	0.66	1.72	0.68	
ONNN	1.51	0.55	0.87	1.20	
SLAB	1.18	1.46	1.36	0.40	
SMTC	1.27	1.34	1.12	0.61	
Total	1.00	1.00	1.00	1.00	

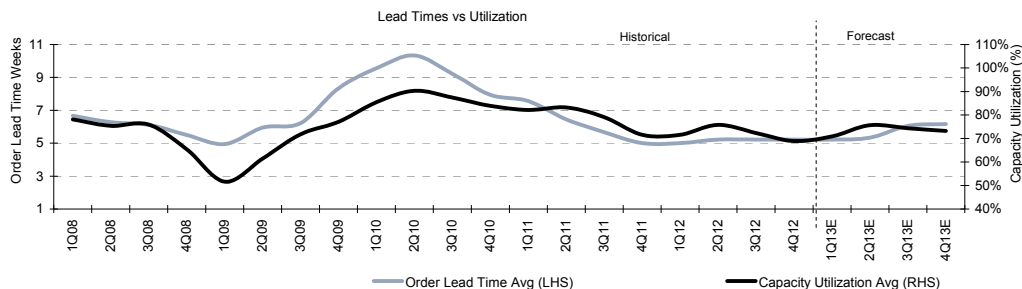
MARKET SHARE OF COMPOSITE

2012 % of Total	Computin	Communi	Consumer	Industrial/	Total
ADI	0%	15%	12%	26%	17%
AVGO	4%	21%	16%	6%	12%
FCS	11%	13%	8%	12%	11%
IRF	4%	5%	6%	8%	6%
ISIL	14%	6%	3%	5%	5%
LLTC	10%	10%	3%	11%	8%
MCHP	8%	4%	11%	6%	7%
MXIM	18%	10%	23%	8%	13%
ONNN	25%	9%	13%	16%	15%
SLAB	4%	5%	4%	1%	3%
ISIL	3%	3%	2%	1%	2%
Total	100%	100%	100%	100%	100%



Source: Citi Research, Gartner, Street Estimates, Company Reports

Figure 28. Analog Lead Times vs. Utilization Rates (1Q08-4Q13E)

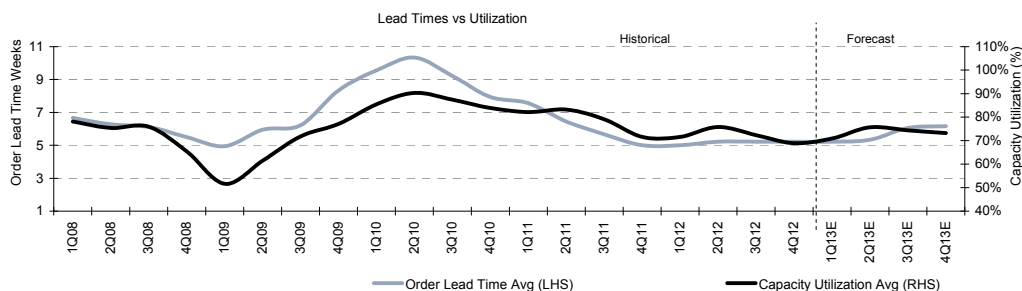


	1Q08	2Q08	3Q08	4Q08	1Q09	2Q09	3Q09	4Q09	1Q10	2Q10	3Q10	4Q10	1Q11	2Q11	3Q11	4Q11	1Q12	2Q12	3Q12	4Q12	1Q13E	2Q13E	3Q13E	4Q13E	
Order Lead Time Avg - New	6.7	6.3	6.1	5.5	4.9	5.9	6.2	8.3	9.6	10.3	9.2	7.9	7.6	6.4	5.7	5.0	5.0	5.2	5.2	5.2	5.2	5.2	5.3	6.1	6.2
Cap. Utilization Avg	78%	75%	76%	66%	52%	61%	72%	77%	85%	90%	87%	84%	82%	83%	79%	72%	72%	76%	72%	69%	71%	76%	74%	73%	

Note: Lead time data primarily based on transcript comments. Also uses off-line conversations and Citi estimates.

Source: Citi Research

Figure 29. Analog Capacity Utilization vs. Gross Margins (1Q08-4Q13E)

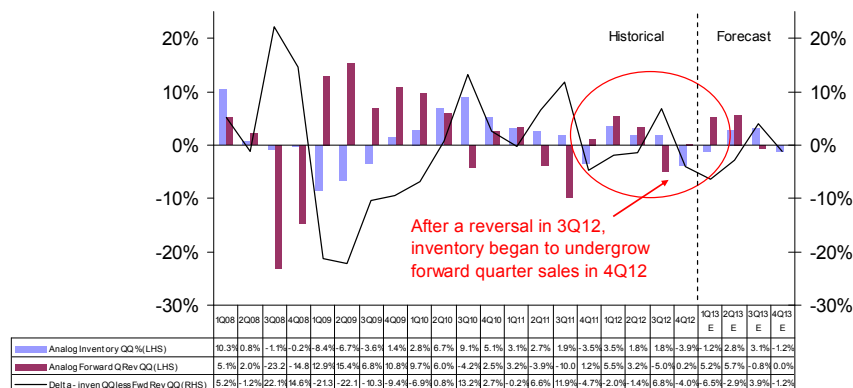


	1Q08	2Q08	3Q08	4Q08	1Q09	2Q09	3Q09	4Q09	1Q10	2Q10	3Q10	4Q10	1Q11	2Q11	3Q11	4Q11	1Q12	2Q12	3Q12	4Q12	1Q13E	2Q13E	3Q13E	4Q13E	
Order Lead Time Avg - New	6.7	6.3	6.1	5.5	4.9	5.9	6.2	8.3	9.6	10.3	9.2	7.9	7.6	6.4	5.7	5.0	5.0	5.2	5.2	5.2	5.2	5.2	5.3	6.1	6.2
Cap. Utilization Avg	78%	75%	76%	66%	52%	61%	72%	77%	85%	90%	87%	84%	82%	83%	79%	72%	72%	76%	72%	69%	71%	76%	74%	73%	

Note: Lead time data primarily based on transcript comments. Also uses off-line conversations and Citi estimates.

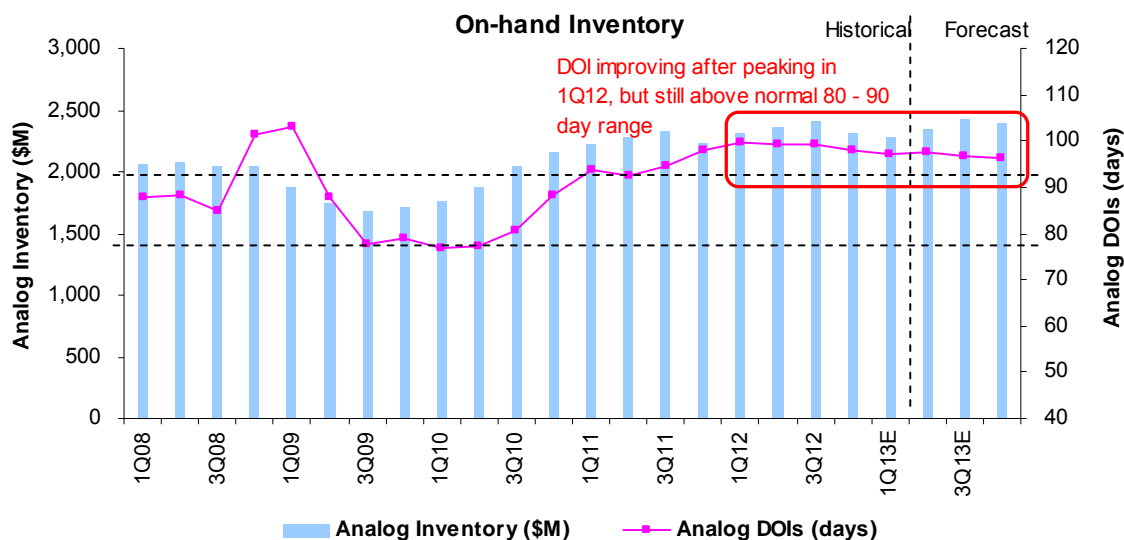
Source: Citi Research, Company Reports

Figure 30. Analog On-hand Inventory vs. Forward Sales Guidance (1Q08-4Q13E)



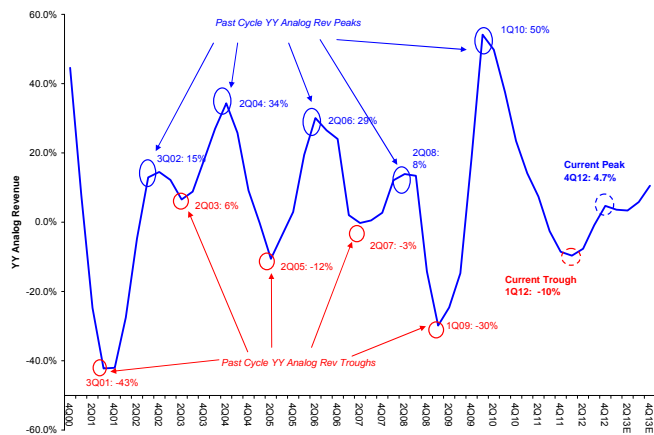
Source: Citi Research

Figure 31. Analog On-hand Inventory and DOIs (1Q08-4Q13E)



Source: Citi Research, Company Reports

Figure 32. Analog Sales Y/Y Growth (4Q00-4Q13E)



Source: Citi Research, Company Reports

Figure 33. Analog Stock Index Performance around Y/Y Rev Peaks

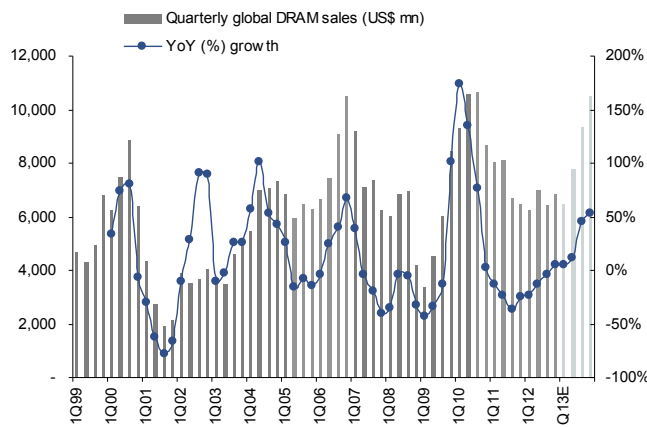


Source: Citi Research

Memory: DRAM & NAND

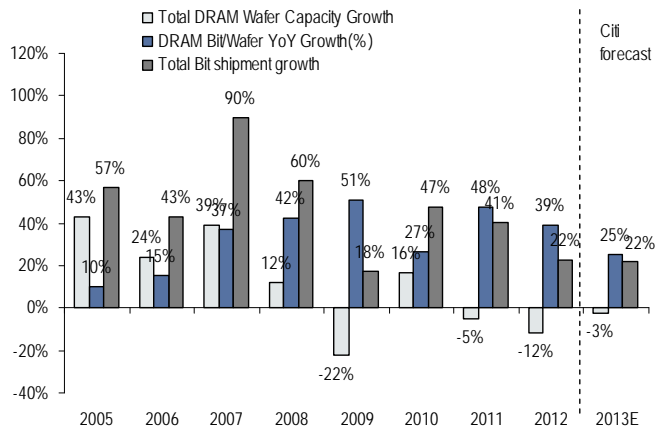
Semiconductor memory companies supply memory chips, which store data temporarily (DRAM to support CPU) or permanently (NAND like HDD), are used in virtually all electronic goods including smartphones and feature phones, PCs, TVs, servers, communication infrastructure, etc. Major DRAM suppliers include Samsung Electronics, SK Hynix and Micron. Major NAND suppliers include Samsung Electronics, SK Hynix, Toshiba and Micron.

Figure 34. Global DRAM Revenue Trend



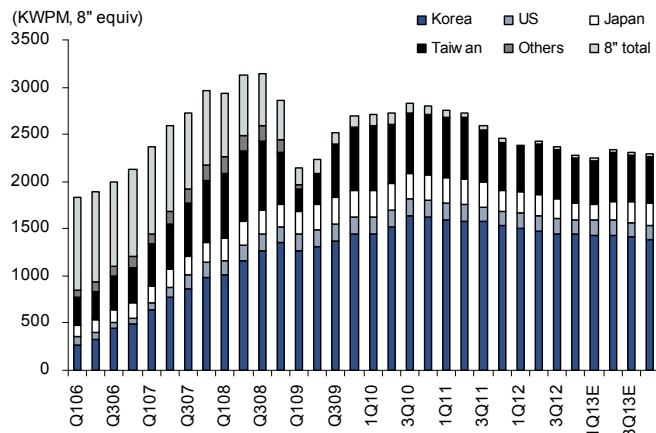
Source: WSTS, Citi Research

Figure 35. Supply Growth Forecast



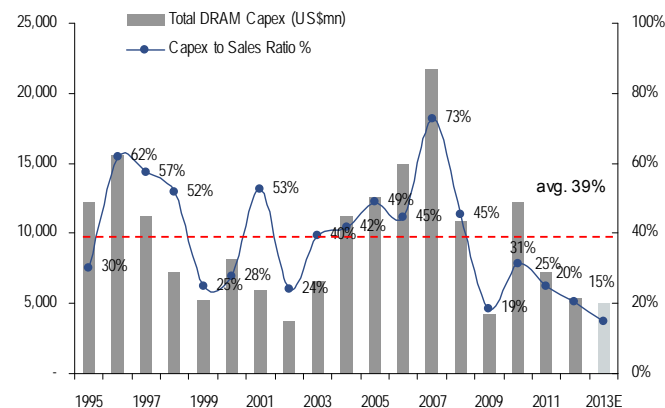
Source: Company data, Citi Research

Figure 36. DRAM Supply By Region



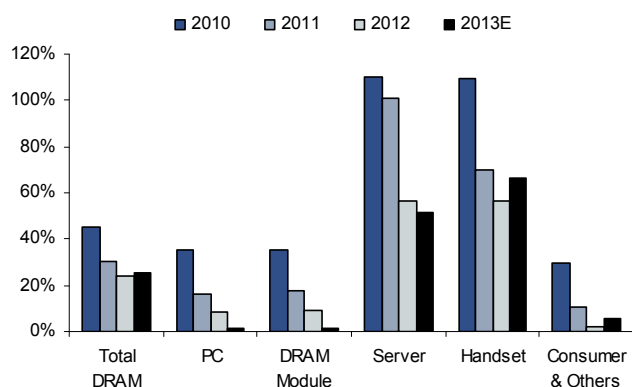
Source: Citi Research, Company Data

Figure 37. DRAM Capex and y/y growth



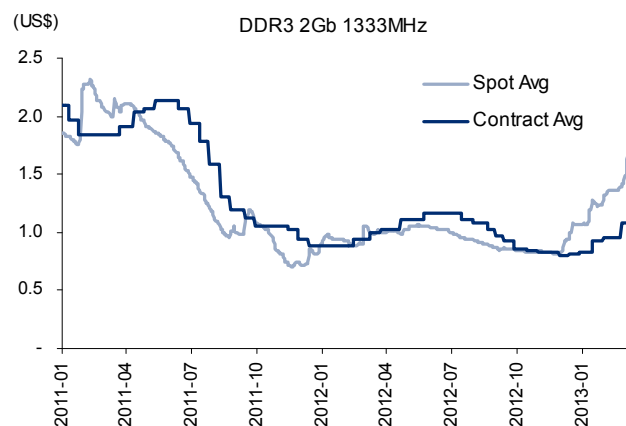
Source: Citi Research, Company Data

Figure 38. Demand Growth By Application



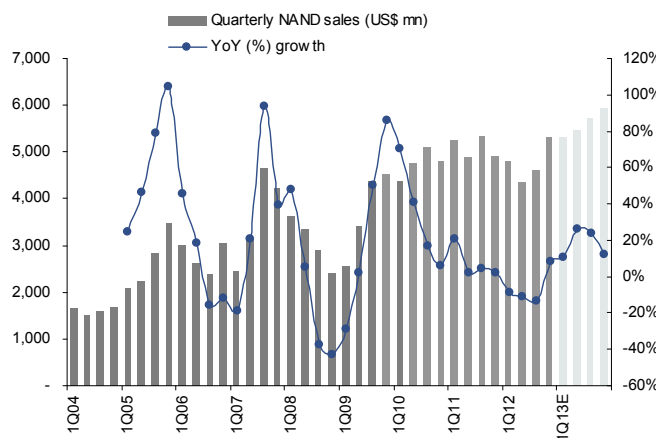
Source: Citi Research

Figure 39. DRAM Pricing



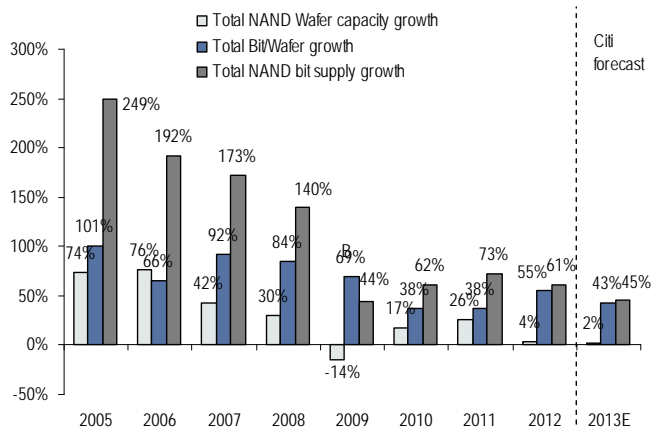
Source: Citi Research, DRAMeXchange

Figure 40. Quarterly Global NAND Revenue Trend



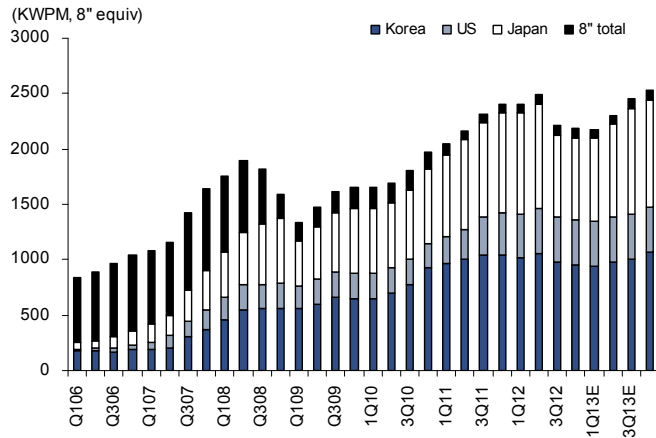
Source: Citi Research, WSTS

Figure 41. NAND Supply Growth Forecast



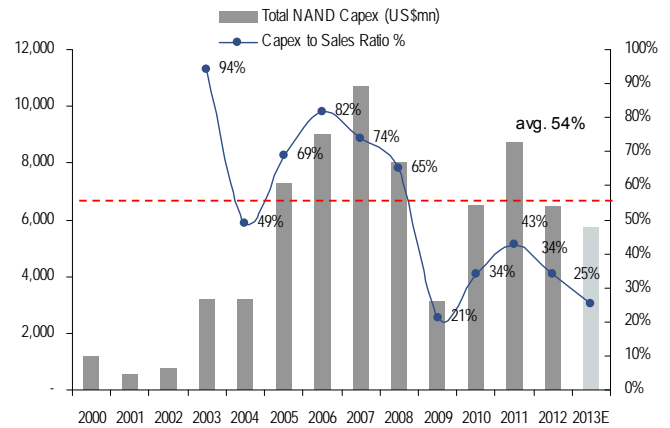
Source: Citi Research, Company Data

Figure 42. Capacity by Country



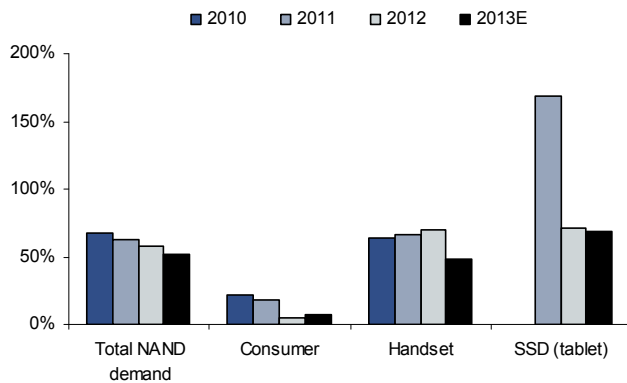
Source: Citi Research, Company Data

Figure 43. Capex and Capex/Sales Trend



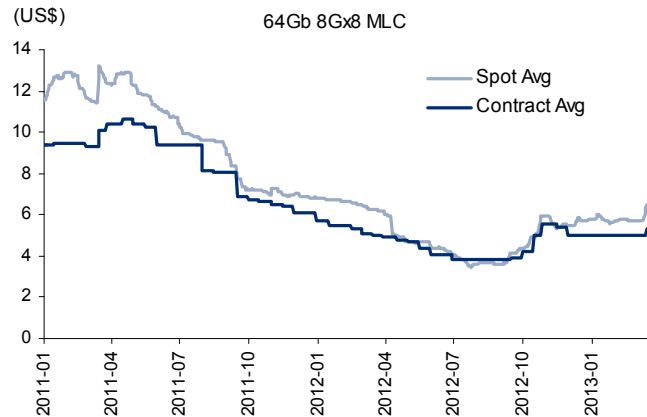
Source: Citi Research, Company Data

Figure 44. Demand Growth by Application



Source: Citi Research

Figure 45. 64Gb MLC Price Trend

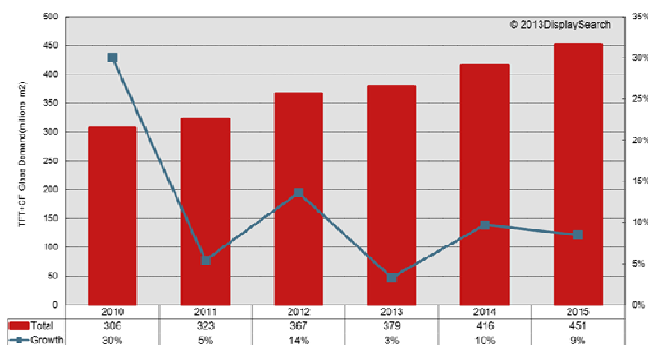


Source: Citi Research, DRAmEXchange

Glass Substrate

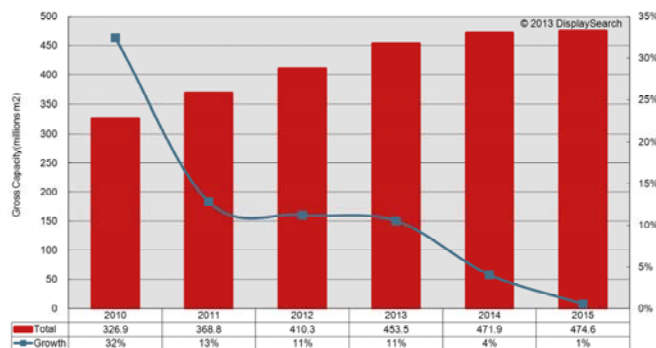
Glass substrates are thin sheets of borosilicate glass or other ion-free compounds with very smooth surfaces. The glass should not provide charge-carrying particles that can migrate into the thin-film transistor (TFT) structures that are fabricated on the glass. The glass should have a smooth surface and uniform thickness so that TFT or color filter dots can be fabricated on it. Other salient features of the substrate include strain temperature and density. The non-alkali glass substrate market was pioneered by Corning, the market and technology leader. Other major participants include Asahi Glass, AvanStrate, and Nippon Electric Glass.

Figure 46. Glass Demand



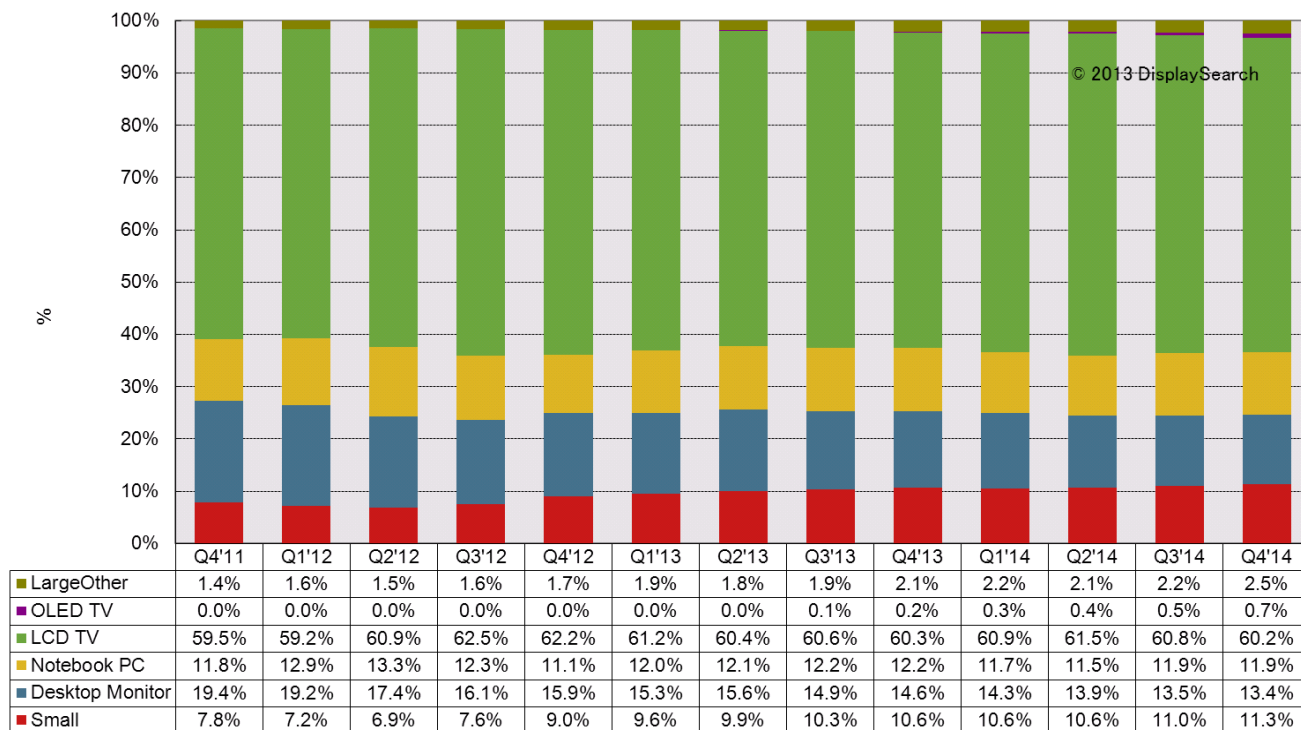
Source: NPDDisplaySearch

Figure 47. Glass Supply



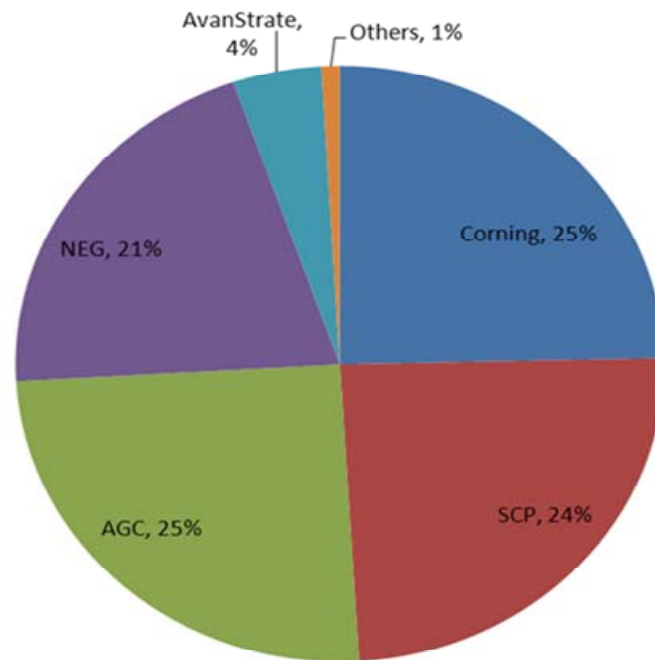
Source: NPDDisplaySearch

Figure 48. Glass Consumption by Application



Source: NPDDisplaySearch

Figure 49. Glass Substrate Market Share (4Q'12)



AGC: Asahi Glass, SCP = Samsung Corning Precision, NEG = Nippon Electric Glass

Source: NPDDisplaySearch

Figure 50. Share of Supplier Area by LCD Maker

Share of Supplier Area by LCD Maker

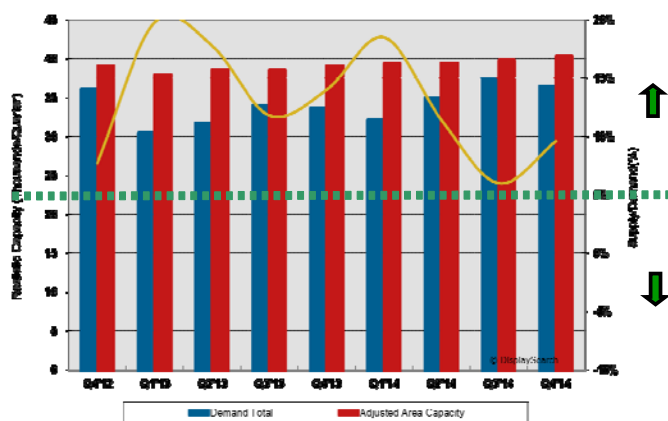
HQ	TFT Maker	Corning	SCP	AGC	NEG	AvanStrate	Others	Q4'12
Taiwan	AUO	25%	0%	19%	9%	1%	0%	13%
China	BOE	21%	1%	0%	0%	0%	30%	6%
China	CEC Pandi	3%	0%	2%	0%	0%	0%	1%
Taiwan	Chimei Inn	19%	0%	22%	14%	61%	14%	16%
China	China Star	0%	0%	15%	0%	0%	0%	4%
Taiwan	CPT	4%	0%	1%	2%	0%	1%	2%
Taiwan	E Ink	0%	0%	0%	0%	0%	0%	0%
China	Foxconn	3%	0%	0%	0%	0%	0%	1%
Taiwan	GiantPlus	0%	0%	0%	0%	0%	0%	0%
Taiwan	HannStar	5%	0%	0%	0%	0%	0%	1%
Korea	Hydis	0%	0%	0%	0%	0%	0%	0%
China	InfoVision	0%	0%	2%	1%	0%	14%	1%
Japan	JDI	0%	0%	4%	0%	2%	0%	1%
Japan	Kyocera	0%	0%	0%	0%	0%	0%	0%
China	LaiBao	0%	0%	0%	0%	1%	0%	0%
Korea	LG Display	1%	20%	21%	63%	0%	31%	24%
Japan	Mitsubishi	0%	0%	0%	0%	0%	0%	0%
Japan	NLT Techn	0%	0%	0%	0%	0%	0%	0%
Japan	Ortus	0%	0%	0%	0%	0%	0%	0%
Japan	Panasonic	0%	0%	0%	7%	0%	0%	1%
China	RIFDA	0%	0%	0%	0%	0%	0%	0%
Korea	Samsung I	0%	79%	8%	1%	32%	0%	23%
Japan	Sharp	18%	0%	5%	0%	3%	0%	6%
China	Tianma	1%	0%	0%	2%	0%	9%	1%
Taiwan	Truly	0%	0%	0%	0%	0%	0%	0%
Taiwan	Wintek	0%	0%	0%	0%	0%	0%	0%
		100%	100%	100%	100%	100%	100%	100%

Source: NPDDisplaySearch

Flat Panel Display

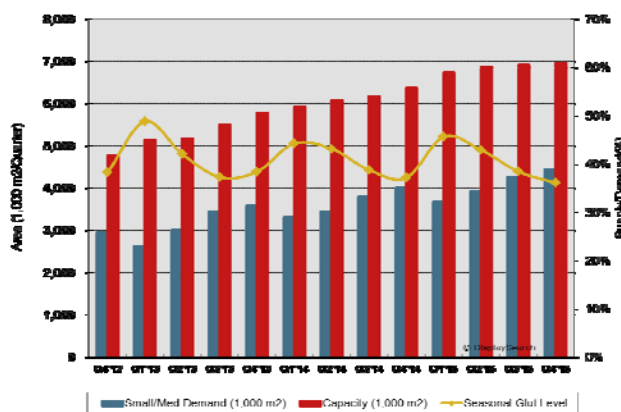
Flat panel displays encompass a growing number of electronic visual display technologies. They are far lighter and thinner than traditional television sets and video displays that use cathode ray tubes (CRTs). Most of the modern flat-panel displays use LCD technologies. Most LCD screens are backlit to make them easier to read in bright environments. They are thin and light. They provide better linearity and higher resolution. In many applications, specifically modern portable devices such as laptops, mobile phones, digital cameras, camcorders, point-and-shoot cameras, and pocket video cameras, any display disadvantages are made up for by portability advantages. Key panel makers include Samsung, LG Display, AU Optonics, Innolux, Japan Display and BOE

Figure 51. Restricted Large-Area Module Supply/Demand



Source: DisplaySearch

Figure 52. Small-Area Module Supply/Demand



Source: DisplaySearch

Figure 53. Panel Pricing

YoY Change			2H Nov 2012	1H Dec 2012	2H Dec 2012	1H Jan 2013	2H Jan 2013	1H Feb 2013	2H Feb 2013	1H Mar 2013	2H Mar 2013	1H Apr 2013	2H Apr 2013
Monitor	17"	SXGA	1.8%	1.8%	1.8%	1.8%	0.9%	0.0%	(0.9%)	(1.4%)			
Monitor	18.5"	HD	3.8%	3.8%	1.9%	0.9%	0.9%	0.0%	(0.9%)	(1.5%)			
Monitor	19"	WXGA+	1.7%	1.7%	1.7%	1.7%	1.7%	0.8%	0.0%	(0.5%)			
Monitor	20"W	HD+ (16:9)	3.3%	3.3%	3.3%	3.3%	3.3%	2.5%	1.7%	1.2%	4.2%	2.5%	2.0%
Monitor	21.5"	FHD (16:9)	1.4%	1.4%	0.0%	(0.7%)	(1.4%)	(2.1%)	(2.7%)	(3.2%)	(3.4%)	(3.4%)	(5.1%)
TV	26"/27"	WXGA+	1.0%	1.0%	1.0%								
TV	32"	WXGA+	4.0%	4.0%	4.0%	2.4%	1.6%	0.8%	0.0%	(0.8%)	(0.8%)	(1.6%)	(2.4%)
TV	42"	WXGA+	10.7%	10.7%	10.7%	10.2%	8.7%	7.8%	6.8%	5.8%	5.3%		
TV	40-42"120 Hz	Full HD	8.2%	8.2%	8.2%	7.9%	6.4%	5.6%	4.9%	4.1%	3.7%	2.6%	1.8%
TV	46"	WXGA+	1.4%	1.4%	1.4%								
Mobile Phone	1.8"	128 x 160	(10.0%)	(9.6%)	(10.1%)	(11.2%)	(12.0%)	(12.5%)	(13.3%)	(14.1%)	(14.7%)	(15.3%)	(15.3%)
Mobile Phone	2.0"	176 x 220	(25.8%)	(10.6%)	(11.0%)	(11.9%)	(12.5%)	(13.1%)	(13.5%)	(14.4%)	(15.2%)	(16.1%)	(16.1%)
Mobile Phone	2.2"	240 x 320	(10.4%)	(10.3%)	(10.8%)	(11.6%)	(12.3%)	(12.7%)	(13.1%)	(13.9%)	(14.5%)	(15.2%)	(15.2%)

Source: DisplaySearch

Figure 54. Panel Market Share by Major Application

Table 4 January 2013 Large-Area TFT LCD Ranking and Shares by Shipment and Application

	Mobile PC*	Share	Monitors	Share	TV	Share	Other	Share
#1	Samsung	30.1%	Innolux Corp (Chimei Innolux)	31.0%	LG Display	22.5%	AUO	34.6%
#2	LG Display	26.7%	LG Display	26.3%	Samsung	21.8%	Sharp	24.4%
#3	AUO	16.9%	AUO	15.0%	Innolux Corp (Chimei Innolux)	18.3%	Tianma	7.5%
#4	Innolux Corp (Chimei Innolux)	11.4%	Samsung	12.4%	AUO	14.0%	Japan Display	6.9%
#5	BOE	6.8%	BOE	8.8%	China Star	8.7%	LG Display	5.1%

*Including >9.1" and larger mini-notes and tablets
Source: Monthly TFT LCD Shipment Database

Table 5 January 2013 Large-Area TFT LCD Ranking and Shares by Area and Application

	Mobile PC*	Share	Monitors	Share	TV	Share	Other	Share
#1	LG Display	29.3%	Innolux Corp (Chimei Innolux)	29.9%	Samsung	24.7%	AUO	45.8%
#2	Samsung	27.4%	LG Display	27.9%	LG Display	23.0%	Samsung	20.4%
#3	AUO	18.9%	AUO	15.3%	Innolux Corp (Chimei Innolux)	16.6%	Sharp	11.4%
#4	Innolux Corp (Chimei Innolux)	13.5%	Samsung	12.9%	AUO	15.0%	LG Display	9.5%
#5	BOE	5.3%	BOE	8.2%	Sharp	7.4%	Japan Display	2.8%

*Including 9.1" and larger mini-notes and tablets

Source: DisplaySearch

Figure 55. 2012 3"+ Mobile Phone Panel Shipments and Share

Panel Maker	Shipment (millions)	Share
Samsung (including Samsung Mobile)	165.3	20.90%
Japan Display (including Sony, Toshiba and Sony)	112.2	14.20%
LG Display	97.7	12.40%
Sharp	92	11.70%
Chimei Innolux	61.4	7.80%
Truly	48.6	6.20%
AUO	47.4	6%
Tianma	33	4.20%
BOE	27.7	3.50%
Others	103.5	13.10%
Total	788.8	100%

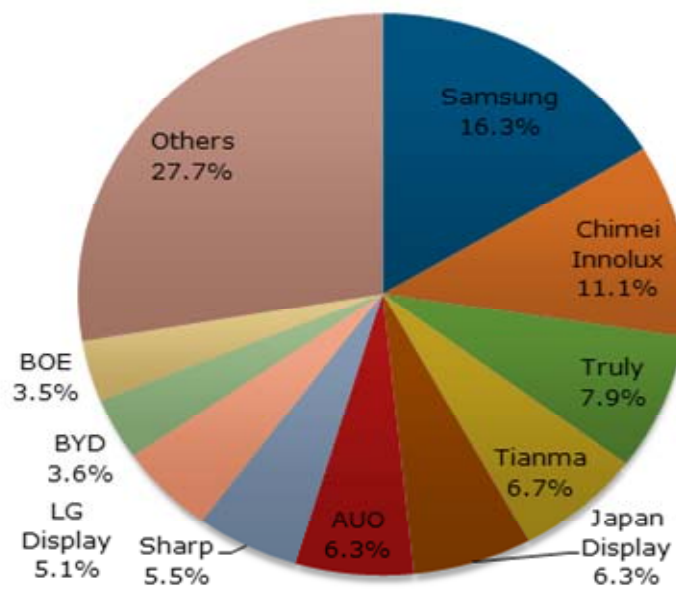
Source: NPD DisplaySearch

Figure 56. 2012 4"+ Mobile Phone Panel Shipments and Share

Panel Maker	Shipment (millions)	Share
Samsung (including Samsung Mobile)	125.1	32.70%
Japan Display (including Sony, Toshiba and Sony)	80	20.90%
Sharp	48.5	12.70%
LG Display	47.1	12.30%
AUO	18.3	4.80%
Truly	17.9	4.70%
Chimei Innolux	13.6	3.60%
Tianma	8.3	2.20%
BOE	15.7	4.10%
Others	8.6	2.30%
Total	383.2	100%

Source: NPD DisplaySearch

Figure 57. Mobile Phone Display Shipments by Suppliers

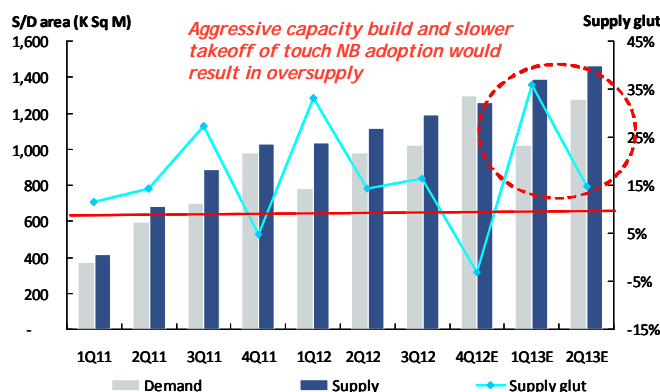


Source: DisplaySearch

Cover Glass

Touch panels are commonly used in a variety of mobile applications such as smartphones, tablets, e-books, and notebooks. Touch panel production process includes front-end sensor patterning and back-end lamination. To better control costs and meet client requirements, many tier one touch module makers such as TPK and Wintek are becoming increasingly vertically integrated, with cover glass treatment, ITO sensor patterning, and full lamination processed in-house. Major touch panel suppliers include TPK, Wintek, Young Fast Opto, HannsTouch, Nissha Printing, etc.

Figure 58. Huge capacity expansion to trigger oversupply concern



Source: Companies, Citi Research Estimates

Figure 59. Glass-based touch panel supply and demand

Unit: K square meter	2010	2011	2012E	2013E
Demand	911	2,650	4,078	5,271
- Smartphone	426	909	1,161	1,513
- Tablet	485	1,741	2,477	1,947
- NB & AIO	-	-	440	1,810
Supply	910	3,016	4,604	6,127
Supply Glut	0%	14%	13%	16%

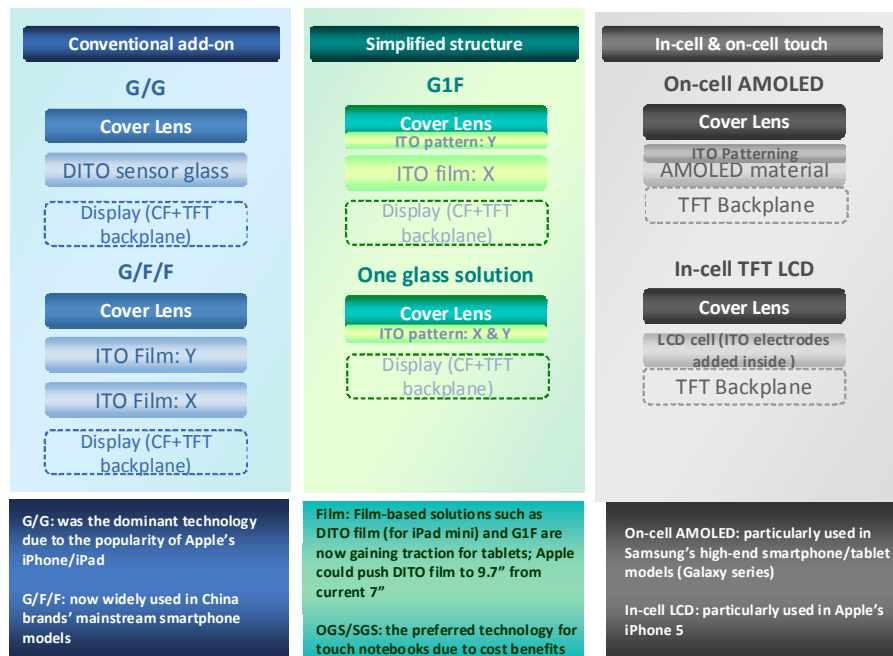
Source: Companies, Citi Research Estimates

Figure 60. Touch NB penetration and share assumptions

K units	1Q13E	2Q13E	3Q13E	4Q13E	1Q14E	2Q14E	3Q14E	4Q14E	2013E	2014E
Total NB	47,104	47,135	53,333	53,335	48,493	48,947	55,388	55,819	200,907	208,648
- B2B	16,486	16,497	18,667	18,667	16,973	17,132	19,386	19,537	70,317	73,027
- B2C	30,618	30,638	34,666	34,668	31,521	31,816	36,002	36,283	130,590	135,621
Touch NB	3,768	5,656	7,467	9,600	9,699	14,684	19,386	22,328	26,491	66,097
- Touch NB penetration in B2C	12%	18%	22%	28%	31%	46%	54%	62%	20%	49%
- Touch NB penetration in total I	8%	12%	14%	18%	20%	30%	35%	40%	13%	32%
Major touch panel makers' shipment										
TPK + Cando	3,015	4,525	5,122	5,472	5,334	8,076	10,081	11,610	18,134	35,101
Wintek	300	754	1,500	2,500	3,000	3,500	4,500	5,000	5,054	16,000
Others (e.g., O-film, Henghao)	453	377	845	1,628	1,365	3,108	4,805	5,718	3,303	14,996
Share										
TPK + Cando	80%	80%	69%	57%	55%	55%	52%	52%	68%	53%
Wintek	8%	13%	20%	26%	31%	24%	23%	22%	19%	24%
Others	12%	7%	11%	17%	14%	21%	25%	26%	12%	23%

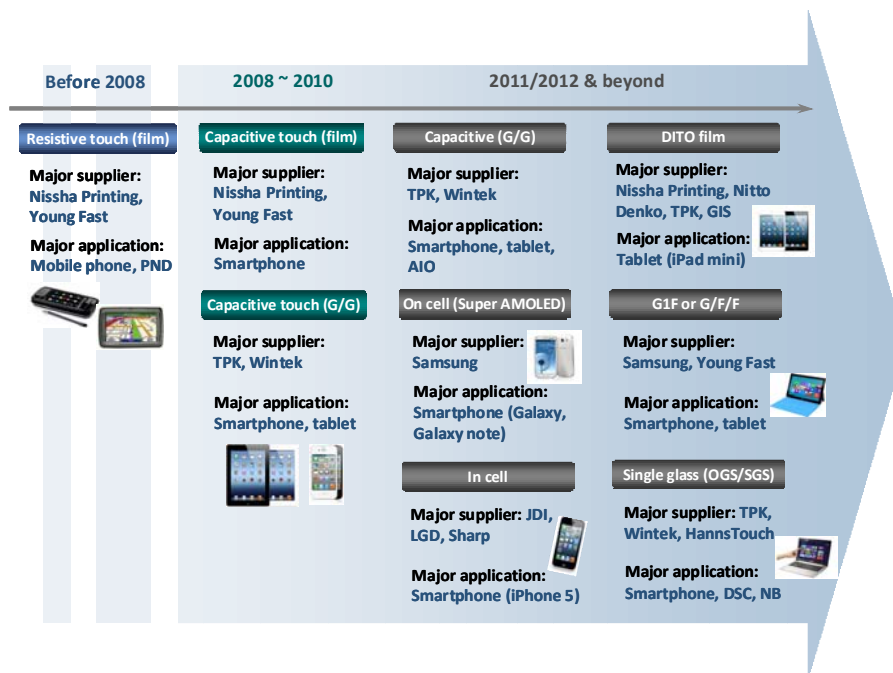
Source: Citi Research Estimates

Figure 61. Diverse touch panel technology structure



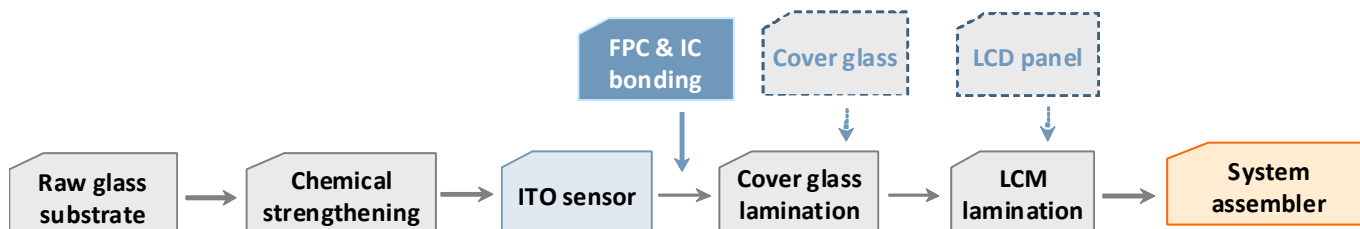
Source: DisplaySearch, Citi Research

Figure 62. Touch panel technology roadmap



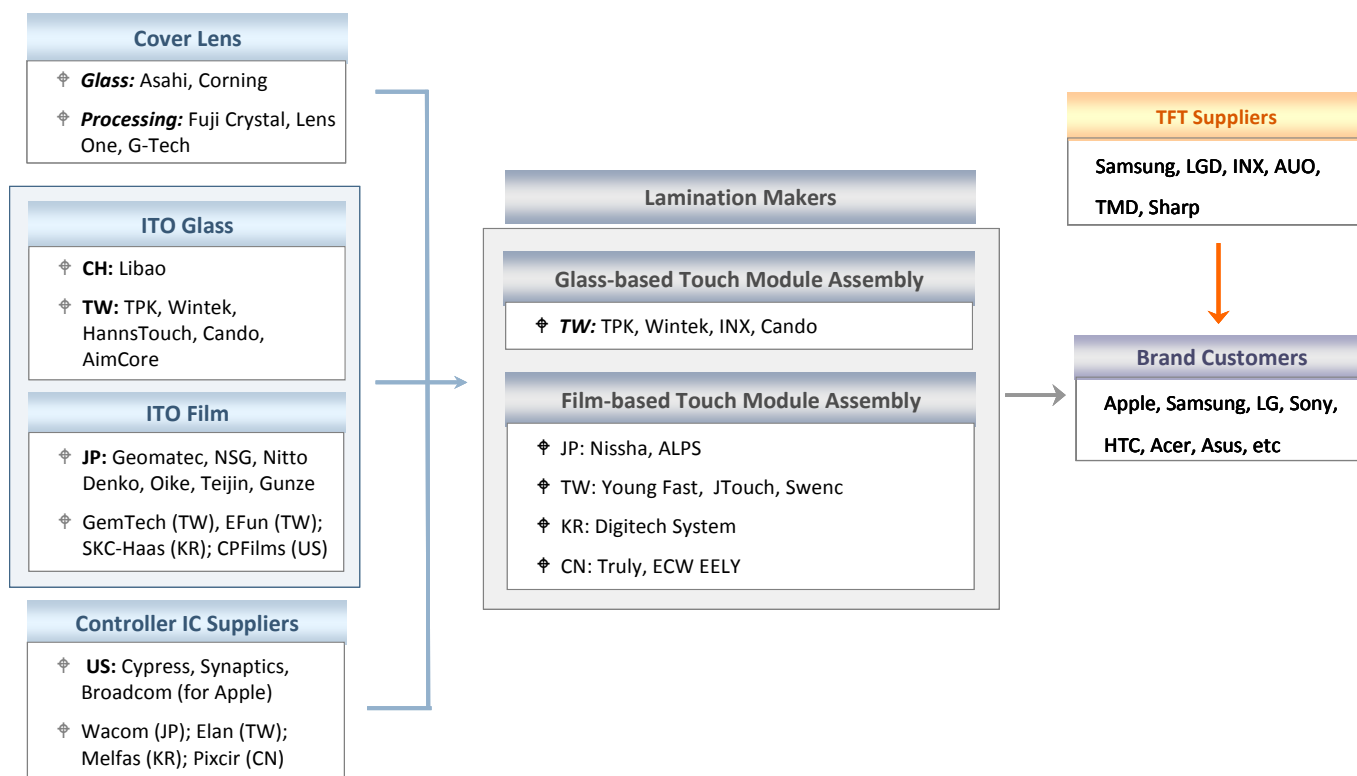
Source: Citi Research

Figure 63. Production supply chain of glass based capacitive touch



Source: Citi Research

Figure 64. Touch panel supply chain



Source: Companies, Citi Research

Connectors

Connectors companies specialize in electronic and electrical interconnect products and assemblies. These products range in application from smartphone & tablet to industrial & automotive. While many think as technology moves to “wireless” that connectors are needed less, while in reality as automotive, smartphones, tablets, etc. increase in complexity the more connectors are needed. As an example Bluetooth technology has reduced the needs for wired headsets in mobile phones minimizing the need for the 9mm headphone connection; however, the connection is now made internally on a smaller scale as the same information still needs to be “connected” to the device. In most phones you see both Bluetooth capabilities and the presence of the 9mm headphone connection outlining how increased complexity in devices simply increases the need for more complex connectors. Key players in this sub-segment are Amphenol, Molex, TE Connectivity, & Sensata. AVX and Vishay are key companies specialize in passive components such as capacitors and resistors.

Figure 65. Connectors – End Markets

Rev \$ By End Market	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Computers & Peripherals	\$6,741	\$6,048	\$6,810	\$6,384	\$6,813	\$8,084	\$8,767	\$8,665	\$6,886	\$9,253	\$9,674
Automotive	\$4,901	\$6,544	\$7,394	\$8,538	\$8,998	\$9,649	\$10,145	\$9,613	\$6,917	\$9,258	\$10,091
Telecom/Datacom	\$3,865	\$3,652	\$3,495	\$4,869	\$5,274	\$6,054	\$6,561	\$7,644	\$6,087	\$7,375	\$8,028
Industrial	\$2,906	\$2,836	\$3,276	\$3,890	\$4,133	\$4,603	\$4,875	\$5,779	\$3,997	\$5,224	\$5,687
Military/Aerospace	\$2,012	\$1,751	\$1,988	\$2,329	\$2,450	\$2,699	\$2,847	\$3,045	\$2,894	\$3,374	\$3,457
Consumer	\$774	\$1,043	\$1,244	\$1,840	\$1,984	\$2,301	\$2,514	\$2,379	\$1,958	\$2,605	\$2,661
Transportation (non-auto)	\$1,317	\$1,169	\$1,248	\$1,446	\$1,497	\$1,613	\$1,759	\$2,080	\$1,577	\$1,947	\$2,112
Other	\$992	\$1,098	\$1,326	\$2,018	\$2,103	\$2,436	\$2,664	\$3,000	\$2,168	\$2,704	\$2,848
Office Equipment	\$947	\$291	\$342	\$489	\$510	\$562	\$593	\$689	\$619	\$782	\$815
Instrumentation	\$593	\$503	\$577	\$795	\$835	\$934	\$987	\$998	\$919	\$1,155	\$1,218
Medical Equipment	\$529	\$553	\$651	\$820	\$886	\$1,018	\$1,109	\$1,348	\$1,281	\$1,664	\$1,765
Total	\$25,576	\$25,489	\$28,352	\$33,419	\$35,483	\$39,953	\$42,821	\$45,239	\$35,304	\$45,341	\$48,355
% By End Market	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Computers & Peripherals	26.4%	23.7%	24.0%	19.1%	19.2%	20.2%	20.5%	19.2%	19.5%	20.4%	20.0%
Automotive	19.2%	25.7%	26.1%	25.5%	25.4%	24.2%	23.7%	21.2%	19.6%	20.4%	20.9%
Telecom/Datacom	15.1%	14.3%	12.3%	14.6%	14.9%	15.2%	15.3%	16.9%	17.2%	16.3%	16.6%
Industrial	11.4%	11.1%	11.6%	11.6%	11.6%	11.5%	11.4%	12.8%	11.3%	11.5%	11.8%
Military/Aerospace	7.9%	6.9%	7.0%	7.0%	6.9%	6.8%	6.6%	6.7%	8.2%	7.4%	7.1%
Consumer	3.0%	4.1%	4.4%	5.5%	5.6%	5.8%	5.9%	5.3%	5.5%	5.7%	5.5%
Transportation (non-auto)	5.1%	4.6%	4.4%	4.3%	4.2%	4.0%	4.1%	4.6%	4.5%	4.3%	4.4%
Other	3.9%	4.3%	4.7%	6.0%	5.9%	6.1%	6.2%	6.6%	6.1%	6.0%	5.9%
Office Equipment	3.7%	1.1%	1.2%	1.5%	1.4%	1.4%	1.4%	1.5%	1.8%	1.7%	1.7%
Instrumentation	2.3%	2.0%	2.0%	2.4%	2.4%	2.3%	2.3%	2.2%	2.6%	2.5%	2.5%
Medical Equipment	2.1%	2.2%	2.3%	2.5%	2.5%	2.5%	2.6%	3.0%	3.6%	3.7%	3.7%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
% Y/Y By End Market	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Computers & Peripherals	-20.1%	-10.3%	12.6%	-6.3%	6.7%	18.7%	8.4%	-1.2%	-20.5%	34.4%	4.6%
Automotive	3.7%	33.5%	13.0%	15.5%	5.4%	7.2%	5.1%	-5.2%	-28.0%	33.9%	9.0%
Telecom/Datacom	-34.4%	-5.5%	-4.3%	39.3%	8.3%	14.8%	8.4%	16.5%	-20.4%	21.2%	8.8%
Industrial	-31.4%	-2.4%	15.5%	18.7%	6.2%	11.4%	5.9%	18.5%	-30.8%	30.7%	8.9%
Military/Aerospace	0.2%	-13.0%	13.6%	17.2%	5.2%	10.2%	5.5%	7.0%	-4.9%	16.6%	2.4%
Consumer	-24.5%	34.8%	19.3%	47.9%	7.8%	16.0%	9.3%	-5.3%	-17.7%	33.1%	2.1%
Transportation (non-auto)	9.1%	-11.2%	6.8%	15.9%	3.5%	7.7%	9.0%	18.2%	-24.2%	23.4%	8.5%
Other	-33.6%	10.7%	20.7%	52.3%	4.2%	15.8%	9.4%	12.6%	-27.7%	24.7%	5.3%
Office Equipment	-24.1%	-69.2%	17.5%	42.8%	4.4%	10.2%	5.4%	16.3%	-10.1%	26.3%	4.1%
Instrumentation	-17.3%	-15.1%	14.7%	37.7%	5.1%	11.8%	5.7%	1.1%	-7.9%	25.7%	5.5%
Medical Equipment	-14.1%	4.4%	17.8%	26.0%	8.1%	14.9%	9.0%	21.5%	-4.9%	29.9%	6.1%
Total	-19.1%	-0.3%	11.2%	17.9%	6.2%	12.6%	7.2%	5.6%	-22.0%	28.4%	6.6%
Global Light Vehicles Produc	55967.84	57,028	58,609	61,773	64,026	66,762	70,348	65,986	63,887	72,444	75,507
Content per car	\$ 88	\$ 115	\$ 126	\$ 138	\$ 141	\$ 145	\$ 144	\$ 146	\$ 108	\$ 128	\$ 134
Content growth y/y	4.2%	31.0%	9.9%	9.6%	1.7%	2.9%	-0.2%	1.0%	-25.7%	18.0%	4.6%

Source: Bishop (note 2012 data not yet available)

Figure 66. Connectors – Top 10 Connector Manufacturers

\$ Millions						2008	2009	2010	2011	2008	2009	2010	2011
Rank	Manufacturer	2008	2009	2010	2011	Y/Y Change	Y/Y Change	Y/Y Change	Y/Y Change	Market Share	Market Share	Market Share	Market Share
1	TE Connectivity	\$8,103	\$6,005	\$7,865	\$8,234	0%	-26%	31%	5%	18.4%	17.5%	17.3%	17.0%
2	Amphenol Corporation	\$3,236	\$2,820	\$3,293	\$3,665	14%	-13%	17%	11%	7.4%	8.2%	7.3%	7.6%
3	Molex Incorporated	\$3,200	\$2,480	\$3,403	\$3,582	-1%	-23%	37%	5%	7.3%	7.2%	7.5%	7.4%
4	Yazaki	\$1,492	\$1,260	\$1,777	\$2,176	15%	-16%	41%	22%	3.4%	3.7%	3.9%	4.5%
5	Foxconn (Hon Hai)	\$1,468	\$1,146	\$1,547	\$1,628	7%	-22%	35%	5%	3.3%	3.3%	3.4%	3.4%
6	FCI	\$1,841	\$1,306	\$1,697	\$1,551	1%	-29%	30%	-9%	4.2%	3.8%	3.7%	3.2%
7	JST	\$1,549	\$1,364	\$1,602	\$1,509	0%	-12%	17%	-6%	3.5%	4.0%	3.5%	3.1%
8	Delphi Connection Systems	\$999	\$726	\$1,228	\$1,352	-14%	-27%	69%	10%	2.3%	2.1%	2.7%	2.8%
9	Hirose	\$1,045	\$939	\$1,155	\$1,156	2%	-10%	23%	0%	2.4%	2.7%	2.5%	2.4%
10	JAE	\$1,042	\$786	\$976	\$1,083	5%	-25%	24%	11%	2.4%	2.3%	2.2%	2.2%
Total Top 10		\$23,975	\$18,832	\$24,543	\$25,936	3%	-21%	30%	6%	55%	55%	54%	54%
All Others		\$20,002	\$15,558	\$20,799	\$22,419	3%	-22%	34%	8%	45%	45%	46%	46%
Total Market		\$43,977	\$34,390	\$45,341	\$48,355	3%	-22%	32%	7%	100%	100%	100%	100%

Source: Bishop (note 2012 data not yet available)

Figure 67. Connectors – Top 10 Connector Manufacturers – Segment Rankings

World Rank	Computers and Peripherals	Business Retail Education	Instruments	Medical Equipment	Industrial Equipment	Automotive Equipment	Transportation Equipment	Military Aerospace	Telecom Datacom Equipment	Consumer Electronics	Other
1	Foxconn	TE Connectivity	TE Connectivity	TE Connectivity	TE Connectivity	TE Connectivity	FCI	Amphenol	TE Connectivity	TE Connectivity	TE Connectivity
2	Molex	SMK	LEMO SA	Amphenol	HARTING	Yazaki	Deutsch	TE Connectivity	Amphenol	Molex	Hirose
3	Amphenol	JST	Rosenberger	Molex	Molex	Delphi	Sumitomo	Glenair	Molex	JST	FCI
4	TE Connectivity	Foxconn	Delphi	3M	Amphenol	FCI	Delphi	Deutsch	Hirose	Yeonho	Multi-Contact
5	FCI	Smiths	Samtec	LEMO SA	JST	Sumitomo	Amphenol	Souriau	Rosenberger	JAE	Delphi
6	OTES	Delphi	Foxconn	ODU	3M	Molex	Molex	China Aviation	JAE	AVX/Elco	Sumitomo
7	I-PEX	AVX/Elco	AVX/Elco	Samtec	Belden, Inc.	JAE	Yazaki	ITT	JST	Hirose	JST
8	JAE	Rosenberger	Molex	Delphi	Weidmuller	Amphenol	TE Connectivity	Delphi	FCI	Lumberg	3M
9	Foxlink	3M	ODU	ITT	Sumitomo	Hirose	Korea Electric	Radiall	Foxconn	FCI	ERNI
10	Hirose	DDK	Multi-Contact	Souriau	Deutsch	JST	ITT	AMETEK	Samtec	Foxconn	JAE

Source: Bishop (note 2012 data not yet available)

Figure 68. Connectors – Top 10 Connector Manufacturers – Regional Sales Rank

World Rank	Manufacturer	North America	Europe	Japan	China	Asia Pacific	ROW
1	TE Connectivity	1	1	1	1	1	1
2	Amphenol	2	3	13	3	3	2
3	Molex	3	4	4	2	4	81
4	Yazaki	5	11	2	7	6	82
5	Foxconn (Hon Hai)	33	36	20	4	5	5
6	FCI	9	2	14	9	8	6
7	JST	15	30	3	5	2	50
8	Delphi Connection Systems	4	7	870	95	10	3
9	Hirose	30	32	6	10	7	23
10	JAE	21	41	5	6	14	83

Source: Bishop (note 2012 data not yet available)

Electronic Manufacturing Services

Electronic Manufacturing Service companies test, manufacture, distribute, provide return/repair services and design for electronic components and assemblies for Original Equipment Manufacturers. The largest companies in this sub-industry are Hon Hai, Flextronics, Jabil Circuit, Benchmark Electronics, Sanmina, and Plexus. A few large suppliers to EMS companies are Avnet, Arrow, and hundreds of semiconductor chip and component suppliers. While EMS firms cater to many OEM's a few good examples would be Cisco, Juniper, Samsung, Apple, IBM, Coca-Cola, etc. Please see the below EMS framework to better understand EMS relationships with OEM's.

Over the past decade we have written extensively about the "Four Phases" of the EMS economic cycle and cautioned investors that fundamentals across the industry would not stabilize until we reached the third phase. The most advantageous time to own EMS stocks is during Phases Three and Four. In late 2011 we moved back to Phase One as Citi's economic team negatively revised their global growth forecasts and several OEMs began cutting orders which resulted in sales and margin pressure for EMS companies. Since the beginning of 2012, global growth forecasts have stabilized and have modestly ticked higher spurred by better-than-expected economic activity and central bank stimulus measures which have underpinned business and consumer confidence. However, recently, the EMU crisis appears to be worsening and global growth disappoints). We believe we have stalled in Late Phase One/Early Phase Two of the EMS cycle and continue to recommend an investing style that is more company specific (big new customers ramping, etc) until we are able to see better visibility and order trends. At this time we prefer the connector sector given higher profitability and better cash flow characteristics which can be used for accretive M&A, dividends, stock buy backs all while support organic growth.

We remind investors of our "Four Phase" framework to the EMS economic cycle below:

- **Phase One:** We are moving past Phase One as OEMs order cuts from lower demand have occurred and the downward GDP revisions have occurred. This is not the phase to build ownership positions in EMS stocks.
- **Phase Two:** OEMs also in-source production (i.e. shift it away from EMS) in the initial stages of a downturn in hopes of increasing utilization rates at company owned factories. By our estimate, this phase has cost the EMS industry \$7B to \$10B in annual revenues since the macro recession began in late 2007. We note at this time most in-sourcing changes have occurred as well as OEM restructuring announcements. GDP revisions have now started to stabilize.
- **Phase Three:** In the third stage of the cycle the OEMs typically engage in restructuring efforts during which they begin to incrementally outsource more and/or try to sell assets to EMS companies in return for the promise of future business. We believe this phase occurred in 2010/2011 as we saw asset acquisition transactions (Sanmina's purchase of JDSU assets and Hon Hai's co-investment with HP for PC manufacturing capabilities). We have also see new outsourcing from HP for notebooks to FLEX and Hon Hai, as well as from Research in Motion for smart-phones to Jabil, Flextronics, and Celestica and several LCD TV makers outsourcing which occurred in early 2011 but since has come to an abrupt slow down. During 2009 to early 2011 the sector experienced this favorable phase.
- **Phase Four:** In the last phase, the economic recovery starts and OEMs find themselves with capacity shortages – thus pushing them to increase their outsourcing efforts. In our view, this is the most profitable phase of the cycle as the pure incremental outsourcing wins (without asset purchases) should push capacity utilization rates and margins higher across the industry. **During both Phase Three & Four we would expect a series of positive estimate revisions and for shares of EMS companies to materially appreciate over time.**

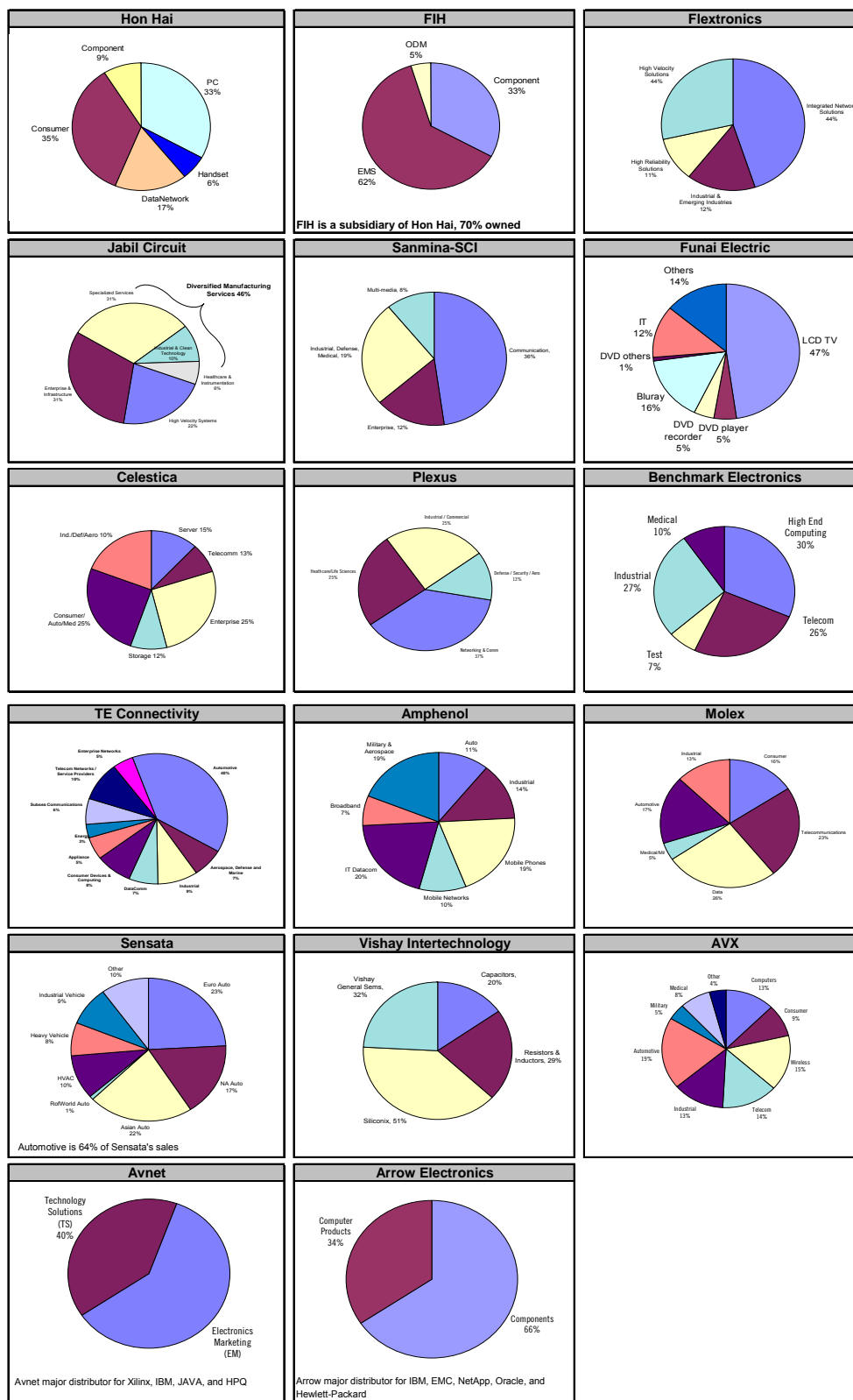
Figure 69. Citi Research Proprietary Customer Matrix Profile

Top Customers	BHE	CLS	FLEX	JBL	PLXS	SANM	Hon Hai	FIH	Funai
Adaptec						X			
Adtran		X		X					
Agilent				X		X			
Alcatel		~10%	X	X		>10%			
Apple			X	13%			38%		
Applied Materials	New Acq		O			X			
Arris	O		O		X				
Avaya		X	X						
BAE Systems					X				
Blackberry			~5%	10%					
Boston Scientific	New Acq								
Casio Computer			X						
Ciena	X	X							
Cisco Systems		>10%	~9%	10%		X	6%		
Coca-Cola					~8%				
Denso						X			
EchoStar				O		Top 5			
Draeger					X				
EMC	8-9%	X	O	O		X			
Emerson	X			X					
Emulex	X								
Ericsson			X	X		X			
Extreme			O						
F5			O						
Foxconn International Holdings							5%		
Foundry		O				X			
Fujitsu						X			
GE (Medical & Industrial)	New Acq			X	<10%				
General Dynamics					X	X			
Guidant	X								
Harris					X				
Hitachi		X	O			O			
Harmonic					X				
Hewlett-Packard		X	~5%	8-10%		Top 5	12%		
Honeywell		O			X				
Huawei			X					29%	
IBM	21%	~10%	O	X		X	X		
iDirect Tech					X				
Infinera				O		O			
Ingenico S.A.				X					
Intermec					X				
JDS Uniphase	X					X			
Johnson & Johnson					X				
Juniper		~10%	X		>10%				
KLA Tencor					X				
Kodak			O		O	X			
Kyocera			X						
LeCroy					X				
Lego			O						
Lenovo			X			X	O		
Lexmark									X
LG Electronics			O						
Lockheed Martin						X			
Lucent		X	O			X			
Medtronic	6-7%		O						
Microsoft			X				O		
Motorola Mobility	New Acq	X	soon to be >10%	O	X			6%	
NCR		X	O	X					
NEC					X				
NMS Communications									
NetApp				X					
Network Appliance				X					
Nokia			O	4%		X		40%	
Nokia Siemens Networks						Top 5			
Nortel Networks			3%	X		X	X		
Panasonic		O							
Powerwave		O							
Pace Plc				X					
Polycom		X	O						
Qlogic				X					
Qualcomm				X					
Raytheon		O				X			
Roche Diagnostics						X			
Royal Philips Electronics			O	X		Top 5			X
Samsung								11%	
Siemens	New Acq				X	X			
Sony-Ericsson			3%	O				5%	
Sony			X	O			9%	5%	
Sun Microsystems		X	X			X			
TEK									
Tekelec	X		O						
Telular					X				
Tellabs			O	X		X			
Teradyne			O						
Thomson			O						
Valeo				X					
Walmart									X
Xerox			X						

X denotes top customer, O denotes less than 2% rev customer. Avnet distributor for Xilinx. Arrow distributor for Altera.

Source: Citi Research

Figure 70. Supply Chain End Market Exposures (2012 data)



Source: Citi Research

Figure 71. Total Global Production of 3G Electronics Products vs. EMS/ODM Production (Billions of Dollars)

	2011	2012	2013	2014	2015	2016	CAGR 2011-2016
Total Global 3C	1,031	1,078	1,124	1,175	1,220	1,266	4.20%
Total Global EMS/ODM	472	546	620	687	750	828	11.90%
EMS/ODM (%)	45.80%	50.60%	55.20%	58.50%	61.50%	65.40%	7.40%

3C = computing, communications and consumer; CAGR = compound annual growth rate; EMS = electronics manufacturing service; ODM = original design manufacturer

Source: Gartner (September 2012)

Figure 72. Total Global EMS/ODM Production of 3G Electronics (Billions of Dollars)

	2011	2012	2013	2014	2015	2016	CAGR 2011-2016
Communication	134	157	185	207	238	274	15.40%
Consumer	65	88	101	122	126	138	16.30%
Computing	273	301	334	358	386	416	8.80%
Total	472	546	620	687	750		

Source: Gartner (September 2012)

Figure 73. Forecast for Major Communications Electronics Production by EMS/ODM (Thousands of Units)

By EMS/ODMs	2011	2012	2013	2014	2015	2016	CAGR 2011-2016
Traditional Mobile Phone	140,982	149,606	140,389	139,974	132,989	129,094	-1.7%
Utility/Basic Smartphone	59,927	76,620	88,961	101,092	106,609	104,260	11.7%
Premium Smartphone	132,520	201,365	314,067	409,986	524,880	592,068	34.9%

CAGR = compound annual growth rate; EMS = electronics manufacturing service; ODM = original design manufacturer

Source: Gartner (September 2012)

Figure 74. Forecast for Major Computing (or Data Processing) Electronics Production by EMS/ODM (Thousands of Units)

By EMS/ODMs	2011	2012	2013	2014	2015	2016	CAGR 2011-2016
Mobile PCs and Netbooks	177,328	182,860	204,440	238,908	274,187	306,102	11.5%
Media Tablets	60,195	97,620	142,548	177,216	240,421	260,832	34.1%
Desktop PCs/Motherboards	108,587	109,122	112,580	112,812	115,026	117,374	1.6%
LCD Monitors	127,021	130,315	152,477	171,122	189,142	208,368	10.4%

CAGR = compound annual growth rate; EMS = electronics manufacturing service; ODM = original design manufacturer

Source: Gartner (September 2012)

Figure 75. Forecast for Major Consumer Electronics Production by EMS/ODM Companies (Thousands of Units)

By EMS/ODM Vendors	2011	2012	2013	2014	2015	2016	CAGR 2011-2016
Portable Media Players	107,607	100,532	92,875	85,626	80,106	72,349	-7.60%
Digital Still Cameras	80,262	86,047	90,116	92,247	93,621	94,580	3.30%
Digital Set-Top Boxes	105,068	126,725	156,093	183,390	212,726	228,996	16.90%
Video Game Devices	63,240	58,015	56,948	56,253	54,932	51,412	-4.10%
LCD TVs	72,194	87,562	93,890	101,903	120,193	128,328	12.20%

CAGR = compound annual growth rate; EMS = electronics manufacturing service; ODM = original design manufacturer

Source: Gartner (September 2012)

Figure 76. EMS, Connector, & Components Revenue Profiles

REVENUES (\$US M)	CY1998	CY1999	CY2000	CY2001	CY2002	CY2003	CY2004	CY2005	CY2006	CY2007	CY2008	CY2009	CY2010	CY2011	CY2012
Electronics Manufacturing Services (EMS)															
Hon Hai	1,241	1,853	2,954	4,393	7,475	11,727	16,242	28,377	40,601	53,276	61,826	59,331	95,199	117,502	132,020
Flextronics	3,556	5,883	11,224	12,923	13,615	13,822	16,063	15,582	17,774	24,460	33,141	23,754	27,761	29,944	24,670
Jabil Circuit	1,406	2,308	3,997	4,086	3,729	5,170	6,577	8,095	11,085	12,435	12,794	11,398	14,403	16,763	17,462
Soletron	6,345	10,301	16,998	16,149	12,261	11,261	11,632	10,207	11,103	Acq'd	Acq'd	Acq'd	Acq'd	Acq'd	Acq'd
Sanmina-SCI	2,109	2,855	4,887	4,975	10,168	10,795	12,487	11,344	10,872	9,383	6,849	5,237	6,503	6,442	6,086
Celestica	3,249	5,296	9,752	10,004	8,271	6,735	8,840	8,471	8,812	8,070	7,678	6,092	6,526	7,213	6,507
Funai Electric				1,466	1,897	2,722	3,034	3,567	3,192	3,394	2,433	3,026	3,395	3,463	3,117
Benchmark Electronics	524	877	1,704	1,277	1,630	1,840	2,001	2,257	2,907	2,916	2,590	2,089	2,402	2,253	2,468
Plexus	420	518	876	980	889	841	1,090	1,270	1,513	1,624	1,839	1,591	2,149	2,195	2,308
Memory Modules															
SMART Modular						666	648	611	786	766	629	424	796	Private	Private
Connectors															
Molex	1,647	1,907	2,437	1,957	1,788	1,965	2,493	2,614	3,171	3,233	3,200	2,480	3,403	3,582	3,580
Amphenol	919	1,011	1,360	1,104	1,062	1,240	1,530	1,808	2,471	2,851	3,236	2,820	3,554	3,940	4,292
Tyco Electronics										12,576	13,450	10,435	12,378	14,185	13,246
Sensata										1,403	1,423	1,135	1,540	1,827	1,914
Components															
Vishay Intertechnology	1,573	1,760	2,465	1,655	1,823	2,171	2,414	2,295	2,581	2,833	2,822	2,042	2,725	2,594	2,230
AVX	1,232	1,450	2,506	1,576	1,148	1,082	1,293	1,301	1,458	1,593	1,524	1,209	1,600	1,602	1,417
Component Distributors															
Avnet	6,165	7,454	12,977	10,556	8,880	9,490	10,766	12,611	14,766	16,993	17,864	16,656	22,921	26,704	25,158
Arrow Electronics	8,345	9,313	12,959	10,128	7,498	8,528	10,646	11,164	13,577	15,985	16,761	14,684	18,745	21,390	20,405
REVS Y/Y% CHG	CY1998	CY1999	CY2000	CY2001	CY2002	CY2003	CY2004	CY2005	CY2006	CY2007	CY2008	CY2009	CY2010	CY2011	CY2012
Electronics Manufacturing Services (EMS)															
Hon Hai	71%	49%	59%	49%	70%	57%	39%	75%	43%	31%	16%	-4%	60%	23%	12%
Flextronics	78%	65%	91%	15%	5%	2%	16%	-3%	14%	38%	35%	-28%	17%	8%	-18%
Jabil Circuit	28%	64%	73%	2%	-9%	39%	27%	23%	37%	12%	3%	-11%	26%	16%	4%
Soletron	58%	62%	65%	-5%	-24%	-8%	3%	-12%	9%	Acq'd	Acq'd	Acq'd	Acq'd	Acq'd	Acq'd
Sanmina-SCI	110%	35%	71%	2%	104%	6%	16%	-9%	-4%	-14%	-27%	-24%	24%	-1%	-6%
Celestica	113%	63%	84%	3%	-17%	-19%	31%	-4%	4%	-8%	-5%	-21%	7%	11%	-10%
Funai Electric				29%	43%	11%	18%	-11%	6%	-28%	24%	12%	2%	-2%	-10%
Benchmark Electronics	61%	67%	94%	-25%	28%	13%	9%	13%	29%	0%	-11%	-19%	15%	-6%	10%
Plexus	6%	23%	69%	12%	-9%	-5%	30%	17%	19%	7%	13%	-14%	35%	2%	5%
Memory Modules															
SMART Modular						-3%	-6%	29%	-3%	-18%	-33%	88%	Private	Private	Private
Connectors															
Molex	2%	16%	28%	-20%	-9%	10%	27%	5%	21%	2%	-1%	-23%	37%	5%	0%
Amphenol	4%	10%	35%	-19%	-4%	17%	23%	18%	37%	15%	14%	-13%	26%	11%	9%
Tyco Electronics									5%	7%	1%	-23%	19%	15%	-7%
Sensata											1%	-20%	36%	19%	5%
Components															
Vishay Intertechnology	40%	12%	40%	-33%	10%	19%	11%	-5%	12%	10%	0%	-28%	33%	-5%	-14%
AVX	-2%	18%	73%	-37%	-27%	-6%	20%	1%	12%	9%	-4%	-21%	32%	0%	-12%
Component Distributors															
Avnet	9%	21%	74%	-19%	-16%	7%	13%	17%	17%	15%	5%	-7%	38%	17%	-6%
Arrow Electronics	7%	12%	39%	-22%	-26%	14%	25%	5%	22%	18%	5%	-12%	28%	14%	-5%

Source: Citi Research

Figure 77. EMS, Connector, Components & Distributors Margin Profiles

REVENUES (\$US M)	CY1998	CY1999	CY2000	CY2001	CY2002	CY2003	CY2004	CY2005	CY2006	CY2007	CY2008	CY2009	CY2010	CY2011	CY2012
Electronics Manufacturing Services (EMS)															
Hon Hai	1,241	1,853	2,954	4,393	7,475	11,727	16,242	28,377	40,601	53,276	61,826	59,331	95,199	117,502	132,020
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Jabil Circuit	1,406	2,308	3,997	4,086	3,729	5,170	6,577	8,095	11,085	12,435	12,794	11,398	14,403	16,763	17,462
Soletron	6,345	10,301	16,998	16,149	12,261	11,261	11,632	10,207	11,103	Acq'd	Acq'd	Acq'd	Acq'd	Acq'd	Acq'd
Sanmina-SCI	2,109	2,855	4,887	4,975	10,168	10,795	12,487	11,344	10,872	9,383	6,849	5,237	6,503	6,442	6,086
Celestica	3,249	5,296	9,752	10,004	8,271	6,735	8,840	8,471	8,812	8,070	7,678	6,092	6,526	7,213	6,507
Funai Electric				1,466	1,897	2,722	3,034	3,567	3,192	3,394	2,433	3,026	3,395	3,463	3,117
Benchmark Electronics	524	877	1,704	1,277	1,630	1,840	2,001	2,257	2,907	2,916	2,590	2,089	2,402	2,253	2,468
Plexus	420	518	876	980	889	841	1,090	1,270	1,513	1,624	1,839	1,591	2,149	2,195	2,308
Memory Modules															
SMART Modular						666	648	611	786	766	629	424	796	Private	Private
Connectors															
Molex	1,647	1,907	2,437	1,957	1,788	1,965	2,493	2,614	3,171	3,233	3,200	2,480	3,403	3,582	3,580
Amphenol	919	1,011	1,360	1,104	1,062	1,240	1,530	1,808	2,471	2,851	3,236	2,820	3,554	3,940	4,292
Tyco Electronics									12,576	13,450	13,620	10,435	12,378	14,185	13,246
Sensata										1,403	1,423	1,135	1,540	1,827	1,914
Components															
Vishay Intertechnology	1,573	1,760	2,465	1,655	1,823	2,171	2,414	2,295	2,581	2,833	2,822	2,042	2,725	2,594	2,230
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Component Distributors															
Avnet	6,165	7,454	12,977	10,556	8,880	9,490	10,766	12,611	14,766	16,993	17,864	16,656	22,921	26,704	25,158
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REVS Y/Y% CHG	CY1998	CY1999	CY2000	CY2001	CY2002	CY2003	CY2004	CY2005	CY2006	CY2007	CY2008	CY2009	CY2010	CY2011	CY2012
Electronics Manufacturing Services (EMS)															
Hon Hai	71%	49%	59%	49%	70%	57%	39%	75%	43%	31%	16%	-4%	60%	23%	12%
Flextronics	78%	65%	91%	15%	5%	2%	16%	-3%	14%	38%	35%	-28%	17%	8%	-18%
Jabil Circuit	28%	64%	73%	2%	-9%	39%	27%	23%	37%	12%	3%	-11%	26%	16%	4%
Soletron	58%	62%	65%	-5%	-24%	-8%	3%	-12%	9%	Acq'd	Acq'd	Acq'd	Acq'd	Acq'd	Acq'd
Sanmina-SCI	110%	35%	71%	2%	104%	6%	16%	-9%	-4%	-14%	-27%	-24%	24%	-1%	-6%
Celestica	113%	63%	84%	3%	-17%	-19%	31%	-4%	4%	-8%	-5%	-21%	7%	11%	-10%
Funai Electric					29%	43%	11%	18%	-11%	6%	-28%	24%	12%	2%	-10%
Benchmark Electronics	61%	67%	94%	-25%	28%	13%	9%	13%	29%	0%	-11%	-19%	15%	-6%	10%
Plexus	6%	23%	69%	12%	-9%	-5%	30%	17%	19%	7%	13%	-14%	35%	2%	5%
Memory Modules															
SMART Modular							-3%	-6%	29%	-3%	-18%	-33%	88%	Private	Private
Connectors															
Molex	2%	16%	28%	-20%	-9%	10%	27%	5%	21%	2%	-1%	-23%	37%	5%	0%
Amphenol	4%	10%	35%	-19%	-4%	17%	23%	18%	37%	15%	14%	-13%	26%	11%	9%
Tyco Electronics									5%	7%	1%	-23%	19%	15%	-7%
Sensata											1%	-20%	36%	19%	5%
Components															
Vishay Intertechnology	40%	12%	40%	-33%	10%	19%	11%	-5%	12%	10%	0%	-28%	33%	-5%	-14%
AVX	-2%	18%	73%	-37%	-27%	-6%	20%	1%	12%	9%	-4%	-21%	32%	0%	-12%
Component Distributors															
Avnet	9%	21%	74%	-19%	-16%	7%	13%	17%	17%	15%	5%	-7%	38%	17%	-6%
Arrow Electronics	7%	12%	39%	-22%	-26%	14%	25%	5%	22%	18%	5%	-12%	28%	14%	-5%

Source: Citi Research

Figure 78. EMS, Connector, Components & Distributors Margin Profiles

	Country	ODM	PCBA	HDI PCB	FPCB	Optical Lens	Cam Module	Keypad	Plastic cas	Mg alloy	LCD/LCM	Connector	Acoustic	BT/Wi-Fi	Battery cell	Battery Pack
FIH	TWN															
Flextronics	US															
Jabil/TGP	US/TWN															
Elcoteq	Fin															
BYD	China															
Cheng Uei	TWN															
Lite-On/Silitech	TWN															
Ichia	TWN															
Mogem	Korea															
Hi-P	Singapore															
Jurong Tech	Singapore															
Catcher	TWN															
Intops	Korea															
Merry	TWN															
AAC Acoustic	China															
BSE Holdings	Korea															
Hosiden	JPN															
Largan	TWN															
Asia Optical	TWN															
Career	TWN															
Interflex	Korea															
G-Flex	China															
Unimicron	TWN															
Compeq	TWN															

Source: Citi Research

Citi's global inventory analysis includes over 140 global technology companies, this detailed analysis is available quarterly.

Aggregate inventory increased -4.5% q/q in 4Q'12, below the 5 year and 10 year average (a positive) and but not as large of a decline as the March sales outlook of -9.7% (a negative).

Figure 79. Total Aggregate Supply Chain

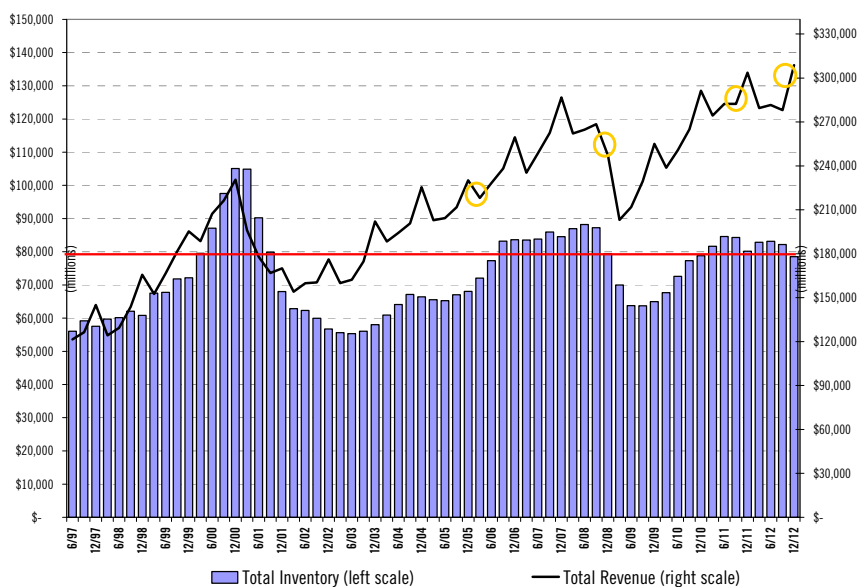
	4Q12 Inventory %Change Q/Q	1Q13E Sales %Change Q/Q
Current	-4.5%	-9.7%
5-year average	-2.9%	0.4%
10-year average	-1.2%	-8.7%

	4Q12 Inventory %Change Y/Y	1Q13E Sales %Change Y/Y
Current	-2.1%	-0.3%
5-year average	-0.7%	4.6%
10-year average	4.0%	6.8%

Source: Citi Research, FactSet, FirstCall, Bloomberg

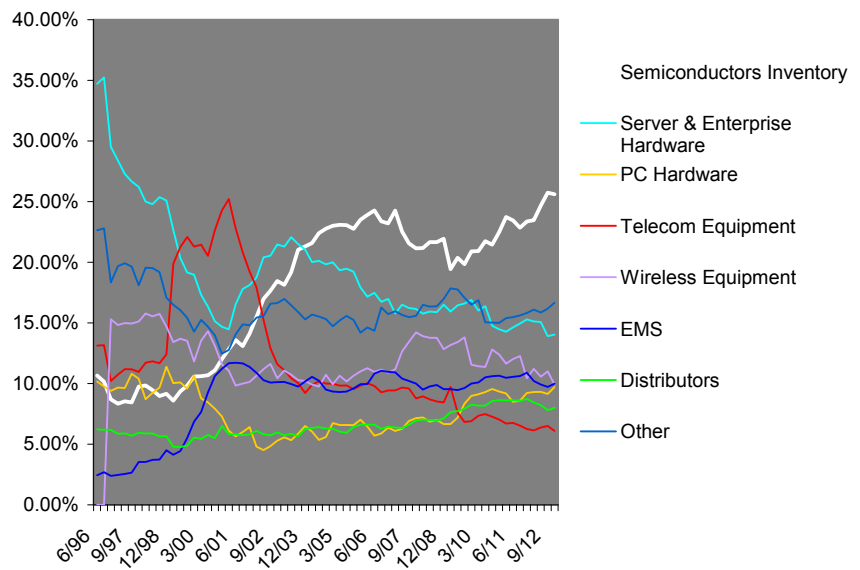
The technology supply chain is operating more efficiently (higher sales on similar inventory levels) when compared to previous years. The red line highlights the current inventory level and when the supply chain had similar inventory levels in the past. The yellow rings indicate corresponding sales levels to historic inventory levels similar to the current inventory level.

Figure 80. Total Supply Chain Inventory vs. Revenue Levels



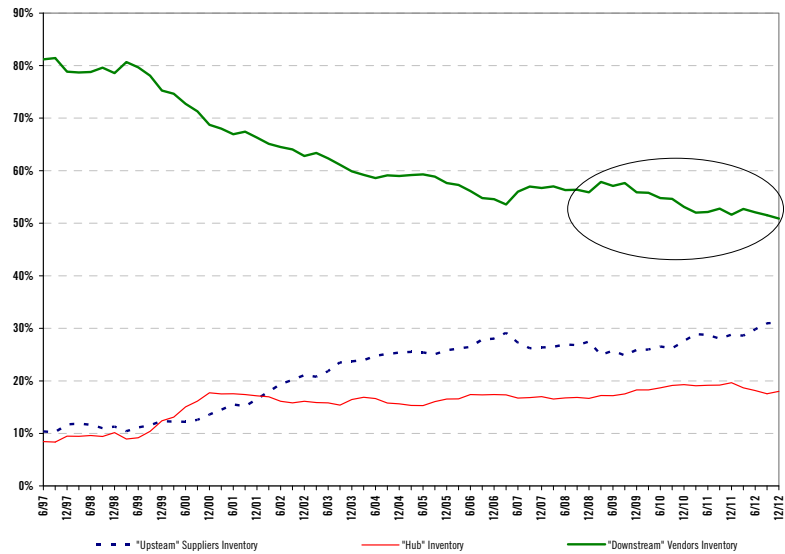
Source: Citi Research, FactSet, First Call, Bloomberg

Figure 81. Inventory - % Held At Each Sub-sector Along the Supply Chain: 2Q96–1Q12



Source: Citi Research

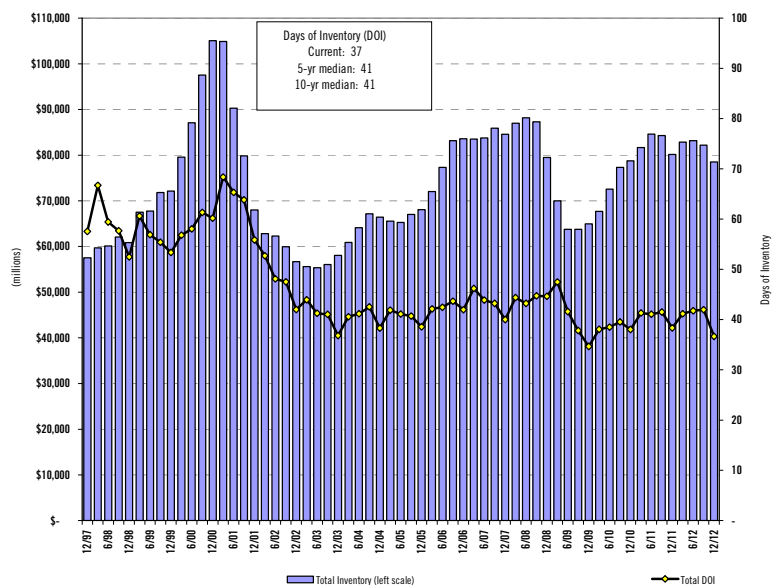
Figure 82. Inventory - % Held At Each Segment Along the Supply Chain: 2Q97–1Q12



Source: Citi Research, FactSet, First Call, Bloomberg

Supply Chain Days of Inventory decreased to 37 from 42, below the 5-year average of 41 days and 10-year average of 41 days.

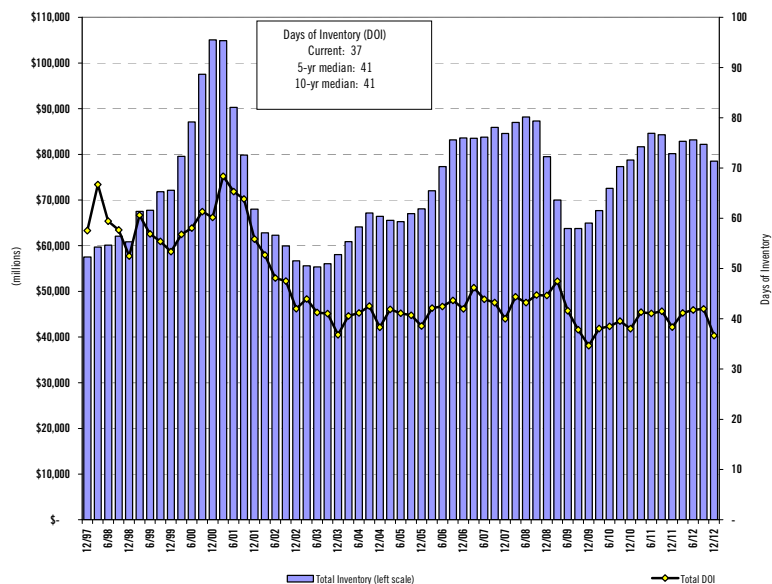
Figure 83. Total Inventory vs. Days of Inventory



Source: Citi Research, FactSet, First Call, Bloomberg

Inventories as a percent of sales decreased 413bps q/q to 25.4% and is -100bps below 4Q'11 of 26.4%. Inventory Turns increased in the Dec quarter

Figure 84. Inventories Throughout the Supply Chain



Source: Citi Research, FactSet, First Call, Bloomberg

Distribution

IT broad-line distributors are essentially wholesalers of commodity technology products (PC, servers, printers, accessories, etc) that serve the SMB market. The industry is highly fragmented, but includes some sizable companies such as Ingram Micro, Tech Data, and Synnex. Large vendors such as HP tend to leverage these distributors to cost-effectively sell their products into the VAR channel.

Arrow and Avnet are two of the large electronic component distributors in another highly fragmented market. These distributors will sell products from hundreds of suppliers but as an example suppliers may be Intel, NetApp, Hewlett Packard, IBM, etc. as they further distribute these products to hundreds of thousands of customers.

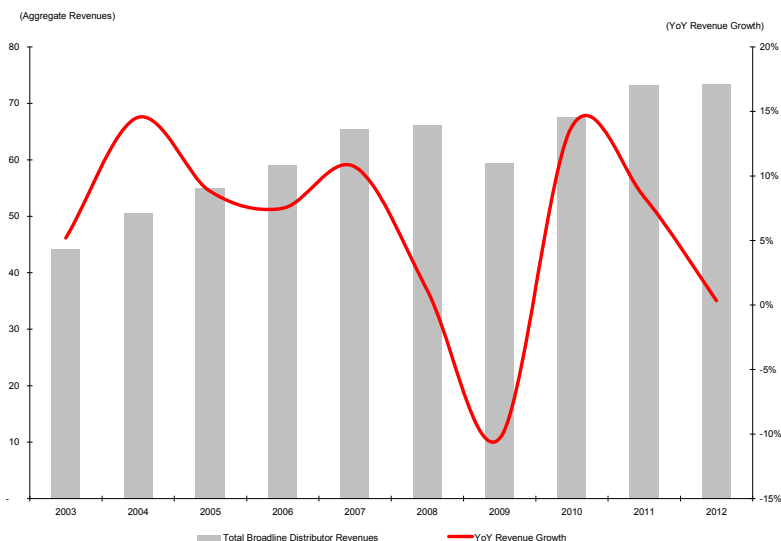
Figure 85. Top Distributors by Revenue (2011)

Company Name	Rank				Global Sales				% chg Y/Y				Ownership		Breakdown By Region (2011)		
	2011	2010	2009	2008 (NA only)	2011	2010	2009	2008	2011	2010	2009	2008	Public	Private	North America	Asia/Japan	Europe/Modest/ROW
Avnet Inc.	1	1	1		\$ 26,700	\$ 22,920	\$ 16,656	\$ 17,860	16%	38%	-7%	5%	X		\$11,481	\$6,492	\$8,727
Arrow Electronics, Inc.	2	2	2	2	\$ 21,390	\$ 18,745	\$ 14,684	\$ 16,761	14%	28%	-12%	5%	X		\$10,576	\$3,925	\$6,889
World Peace Holdings	3	3	3		\$ 11,112	\$ 12,087	\$ 9,608	\$ 4,543	-8%	26%	111%	-3%	X				
Future Electronics	4	4	4	3	\$ 5,107	\$ 4,520	\$ 3,453	\$ 5,441	13%	31%	-37%	23%		X			
Electrocomponents plc (includes Allied)	5	5	8		\$ 1,900	\$ 1,700	\$ 1,550	\$ 1,436	12%	10%	8%	-21%	X		\$440		
Premier Farnell plc (includes Newark)	6	6	7		\$ 1,600	\$ 1,526	\$ 1,265	\$ 1,440	5%	21%	-12%	-3%	X				
TTI Inc./Mouser Electronics Inc.	7	8	6	6	\$ 1,540	\$ 1,400	\$ 1,015	\$ 1,548	10%	38%	-34%	12%	X		\$893	\$138	\$509
Digi-Key Corporation	8	7	9	5	\$ 1,536	\$ 1,519	\$ 927	\$ 983	1%	64%	-6%	4%		X	\$1,036	\$224	\$276
Rutronik Electronics	9				\$ 1,027									X	\$0	\$0	\$1,027
Mouser Electronics	10	11			\$ 582	\$ 498	\$ 285		17%	75%			X		\$384	\$87	\$111
DAC Group	11	10	12	9	\$ 565	\$ 534	\$ 388	\$ 493	6%	38%	-21%	-7%		X	\$559	\$6	\$0
Excelpoint Technology Ltd	12	12	13		\$ 489	\$ 496	\$ 357	\$ 437	-1%	39%	-18%	-10%	X		\$0	\$489	\$0
Carlton - Bates	13	13		10	\$ 362	\$ 339	\$ 385		7%					X			
Dependable Component Supply Corp	14	14	19	20	\$ 327	\$ 303	\$ 218	\$ 270	8%	39%	-19%	70%		X			
Sager	15	15	15	11	\$ 219	\$ 205	\$ 188	\$ 346	7%	9%	-46%	39%	X		\$219	\$0	\$0
PEI-Genesis	16	16	17	21	\$ 212	\$ 194	\$ 145	\$ 172	9%	34%	-15%	18%	X		\$169	\$2	\$41
Richardson Electronics, Ltd (*wireless & power division acquired by Arrow)	17	17	11	16	\$ 161	\$ 156	\$ 492	\$ 566	3%	-68%	-13%	-21%	X				
Master Distributors	18	18	20	24	\$ 156	\$ 147	\$ 108	\$ 116	6%	37%	-7%	3%	X		\$137	\$9	\$9
Powell Electronics Inc.	19	20	21		\$ 120	\$ 100	\$ 90	\$ 110	20%	11%	-18%	19%		X	\$105	\$5	\$10
Bisco Industries Inc	20	21	24	25	\$ 103	\$ 97	\$ 80	\$ 93	6%	22%	-15%	8%	X		\$99	\$2	\$2
Flame Enterprises Inc.	21	22	23		\$ 101	\$ 91	\$ 82	\$ 90	11%	11%	-9%			X	\$88	\$4	\$9
Electro Sonic Inc.	22	19	22		\$ 71	\$ 125	\$ 89	\$ 105	-43%	39%	-15%	12%		X	\$68	\$2	\$1
RS Electronics	23	23			\$ 60	\$ 55	\$ 46		9%	19%				X	\$60	\$0	\$0
Hughes Peters	24	24			\$ 59	\$ 48	\$ 39		23%	23%				X	\$59	\$0	\$0
Steven Engineering	25				\$ 49									X	\$47	\$2	\$2
TOTALS					\$ 75,549	\$ 67,804	\$ 51,765	\$ 53,195									

Source: Citi Research

Note: 2012 data not yet available

Figure 86. Broadline IT Distributor Growth (Aggregate Revenues of IM, TECD, & SNX)



Source: Citi Research

Handsets

A **mobile phone** (also known as a cellular phone, cell phone, and a hand phone) is a device that can make and receive telephone calls over a radio link while moving around a wide geographic area. It does so by connecting to a cellular network provided by a mobile phone operator, allowing access to the public telephone network.

In addition to telephony, modern mobile phones also support a wide variety of other services such as text messaging, MMS, email, Internet access, short-range wireless communications, Bluetooth, business applications, gaming and photography. Mobile phones that offer these and more general computing capabilities are referred to as smartphones.

Key handset players are Nokia, Samsung, Apple, Blackberry, LG, HTC, Sony. We are also seeing smaller whitebox manufacturers offer low cost smartphones in emerging countries. Examples of whitebox manufacturers include Yulong, Hisense, Xaomi.

Figure 87. Handset Supply Chain

Handset Supply Chain
Semiconductors

Basebands
Broadcom
Ericsson
Freescall
Infineon
NXP
QCOM
STM.N
TXN
Renesas (6723.JP)

CMOS Image Sensors
MU
OVTI
Sharp (6753.JP)
STM
Toshiba (6502.JP)

Memory (NAND Flash)
Hynix (00660.KS)
Intel-Micron JV
SEC (05930.KS)
SNDK
Toshiba (6502.JP)
FLSH

Memory (NOR Flash)
Numonyx
SPSN
ST
INTC

Multimedia ICs
AMD
Core Logic (48870.KS)
Epson (6724.JP)
Freescall (FSL)
MtekVision (74000.KS)
NVDA
Marvell

Power Amps
RFMD
SWKS
Renesas
TQNT

Semiconductors
ARMHY
BRCM
CSR.L
NSM (acquired by Texas Instruments)
Wolfson (WIFI)

Transceivers
IFX
QCOM
FSL
SLAB
RFMD
SWKS

Coupler
COSMO (2466.TW)
ECE (2483.TW)

LCD Driver
SEC (05930.KS)
Renesas (6723.JP)
Philips (PHG)
Seiko Epson (8050.JP)
Sharp (6753.JP)

RF Filter
Murata (6981.JP)
TDK (6762.JP)
Soshin Elec (6938.JP)
Miyazaki Matsushita
GOOG
EPC

RF Power Amplifier
FIH (2038.HK)
Hitachi (6501.JP)
RFMD

Adaptor
Delta (2308.TW)
Phihong (2457.TW)
Potrans (2378.TW)

Semiconductors (ctd)

LED	
Bright (3031.TW)	SEMCO (09150.KS)
Everlight (2393.TW)	Citizen Electron (6892.JP)
Epistar (2448.TW)	Rohm (6963.JP)
Harvatek (6168.TW)	Stanley Elec (6923.JP)
Lite-On Tech (2301.TW)	Nichia
Opto Tech (2340.TW)	A
Tyntek (2426.TW)	CREE
UEC (2422.TW)	LG Innotek (11070.KS)

Crystal	
Hoshiden (6904.JP)	Epson Toyocom
Toyo Comm (6708.JP)	Nihon Dempa Kogyo (6779.JP)
Daishinku (6962.JP)	Kyocera Elec Devices (KYO)
Kinseki (6949.JP)	TXC (3042.TW)
Tokyo Denpa (6900.JP)	

Baseband ASIC	
ADI	QCOM
AGR	STM
CNTX	TXN
IFX	ERIC
GOOG	FSL
PHG	

Flash
SEC (05930.KS)
Hynix (00660.KS)
INTC
AMD
ATML
STM

Substrate
Unimicron (3037.TW)
NYPCB (8046.TW)
Kinsus (3189.TW)
SEMCO (09150.KS)
Ibiden (4062.JP)

VCO
Siward (2484.TW)
SEMCO (09150.KS)
Alpha Elec (6770.JP)
FDK (6955.JP)
Matsushita Elec Ind (4283.JP)
Murata (6981.JP)
TDK (6765.JP)

Other
Pan Overseas Elec (2370.TW)
Ralec (2437.TW)
Team Young (5345.TW)
Ta-I (2478.TW)
WTC (2492.TW)

Components

Batteries	
BYD (1211.HK)	Sanyo (6764.JP)
Delta Elec Inc (2308.TW)	Simplo (6121.TWO)
ELC/YDT	Sony (6758.JP)
E-One Moli Energy (Not-listed)	SYNergy Sciencetech (Not-listed)
Foxlink (2392.TW)	Toshiba (6502.JP)
Samsung SDI (06400.KS)	

Camera Modules	
Toshiba (6502.JP)	STM
Sony (6758.JP)	Largan Precision (3008.TW)
Foxconn/Altius	Samsung Techwin (12450.KS)
Lite-On Tech (2301.TW)	SEMCO (09150.KS)
FLEX	

Connectors
Cheng Uei Precision (2392.TW)
Hon Hai (2317.TW)
Hirose (6806.JP)
IAE (6807.JP)
APH
MOLX
SMK (6798.JP)

Flexible PCBs	
Mflex/MFS (M-FLEX.US)	NTK
Foxconn Adv Tech	Ichia (2402.TW)
Global Flex (0471.HK)	Multi-Fineline Electronix
Career (6153.TW)	NOK
Interflex (051370.KS)	

Keypads
Ichia (2402.TW)
Lite-On Tech (2301.TW)
Silitech (3311.TW)
You Eal (49520.KS)
Shin Etsu (7970.JP)
Sunarrow
OK UIL
Polymatech

LCD Screens	
Samsung SDI (06400.KS)	Sharp (6753.JP)
Picvue (2333.TW)	Seiko Epson (8050.JP)
United Radiant (5315.TW)	Philips (PHG)
Wintek (2384.TW)	Sayno Epson
	Toshiba Matsushita

Microphones/Speakers
Hosiden (6804.JP)
Merry (2439.TW)
Panasonic
Philips (PHG)
Meiloon (2477.TW)

Printed Circuit Boards (PCBs)	
AT&S (ATSV.DE)	Elec. & Eltek (EELT.SI)
CMK (6958.JP)	Daeduck Elec (08060.KS)
Compeq (2313.TW)	Korea Circuit (07810.KS)
Ibiden (4062.JP)	Career (6153.TW)
SEMCO (09150.KS)	Ichia (2402.TW)
Unimicron (3037.TW)	Wus PCB (2316.TW)
Gold Circuit (2368.TW)	Nippon Mekton (NL)
Unicap (5307.TW)	Multek/Flextronics (FLEX)
Unitech PCB (2367.TW)	

Power Supply
Phihong (2457.TW)

Lens
Largan (3008.TW)
Genius (3406.TW)
Enplas (6961.TW)
Fujinon
Diotech

Plastic Casing
Taiwan Green Point (3007.TW) (acquired by Jabil)
FIH (2038.HK)
Flextronics (FLEX)
Hi-P (HIP.SP)

Light Metal Casing
Foxconn Tech (2354.TW)
Catcher (2474.TW)

Components (ctd)

Bluetooth Headset ODM
Pan International (2328.TW)
Cheng Uei (2329.TW)
Primax (2336.TW)
Merry (2439.TW)

Panel
TPK (3673.TW)
Wintek (2384.TW)
CMI (3481.TW)

Passive Components
Ceramic Capacitor
SEMCO (09150.KS)
Yageo (2327.TW)
Walsin Tech (2492.TW)
Murata (6981.JP)
TDK (6762.JP)
Taiyo Yuden (6976.JP)

Tantalum Capacitor
NEC (6701.JP)
Kyocera (6971.JP)
KEMET (KEM)
AVX
VSH

Diode
Mospec (2434.TW)
Pan Jit (2481.TW)
Rectron (2302.TW)
Taiwan Semiconductor (5425.TW)
TKS (2428.TW)

Gallium Arsenide
Procomp Informatics (2398.TW)
VPEC (2455.TW)

Inductor
Yageo (2327.TW)
SEMCO (0915.KS)
Taiyo Yuden (6976.JP)

End Products

Handset OEMs
AAFL
LG Electronics (66570.KS)
GOOG
Nokia
BBRY
SEC (05930.KS)
HTC (2498.TW)
Sony (6758.JP)

Handset ODM/EMS
Arima Comm (8101.TW)
Compal Comm (8078.TW)
Elcoteq (ELCQF)
FLEX
Hon Hai (2317.TW)
JBL
CLS
FIH (2038.HK)
LG Electronics (66570.KS)
Pantech
Solomon Tech (2359.TW)
Quanta (2382.TW)
Asustek (2357.TW)
HTC (2498.TW)
BenQ (2352.TW)
Compal (2324.TW)
Dbtel (5304.TW)
Inventec (2356.TW)
Kinop (2312.TW)
SEC (05930.KS)

Source: Citi Research

Apple iPhone

Figure 88. Preliminary iPhone 5 vs. iPhone 4S Cost Estimates

Components / Hardware Elements	Apple iPhone 5 (Pricing as of Sept, 2012)				Apple iPhone 4S (Pricing as of Oct, 2011)			
	iPhone 5 Hardware Comments	16GB3	32GB4	64GB5	iPhone 4S Hardware Comments	16GB32	32GB43	64GB54
Pricing without Contract		\$649	\$749	\$849		\$649	\$749	\$849
Implied Margin		68%	71%	72%		70%	71%	70%
Total BOM Cost		\$199	\$209	\$230		\$188	\$207	\$245
Manufacturing Cost		\$8.00	\$8.00	\$8.00		\$8.00	\$8.00	\$8.00
BOM + Manufacturing		\$207	\$217	\$238		\$196	\$215	\$253
Major Cost Drivers								
Memory								
NAND Flash		\$10.40	\$20.80	\$41.60		\$19.20	\$38.40	\$76.80
DRAM	1GB LPDDR2	\$10.45	\$10.45	\$10.45	512MB LPDDR2	\$9.10	\$9.10	\$9.10
Display & Touchscreen	4" Retina Display w/ In-Cell Touch	\$44.00	\$44.00	\$44.00	3.5" Retina Display w/ Touch	\$37.00	\$37.00	\$37.00
Processor	A6 Processor	\$17.50	\$17.50	\$17.50	A5 Processor	\$15.00	\$15.00	\$15.00
Camera(s)	8MP + 1.2MP	\$18.00	\$18.00	\$18.00	8MP + VGA	\$17.60	\$17.60	\$17.60
Wireless Section - BB/RF/PA	Qualcomm MDM9615M+RTR8600 +Front End	\$34.00	\$34.00	\$34.00	Qualcomm MDM6610+RTR8605 +Front End	\$23.50	\$23.50	\$23.50
User Interface & Sensors		\$6.50	\$6.50	\$6.50		\$6.85	\$6.85	\$6.85
WLAN / BT / FM / GPS	Murata Dual-Band Wireless-N Module	\$5.00	\$5.00	\$5.00	Murata Single-Band Wireless-N Module	\$6.50	\$6.50	\$6.50
Power Management	Dialog + Qualcomm	\$8.50	\$8.50	\$8.50	Dialog + Qualcomm	\$7.20	\$7.20	\$7.20
Battery	3.8V ~1400mAh	\$4.50	\$4.50	\$4.50	3.7V ~1400mAh	\$5.90	\$5.90	\$5.90
Mechanical / Electro-Mechanical		\$33.00	\$33.00	\$33.00		\$33.00	\$33.00	\$33.00
Box Contents		\$7.00	\$7.00	\$7.00		\$7.00	\$7.00	\$7.00

Please note that these teardown assessments are preliminary in nature, account only for hardware and manufacturing costs and do not include additional expenses such as software, licensing, royalties or other expenditures.

Source: IHS Teardown Research (September 2012)

iPhone 4S suppliers making a return engagement with the iPhone 5 include Samsung, Qualcomm, Murata, Dialog, Texas Instruments, STMicroelectronics, Cirrus Logic, Avago, Skyworks, NXP and AKM. Nevertheless—from the advanced, \$17.50 A6 processor manufactured by Samsung, down to the relatively simple \$0.62 electronic compass from AKM Semiconductor—almost every part has been updated.

Figure 89. iPhone 5 Key Vendors and Parts – In Descending Order of Component Value

Manufacturer	Part Number	Description	Comment
		Display / Touchscreen Module - 4" Diagonal, Retina Display, w/ In-Cell Multi-Touch	Japan Display Inc, and LG Display are likely sources
Sandisk	SDMALBB4032G	Flash - NAND, 32GB, MLC	Hynix, Samsung, and Toshiba are other likely sources; Hynix is the supplier in A1429 (Verizon & Sprint version) we torn down
Samsung Semiconductor	APL0598	Apps Processor - PoP	New Apple A6 Processor
Qualcomm	MDM9615	Baseband Processor - Multi-Mode, Multi-Band, GSM/CDMA/EVDO RevB/LTE, w/ Elpida Moblie DDR	Was MDM9600 in the latest iPad
		Primary Camera Module - 8MP, BSI CMOS (TBD), Auto Focus Lens	
		Enclosure, Main, Center - Machined Aluminum Unibody	
Elpida	B8164B3PM-1D-F	SDRAM - Mobile DDR2, 1GB, PoP	Hynix, and Samsung are other likely sources
Murata		BT / WLAN Module - Contains BCM4334, BTv4.0, IEEE802.11 a/b/g/n	
Qualcomm	RTR8600	RF Transceiver - Multi-Band, GSM/EDGE/HSPA+/LTE, 65nm RF CMOS	Same RF transceiver in the latest iPad
Dialog Semiconductor		Power Management IC	PMIC for A6
Qualcomm	PM8018	Power Management IC	PMIC for MDM9615
Sony	US373291H	Battery - Li-Polymer, 3.8V, 1430mAh	ATL is another supplier in A1429 (Verizon & Sprint version) we torn down
		Secondary Camera Module - 1.2MP, BSI CMOS (TBD), Fixed Lens	
Broadcom	BCM5976	Touchscreen Controller	
Texas Instruments	CDPF3246	Touchscreen Controller (TBD)	
ST Microelectronics	L3G4200D	Gyroscope - 3-Axis, Digital	
Cirrus Logic	CS42L65	Audio Codec	This version is approximately 3 times the die size of the previous version in the 4S.
Avago	AFEM7814	PAM - w/ Duplexer	AFEM7813 in A1429 (Verizon & Sprint Version)
Skyworks	SKY77487-18	PAM	SKY77491-158 in A1429 (Verizon & Sprint Version)
Skyworks	SKY77352-15	PAM - Quad-Band GSM/EDGE	Same in A1429 (Verizon & Sprint Version)
NXP	CBTL1608	Interface IC - for Display	
Cirrus Logic	CS35L19	Audio Power Amplifier - w/ Signal Processing	
AKM Semiconductor	AK8963C	Electronic Compass - 3-Axis, w/ Built-In ADC & 14/16-Bit Selectable Digital Output	
Skyworks	SKY77729-4	PAM - LTE Band 17	Avago A5613 LTE Band 13 PAM in A1429 (Verizon & Sprint Version)
ST Microelectronics		Accelerometer	
Murata	SWUA127	FEM	SWUA147 in A1429 (Verizon & Sprint Version)
Skyworks	SKY70631	Antenna Switch Module	Same in A1429 (Verizon & Sprint Version)
RF Micro	RF1102	RF Switch	Same in A1429 (Verizon & Sprint Version)

Source: IHS Teardown Research (September 2012)

Samsung Galaxy S4

The HSPA+ S4 with 16 gigabytes of NAND flash memory costs \$244.00 when the \$8.50 manufacturing cost is added in, as presented in the table below. The BOM of the HSPA+ version of the S4 is \$30.40 higher than for the equivalent version of the Galaxy S III, a 15 percent increase. The Galaxy S III pricing analysis was performed by IHS in September 2012.

Figure 90. Preliminary Samsung S4 Virtual Teardown BOM Estimates (pricing in U.S. Dollars)

	Samsung Galaxy S4 (HSPA Version)		Samsung Galaxy S4 (LTE Version)		Samsung Galaxy S3 (HSPA Version)	
Total BOM Cost	\$236		\$233		\$205	
Manufacturing Cost	\$8.50		\$8.50		\$8.00	
BOM + Manufacturing	\$244		\$241		\$213	
Major Cost Drivers						
Memory (NAND Flash + DRAM)	16GB eMMC + 2GB LPDDR3	\$28.00	16GB eMMC + 2GB LPDDR3	\$28.00	16GB eMMC + 1GB LPDDR2	\$29.00
Display & Touchscreen	5" 1920x1080 Super AMOLED (441ppi), w/ Gorilla®Glass3 by Corning	\$75.00	5" 1920x1080 Super AMOLED (441ppi), w/ Gorilla®Glass3 by Corning	\$75.00	4.8" 1280x720 Super AMOLED, w/ Gorilla®Glass2 by Corning	\$65.00
Processor	Samsung Exynos 5 Octa (5410)	\$30.00	Qualcomm Snapdragon 600 (APQ8064T) - Quad-Core	\$20.00	Samsung Exynos 4 Quad	\$17.50
Camera(s)	13MP + 2MP	\$20.00	13MP + 2MP	\$20.00	8MP + 1.9MP	\$19.00
Wireless Section - BB/RF/PA	Possibly contains Intel PMB9820 + PMB5745 + Front End	\$16.00	Possibly contains MDM9615 + WTR1605L + Front End	\$25.00	Contains Intel PMB9811 + PMB5712 + Front End	\$14.50
User Interface & Sensors	Contains accelerometer, RGB Light, e-compass, Gyro, Barometer, Temperature & Humidity, IR Gesture	\$16.00	Contains accelerometer, RGB Light, e-compass, Gyro, Barometer, Temperature & Humidity, IR Gesture	\$16.00	Contains Capella CM3663 ALS / Proximity, ST LSM330DLC Accelerometer / Gyro, AKM AK8975C e-Compass, & ST LP331AP Barometer Sensors	\$12.70
WLAN / BT / FM / GPS	Possibly contains Broadcom BCM4335 + BCM47521	\$9.00	Possibly contains Qualcomm Atheros WCN3680	\$5.75	Contains Broadcom BCM4334 + BCM47511	\$8.20
Power Management	Samsung PMIC (TBD)	\$8.00	Qualcomm PMICs	\$9.50	Contains Maxim PMIC	\$7.00
Battery	3.8V, 2600mAh w/ NFC Antenna (TBD)	\$5.60	3.8V, 2600mAh w/ NFC Antenna (TBD)	\$5.60	3.8V, 2100mAh w/ NFC Antenna	\$4.90
Mechanical / Electro-Mechanical		\$22.00		\$22.00		\$21.40
Box Contents		\$6.00		\$6.00		\$6.00

Please note that these teardown assessments are preliminary in nature, account only for hardware and manufacturing costs and do not include additional expenses such as software, licensing, royalties or other expenditures.

Source: IHS Teardown Research (March 2013)

Samsung makes extensive use of its own internally manufactured parts in all of its phones, including the Galaxy S4, as presented in table below. The company is believed to supply the display and touch-screen module, as well as the apps processor and power management integrated circuit, according to the preliminary IHS analysis. Samsung also is the primary supplier of the SDRAM and flash memory, although the company could employ alternative sources for these commodity parts.

Figure 91. Samsung Galaxy S4 Estimated Key Vendors and Parts – In Descending Order of Component Value

Manufacturer	Part Number	Description	Comment
Samsung Mobile Display		Display / Touchscreen Module - 5" HD Super AMOLED, 1920x1080, 441ppi	
Samsung Semiconductor	Exynos 5 Octa*	Apps Processor - Quad-Core ARM Cortex-A15, & Quad-Core ARM Cortex-A7, PoP	Qualcomm Snapdragon 600 for the LTE version (APQ8064T)
Samsung Semiconductor		SDRAM - 2GB LPDDR3, PoP	Samsung and SK Hynix are likely the supplier.
Samsung Semiconductor		Flash - eMMC NAND, 16GB, MLC	
Intel	PMB9820*	Baseband Processor	Possibly Qualcomm MDM9615 + WTR1605L for the LTE version
Intel	PMB5745*	RF Transceiver	Possibly Qualcomm MDM9615 + WTR1605L for the LTE version
Broadcom	BCM4335*	BT / WLAN - IEEE802.11a/b/g/n/ac, BT 4.0LE, & FM Radio	Possibly Qualcomm Atheros WCN3680 in the LTE version
Samsung Semiconductor		Power Management IC	Qualcomm PMIC for the LTE version
Broadcom	BCM47521*	GPS / GLONASS	Not needed in the LTE version

Source: IHS Teardown Research (March 2013)

Figure 92. Semi-Analysis Handsets

	Traditional		Utility Smartphone		Premium Smartphone	
Units (M, 2012)	1,141.1		232.0		485.8	
Factory Average Selling Price (\$)	\$29.33		\$160.53		\$241.98	
	Semiconductor Content	Share of Total Semi Content Cost	Semiconductor Content	Share of Total Semi Content Cost	Semiconductor Content	Share of Total Semi Content Cost
General Purpose	\$7.78	51%	\$12.29	36%	\$30.74	48%
Memory	\$2.57	17%	\$4.64	13%	\$20.17	31%
Microcomponent	\$0.16	1%	\$0.39	1%	\$0.53	1%
Logic IC	\$0.74	5%	\$1.01	3%	\$1.05	2%
Analog IC	\$1.17	8%	\$1.36	4%	\$1.81	3%
Discrete	\$0.69	5%	\$0.92	3%	\$1.22	2%
Optical	\$2.44	16%	\$3.97	12%	\$5.96	9%
Nonoptical Sensors	\$0.12	1%	\$1.10	3%	\$2.01	3%
Application Specific	\$7.20	48%	\$21.08	61%	\$31.53	49%
ASIC	\$0.38	3%	\$0.76	2%	\$6.43	10%
ASSP	\$6.82	45%	\$20.33	59%	\$25.10	39%
Total	\$15.10	100%	\$34.47	100%	\$64.28	100%
Total Semi Content as % of ASP	51%		21%		27%	

Source: Gartner (Dec 2012)

Figure 93. Top 20 Companies Revenue from Shipments of Total Memory - Communications - Wireless (Millions of \$US)

Company Name	2012 Share (%)
Samsung Electronics	45%
SK Hynix	21%
Toshiba	16%
Elpida Memory	8%
SanDisk	3%
Micron Technology	3%
Macronix International	1%
Spansion	0%
Nanya Technology	0%
Winbond Electronics	0%
Elite Semiconductor Memory Technology	0%
Broadcom	0%
Eon Silicon Solution	0%
Cypress Semiconductor	0%
STMicroelectronics	0%
Fujitsu Semiconductor	0%
Atmel	0%
Sharp	0%
Microchip Technology	0%
GigaDevice Semiconductor	0%
Others	0%
Total Market	100%

Source: Citi Research, Gartner

Figure 94. Top 20 Companies Revenue from Shipments of Total Microcomponents - Communications - Wireless (Millions of \$US)

Company Name	2012 Share (%)
Freescale Semiconductor	29%
Atmel	22%
Texas Instruments	11%
Melfas	7%
Cypress Semiconductor	6%
Broadcom	4%
Shanghai Huahong Integrated Circuit	4%
Applied Micro Circuits	3%
EM Microelectronic	3%
Cavium Networks	2%
Silicon Laboratories	2%
Microchip Technology	2%
STMicroelectronics	1%
Renesas Electronics	1%
Intel	1%
Infineon Technologies	1%
Maxim Integrated Products	1%
Panasonic	1%
NXP	1%
Toshiba	0%
Others	0%
Total Market	100%

Source: Citi Research, Gartner

Figure 95. Top 20 Companies Revenue from Shipments of Total General Purpose Logic - Communications - Wireless (Millions of \$US)

Company Name	2012 Share (%)
Altera	16%
Xilinx	15%
Renesas Electronics	11%
Samsung Electronics	11%
Ilitek	9%
Novatek	9%
Himax Technologies	7%
Sitronix	4%
Orise Technology	4%
Texas Instruments	4%
Lattice Semiconductor	2%
Fairchild Semiconductor	1%
Solomon Systech	1%
Raydium Semiconductor	1%
Magnachip Semiconductor	1%
Seiko Instruments	1%
JSC Sitronics	1%
Rohm	0%
Toshiba	0%
Maxim Integrated Products	0%
Others	2%
Total Market	100%

Source: Citi Research, Gartner

Figure 96. Top 20 Companies Revenue from Shipments of Total General Purpose Logic - Communications - Wireless (Millions of \$US)

Company Name	2012 Share (%)
Altera	16%
Xilinx	15%
Renesas Electronics	11%
Samsung Electronics	11%
Ilitek	9%
Novatek	9%
Himax Technologies	7%
Sitronix	4%
Orise Technology	4%
Texas Instruments	4%
Lattice Semiconductor	2%
Fairchild Semiconductor	1%
Solomon Systech	1%
Raydium Semiconductor	1%
Magnachip Semiconductor	1%
Seiko Instruments	1%
JSC Sitronics	1%
Rohm	0%
Toshiba	0%
Maxim Integrated Products	0%
Others	2%
Total Market	100%

Source: Citi Research, Gartner

Figure 97. Top 20 Companies Revenue from Shipments of Total Analog - Communications - Wireless (Millions of \$US)

Company Name	2012 Share (%)
Texas Instruments	21%
Analog Devices	11%
Maxim Integrated Products	8%
STMicroelectronics	5%
Microsemi	4%
ON Semiconductor	4%
Ricoh	3%
Avago Technologies	3%
Mitsumi Electric	3%
Intersil	3%
Seiko Instruments	3%
Cirrus Logic	3%
Linear Technology	3%
NXP	2%
Alpha & Omega Semiconductor	2%
Power Integrations	2%
Asahi Kasei Microdevices	2%
BCD Semiconductor Manufacturing	1%
Richtek Technology	1%
Skyworks Solutions	1%
Others	16%
Total Market	100%

Source: Citi Research, Gartner

Figure 98. Top 20 Companies Revenue from Shipments of Total Discrete - Communications - Wireless (Millions of \$US)

Company Name	2012 Share (%)
Freescale Semiconductor	12%
Toshiba	11%
NXP	10%
Avago Technologies	10%
Mitsubishi	6%
ON Semiconductor	6%
Fairchild Semiconductor	5%
Renesas Electronics	4%
Alpha & Omega Semiconductor	3%
CREE	3%
STMicroelectronics	3%
TriQuint Semiconductor	3%
Rohm	3%
Infineon Technologies	2%
Skyworks Solutions	2%
Microsemi	2%
Panasonic	1%
Shindengen Electric	1%
California Micro Devices	1%
International Rectifier	1%
Others	8%
Total Market	100%

Source: Citi Research, Gartner

Figure 99. Top 20 Companies Revenue from Shipments of Total Optoelectronics - Communications - Wireless (Millions of \$US)

Company Name	2012 Share (%)
Sharp	18%
Aptina	13%
Samsung Electronics	12%
Omnivision	11%
Sony	7%
Toyoda Gosei	5%
Toshiba	4%
STMicroelectronics	4%
Nichia	3%
Everlight Electronics	3%
Lite-On Technology	3%
Galaxycore	3%
Avago Technologies	2%
Kingbright	2%
Seoul Semiconductor	1%
SK Hynix	1%
CREE	1%
Rohm	1%
Philips Electronics	1%
Citizen Electronics	1%
Others	5%
Total Market	100%

Source: Citi Research, Gartner

Figure 100. Top 20 Companies Revenue from Shipments of Nonoptical Sensors - Communications - Wireless (Millions of \$US)

Company Name	2012 Share (%)
STMicroelectronics	32%
Asahi Kasei Microdevices	22%
Knowles	16%
Analog Devices	7%
Robert Bosch	6%
Rohm	4%
InvenSense	4%
MEMSIC	3%
Diodes	2%
Maxim Integrated Products	1%
Hokuriku Electric Industry	1%
Sanken	1%
Yamaha	1%
Murata Manufacturing	0%
Omron	0%
BCD Semiconductor Manufacturing	0%
Fujikura	0%
Mitsumi Electric	0%
Panasonic	0%
VTI Technologies	0%
Others	0%
Total Market	100%

Source: Citi Research, Gartner

Figure 101. Top 20 Companies Revenue from Shipments of Total Application Specific - Communications - Wireless (Millions of \$US)

Company Name	2012 Share (%)
Qualcomm	33%
Samsung Electronics	9%
Broadcom	7%
MediaTek	6%
Intel	4%
Texas Instruments	4%
STMicroelectronics	4%
Skyworks Solutions	3%
Spreadtrum Communications	2%
RF Micro Devices	2%
TriQuint Semiconductor	1%
Dialog Semiconductor	1%
Murata Manufacturing	1%
Marvell Technology Group	1%
Renesas Electronics	1%
RDA Microelectronics	1%
Toshiba	1%
Avago Technologies	1%
Maxim Integrated Products	1%
Fujitsu Semiconductor	1%
Others	15%
Total Market	100%

Source: Citi Research, Gartner

Figure 102. Top 10 Mobile Phone Cellular Baseband Vendors

Top 10 Mobile Phone Cellular Baseband Vendors (Including Power Management) by Revenue, Worldwide, 2011 (Millions of Dollars)

Vendor	2011 Revenue	Market Share (%) 2011
Qualcomm	7,077	48.3
Intel	1,762	12
MediaTek	1,312	9
Texas Instruments	1,104	7.5
STMicroelectronics	943	6.4
Broadcom	596	4.1
Spreadtrum Communications	580	4
Freescall Semiconductor	328	2.2
Marvell Technology Group	275	1.9
MStar Semiconductor	126	0.9
Others	553	3.8
Total Market	14,656	100

NA = not applicable

Note: STMicroelectronics' revenue includes ST-Ericsson.

Source: Citi Research, Gartner

Figure 103. Top 10 Mobile Phone Applications and Multimedia Processor Vendors

Top 10 Mobile Phone Application and Multimedia Processor Vendors by Revenue, Worldwide, 2011 (Millions of Dollars)

Vendor	2011 Revenue	Market Share (%) 2011
Samsung Electronics	1,741	53.5
Texas Instruments	553	17
Renesas Electronics	225	6.9
Nvidia	205	6.3
Broadcom	80	2.5
STMicroelectronics	73	2.2
Qualcomm	55	1.7
Toshiba	42	1.3
Panasonic	39	1.2
Rohm	38	1.2
Others	206	6.3
Total Market	3,257	100

Source: Citi Research, Gartner

Figure 104. Top 10 Mobile Phone RF Device Vendors by Revenue

Top 10 Mobile Phone RF Device Vendors by Revenue, Worldwide, 2011 (Millions of Dollars)

Vendor	2011 Revenue	Market Share (%) 2011
Skyworks Solutions	1,038	20.8
RF Micro Devices	696	14
Qualcomm	617	12.4
TriQuint Semiconductor	476	9.6
STMicroelectronics	295	5.9
Intel	291	5.8
Avago Technologies	260	5.2
Renesas Electronics	245	4.9
MediaTek	184	3.7
Fujitsu Semiconductor	144	2.9
Others	738	14.8
Total Market	4,984	100

Source: Citi Research, Gartner

Figure 105. Top 8 Mobile Phone Wireless Connectivity Vendors by Revenue

Top Eight Mobile Phone Wireless Connectivity Vendors by Revenue, Worldwide, 2011 (Millions of Dollars)

Vendor	2011 Revenue	Market Share (%) 2011
Broadcom	1,009	39.8
Texas Instruments	510	20.1
CSR	295	11.6
MediaTek	158	6.2
Qualcomm	114	4.5
RDA Microelectronics	103	4.1
STMicroelectronics	102	4
Marvell Technology Group	60	2.4
Others	183	7.2
Total Market	2,534	100

Source: Citi Research, Gartner

Figure 106. Total Handset Shipments by Vendor & Vendor Market

Unit Shipments (mm)	2009	2010	2011	2012	2013E	2014E	2015E
Nokia	4318	4530	4171	3855	3117	2566	2796
Motorola	551	372	414	343	270	287	324
Samsung	2271	2787	3286	4006	4540	4991	5943
LG	1177	1167	880	565	616	679	734
Sony	570	431	342	311	392	500	583
BBRY	340	480	528	332	334	373	409
Apple	251	475	931	1358	1398	1603	1727
HTC	118	246	450	307	360	414	515
Top OEMs	9586	10,488	11,002	11,077	11,027	11,813	13,045
Y/Y growth	-5%	9%	5%	-4%	4%	7%	10%
WW Shipments include white brands	1,3945	1,725.7	1,966.8	1,991.1	2,128.2	2,332.2	2,600.4
Y/Y growth	6%	24%	14%	1%	7%	11%	11%

Handset Mkt Share (%)	2009	2010	2011	2012	2013E	2014E	2015E
Nokia	31.0	26.2	21.2	16.8	14.6	12.6	10.8
Motorola	4.0	2.2	2.1	1.7	1.3	1.2	1.3
Samsung	16.3	16.2	16.7	20.1	21.3	21.2	22.9
LG	8.4	6.8	4.5	2.8	2.9	2.9	2.8
Sony	4.1	2.5	1.7	1.6	1.8	2.1	2.2
BBRY	2.4	2.8	2.7	1.7	1.6	1.6	1.6
Apple	1.8	2.8	4.7	6.8	6.6	6.8	6.6
HTC	0.8	1.4	2.3	1.5	1.7	1.8	2.0
Others	31.2	30.2	40.1	46.9	48.2	49.8	49.8

Source: Citi Research

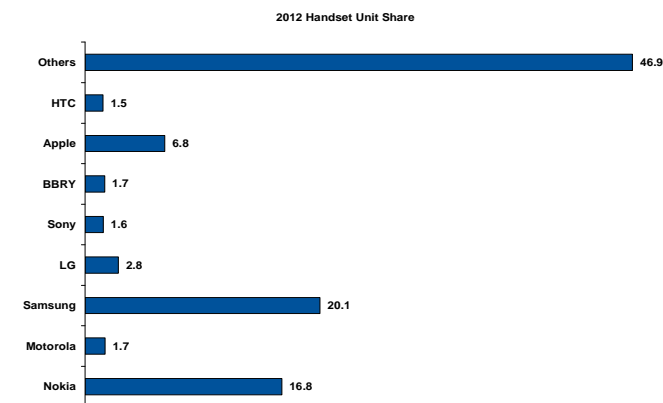
Figure 107. Total Smartphone Shipments by Vendor

Unit Shipments (mm)	2009	2010	2011	2012	2013E	2014E	2015E
NOK - Converged Device	67.8	100.3	77.3	35.0	32.9	42.8	48.6
BBRY	34.0	48.0	52.8	33.2	33.4	37.3	40.9
Apple	25.1	47.5	93.1	135.8	139.8	160.3	172.7
HTC	11.8	24.6	45.0	30.7	36.0	41.4	51.8
Motorola	2.8	13.7	18.6	20.6	20.3	24.4	31.2
Samsung	5.9	24.9	97.2	212.3	327.5	442.2	574.8
Sony	1.4	10.3	19.6	29.9	39.2	50.0	58.5
LGE	0.6	6.5	20.2	26.2	40.1	52.1	62.5
Top OEMs	151.5	276.9	423.9	523.7	669.1	850.4	1041.0
Y/Y growth	24%	83%	53%	24%	28%	27%	22%
WW Converged Device Shipments	188.6	320.0	487.0	732.1	1165.4	1458.2	1751.0
Y/Y growth	19%	70%	52%	50%	59%	25%	20%

Converged device Mkt share (%)	2009	2010	2011	2012	2013E	2014E	2015E
NOK - Converged Device	35.9	31.3	15.9	4.8	2.8	2.9	2.8
BBRY	18.0	15.0	10.8	4.5	2.9	2.6	2.3
Apple	13.3	14.8	19.1	18.5	12.0	11.0	9.9
HTC	6.2	7.7	9.2	4.2	3.1	2.8	3.0
Palm	1.1	0.4	-	-	-	-	-
Motorola	1.5	4.3	3.8	2.8	1.7	1.7	1.8
Samsung	3.1	7.8	20.0	29.0	28.1	30.3	32.8
Sony	0.8	3.2	4.0	4.1	3.4	3.4	3.3
LGE	0.3	2.0	4.2	3.6	3.4	3.6	3.6
Others	20.8	13.8	13.0	28.5	42.6	41.7	40.5

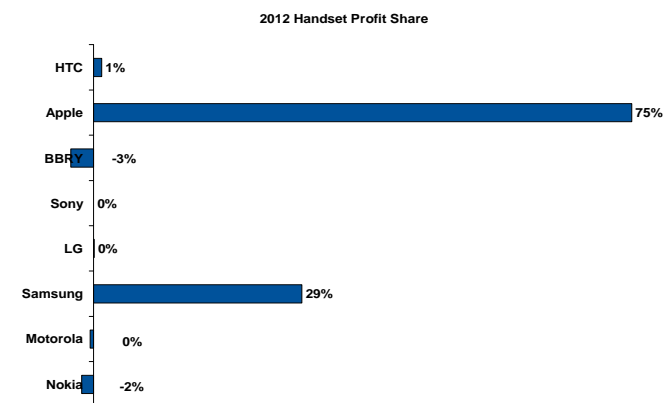
Source: Citi Research

Figure 108. Handset Unit Share



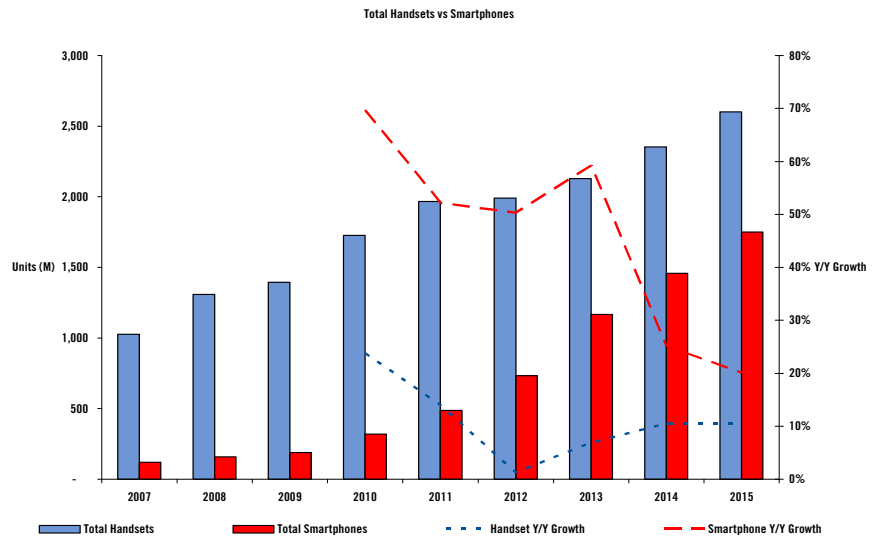
Source: Citi Research

Figure 109. Handset Operating Profit Share



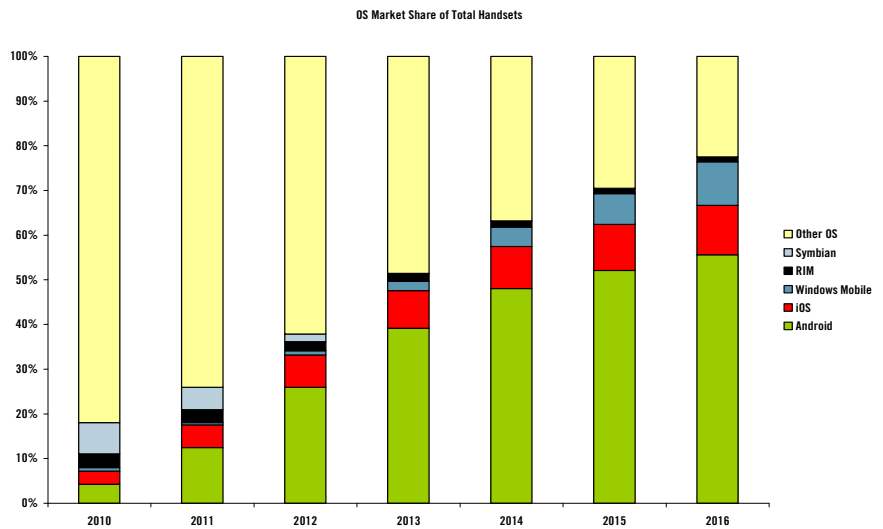
Source: Citi Research

Figure 110. Total Handsets vs. Smartphones



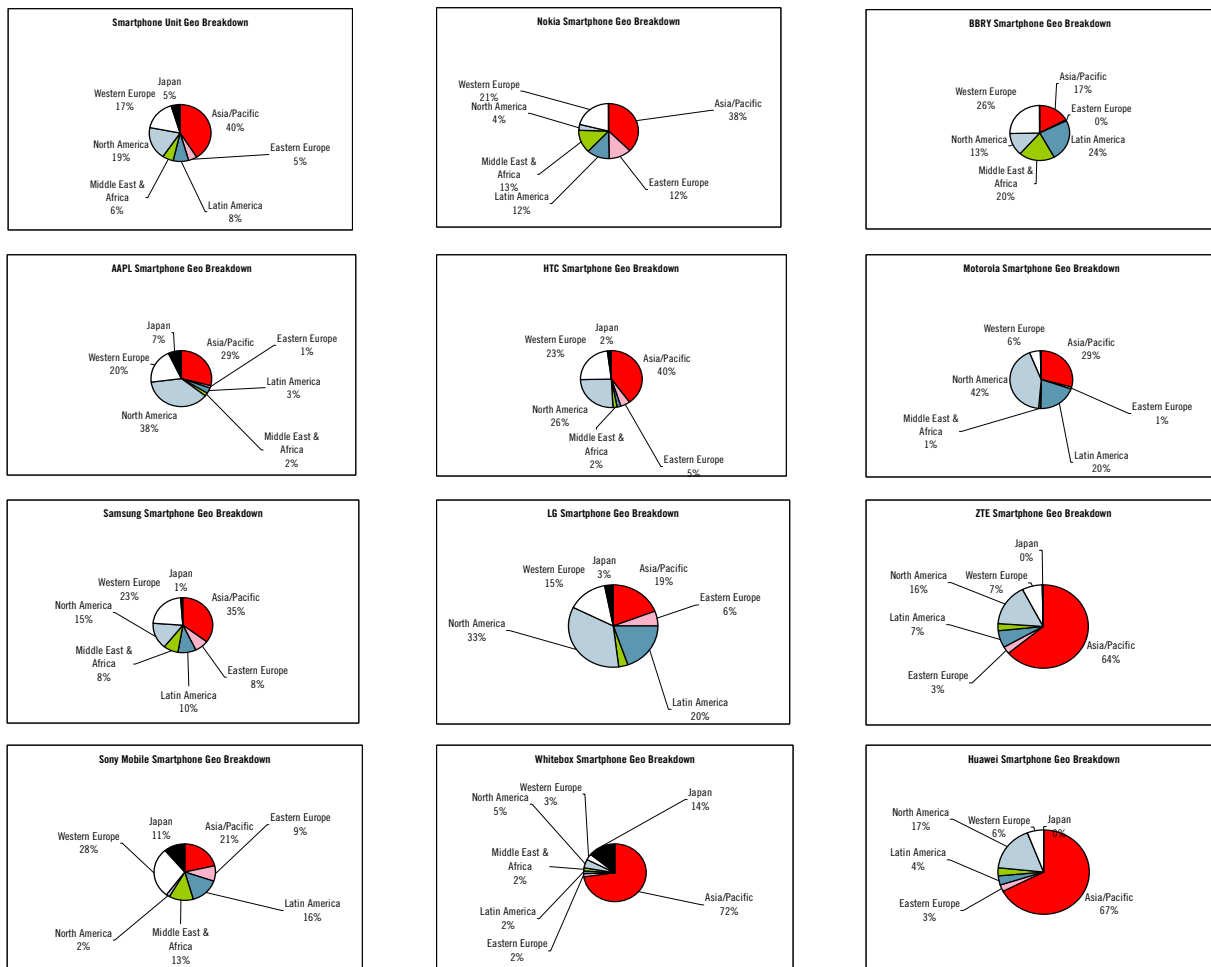
Source: Citi Research

Figure 111. OS Market Share of Total Handsets



Source: Gartner

Figure 112. 2012 Smartphone Unit Sales Geographic Breakdown by Vendor



Source: Gartner

PCs & Tablets

The largest global PC vendors are HP, Lenovo, Acer and Asustek. These OEMs (Original Equipment Manufacturers) outsource much of the actual PC assembly to Asian manufacturers, particularly notebooks which are almost all made by Taiwanese ODMs. Tablets, a category that was reinvented by the introduction of the iPad, remains dominated by Apple with Samsung the only other major contender. However, we will likely see continued market share gains by Asian whitebox makers who are offering sub-\$100 tablets.

Figure 113. PC/Motherboard & Notebook Supply Chain

**PC/Motherboard & Notebook Supply Chain
Semiconductors**

Chipsets
AMD
INTC
NVDA
SIS (2363.TW)
VIA (2388.TW)
ALI (3041.TW)

Graphics ICS/ Video Cards
NVDA
INTC
S3 (merged by VIA)
AMD

Memory (DRAM)
Hynix (00660.KS)
MU
ProMOS (5387.TW)
QI
SEC (005930.KS)
Mosel (2342.TW)
Nan Ya Tech (2408.TW)
Powerchip (5346.TW)
Vanguard (5347.TW)
Winbond (2344.TW)

Microprocessors
AMD
INTC

Power Management ICS
International Rectifier
Intersil
Maxim
Q2 Micro (Caymans)
Semtec

Wireless LANs (WLAN)
Atheros (acquired by Qualcomm)
Broadcom
D-Link (TW)
INTC
Marvell
Microsemi
LSI
Realtek (TW)

Semiconductors
MCRL
NSM (acquired by Texas Instruments)
ONNN

VGA Card
Asustek (2357.TW)
Abit (2407.TW)
Elitegroup (2331.TW)
Gigabyte (2376.TW)
Leadtek (2465.TW)
Microstar (2377.TW)
TUL (6150.TW)

LAN Card
Abocom (2444.TW)
Accoton (2345.TW)
CIS Tech (2326.TW)
D-Link (2332.TW)

NIC IC
Realtek (2379.TW)
COMS
INTC

IC Packages
Ibiden (4062.JP)
Nanya Plastic (1303.TW)
NGK Spark Plug (NGK)
SEMCO (09150.KS)
Shinko Elec (6967.JP)

Components

CPU
VIA (2388.TW)
AMD
INTC
TMTA

Sound Card
Creative Lab (CREA.SI)
YAMAHA (7951.JP)

Components (ctd)

Batteries
BYD (HK)
Samsung SDI (06400.KS)
Simplo (TW)
Sanyo (JP)
Sony (6758.JP)

Hard Disk Drives
STX
Toshiba (6502.JP)
WDC

Keyboards
Minebea (6479.JP)
Sunrex (2387.TW)
Chicony (2385.TW)
Huan Hsin (H16.SI)
BenQ (2352.TW)
Behavior Tech (2341.TW)
Ichia (2402.TW)
KYE Systems (2365.TW)
Lite-On Tech (2301.TW)
Hon Hai (2317.TW)
SEMCO (09150.KS)

LCD Panels
LGD (34220.KS)
AU Optonics (TW)
SEC (05930.KS)
Sharp (JP)

LCD/CRT Monitor
Amtran (2489.TW)
BenQ (2352.TW)
Lite-On Tech (2301.TW)
Coretronic (5371.TW)
Jean (2442.TW)
Sampo (6137.TW)
Delta Elec (DELT.BK)
Hansol Electronics (0471.KS)
Hynix (00660.KS)
LGE (66570.KS)
LGD (34220.KS)
Orion Electric (0439.KS)
SEC (005930.KS)
TPV (0903.HK)
AUO (2409.TW)
Chi Mei (3009.TW)
CPT (2475.TW)
HannStar (6116.TW)
CMI
Picvue (2333.TW)
Quanta Display (3012.TW)
Wintek (2384.TW)
Hitachi (6501.JP)
Sharp (6753.JP)

Motherboards
Abit (2407.TW)
Aopen (3046.TW)
Asustek (2357.TW)
Hon Hai (2317.TW)
DFI (2397.TW)
Elitegroup (2331.TW)
Gigabyte (2376.TW)
Mitac (2315.TW)
Microstar (2377.TW)
Procomp (2398.TW)
Shuttle (2405.TW)
USI (2350.TW)

Operating Systems
MSFT
AAPL

Optical Disk Drives (CD/DVD Drives)
Asia Optical (3019.TW)
Lite-On Tech (2301.TW)
MediaTek (2454.TW)
Quanta Storage (TW)
SEC (005930.KS)

PC Camera Module
Chicony (2385.TW)

Pointers/Trackpads
Synaptics (US)
Alps Electric (JP)

Power Supply
Asustek (2357.TW)
Chicony (2385.TW)
Chroma (2360.TW)
Delta (2308.TW)
Hon Hai (2317.TW)
Lite-ON Tech (2301.TW)
Phihong (2457.TW)
Potrans (2378.TW)
UMEC (2413.TW)

Driver IC/Module
Data Int'l (5432.TW)
Novatek (3034.TW)
Myson Tech (5314.TW)
Winbond (2344.TW)
Welltrend (2436.TW)

PCB
Boardtek (5349.TW)
Chin Poon (2355.TW)
Compeq (2313.TW)
Gold Circuit (2368.TW)
Tripod (3044.TW)
Unicap (5307.TW)
Unimicron (3037.TW)
Unitex PCB (2367.TW)
Wus PCB (2316.TW)
Ya Hsin (2418.TW)
Elec. & Eltek (EELT.SI)
Daeduck Elec (08060.KS)
Legend (0992.HK)
Korea Circuit (07810.KS)
SEMCO (09150.KS)

Components (ctd)

Passive Components
Chilisin (2456.TW)
Cyntec (2452.TW)
Holy Stone Ent. (3026.TW)
Lelon (2472.TW)
Luxon (2389.TW)
Pan Overseas Elec. (2370.TW)
Ralec (2437.TW)
Team Young (5345.TW)
Ta-I (2478.TW)
Yageo (2327.TW)
WTC (2492.TW)
LGE (66570.KS)
SEC (005930.KS)
Trigem Computer

CD/CD-RW
CMC (2323.TW)
Gigastorage (2406.TW)
Infodisk (2491.TW)
Lead Data (2443.TW)
Prodisc (2396.TW)
Ritek (2349.TW)

CD/DVD/CD-RW ROM IC
Mediatek (2454.TW)
VIA (2388.TW)
Sony (6758.JP)

CD/DVD/CD-RW ROM
Aopen (3046.TW)
QSI (6188.TW)
Lite-On IT (8008.TW)
Asustek (2357.TW)
BenQ (2352.TW)
Behavior Tech (2341.TW)
Asia Optical (3019.TW)
Lite-On Tech (2301.TW)
Hon Hai (2317.TW)
LGE (66570.KS)
SEC (05930.KS)
Toshiba (6502.JP)
Sony (6758.JP)

Case
Catcher (2474.TW)
Compucase (3032.TW)
Enlight (2438.TW)
Foxconn Tech (2354.TW)
Hon Hai (2317.TW)
In Win Dev (6117.TW)
Loyalty Founder (5465.TW)

Printer
Kinpo (2312.TW)
Lite-On Tech (2301.TW)
Cal-Comp (CCET.BK)

End Products

PC OEMs
Hewlett-Packard (HPQ)
Apple
Acer
Lenovo (0992.HK)
Toshiba
Asustek
SEC (05930.KS)
Sony (6758.JP)
Fujitsu

Source: Citi Research

Apple iPad

Figure 114. Preliminary BOM and Manufacturing Costs for the iPad (16GB and Wi-Fi, USD)

Components / Hardware Elements	Price
Retail Pricing (As of November 2012)	\$329
Total BOM Cost	\$188
Manufacturing Cost	\$10
BOM + Manufacturing	\$198
Major Cost Drivers	
Memory: 512MB LPDDR2 + 16GB NAND	
NAND Flash + DRAM	\$15.50
Display & Touchscreen: 7.9" 1024x768 w/ GF2 Multitouch	\$80.00
Processors: Apple APL2498 (32nm A5)	\$13.00
Camera(s): 5MP BSI + 1.2MP 720p BSI	\$11.00
User Interface & Sensors & Combo Module (WLAN/BT/FM)	\$15.00
Power Management	\$7.50
Battery: 3.72V 16.5Wh Li-Polymer	\$13.50
Mechanical / Electro-Mechanical / Other	\$26.00
Box Contents	\$6.00

Please note that these teardown assessments are preliminary in nature, account only for hardware and manufacturing costs and do not include additional expenses such as software, licensing, royalties or other expenditures.

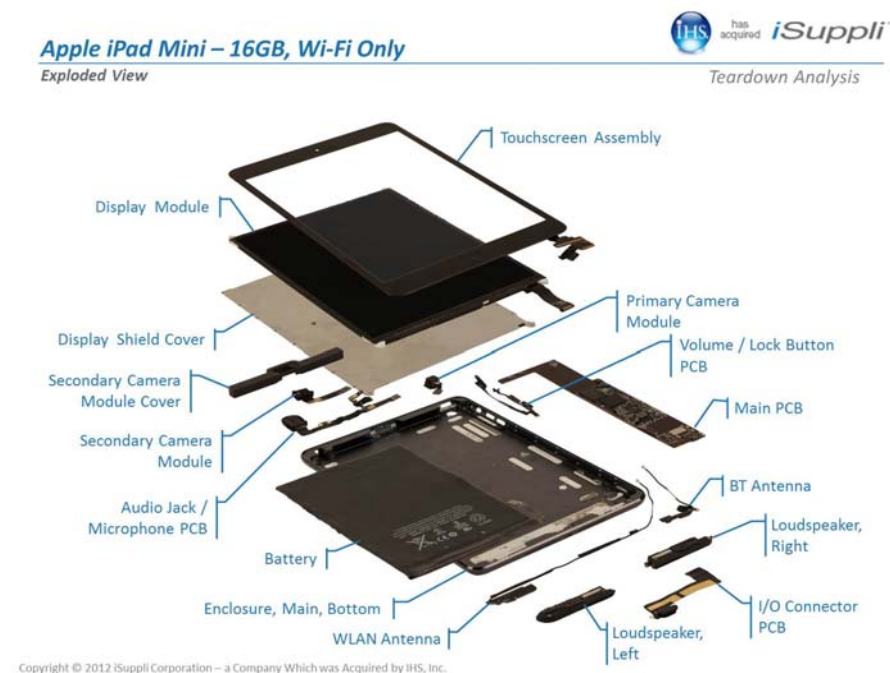
Source: IHS Teardown Research (November 2012)

Figure 115. iPad mini Key Identified Vendors and Parts in Descending Order of Component Value

Manufacturer	Part Number	Description	Comment
		Display Module - 7.9" Diagonal, 1024x768 Pixels	LG Display, and AU Optronics are likely sources
		Touchscreen / Display Window - 7" Diagonal, Capacitive, GF2 Technology, Contains 2 Broadcom BCM5976 Controllers	
Dynapack		Battery Pack - Li-Polymer, 3.72V, 4440mAh, 16.5Wh	Other likely suppliers include Amperex Technology, Simplo Technology, & Sony 1 Cell ~528Wh/L
Samsung Semiconductor	APL2498	Apps Processor - Dual ARM Core, 32nm, PoP	
SK Hynix	H2JTDG8UD2MBR	Flash - MLC NAND, 16GB	Sandisk, and Toshiba are other likely sources.
		Primary Camera Module - 5MP, BSI CMOS, Auto Focus Lens	
Compeq		10-Layer - FR4/RCF HDI, Any Layer Stacked Via	
Elpida	EDB4064B3PM-8D-F	SDRAM - Mobile DDR2, 512MB, PoP	SK Hynix is another likely supplier.
Murata		BT / WLAN Module - Contains Broadcom BCM4334, IEEE802.11 a/b/g/n, Bluetooth V4.0+HS	Same module in iPhone 5
Dialog Semiconductor		Power Management IC	PMIC for A5
		Secondary Camera Module - 1.2MP, BSI CMOS, 1/6" Format, Fixed Lens	
Cirrus Logic		Audio Codec	
ST Microelectronics	A3G4250D	Gyroscope - 3-Axis, Digital	
AKM Semiconductor	AK8963C	Electronic Compass - 3-Axis, w/ Built-In ADC & 14/16-Bit Selectable Digital Output	
Cirrus Logic	CS35L19	Audio Power Amplifier - w/ Signal Processing (Qty:2)	
NXP	CBTL1608	Interface IC	
ST Microelectronics	LIS3DSH	Accelerometer - MEMS, 3-Axis, ±2g/±4g/±6g/±8g/±16g, Digital Output	

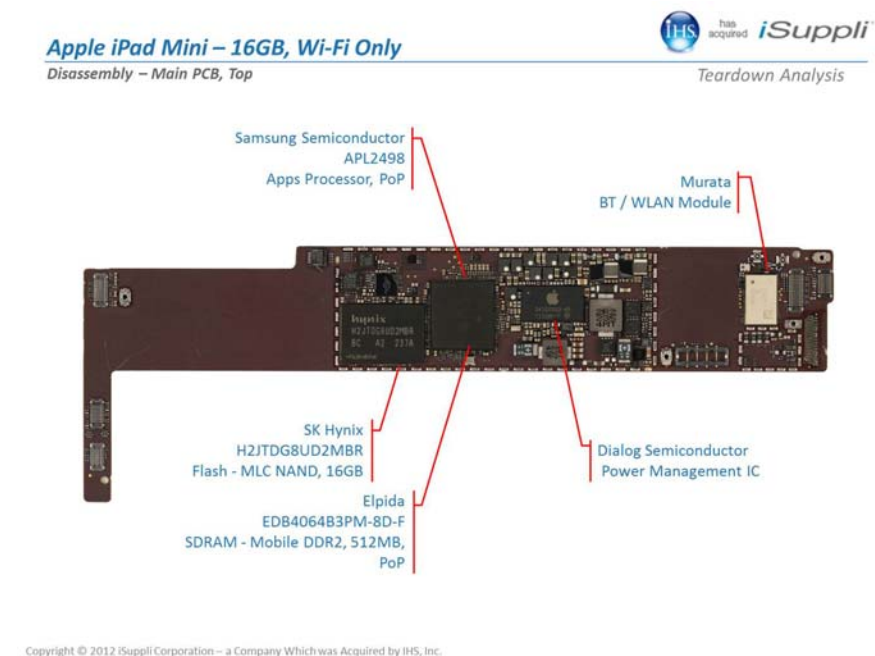
Source: IHS Teardown Research (November 2012)

Figure 116. Apple iPad Mini – 16GB, Wi-Fi Only



Source: IHS Teardown Research (November 2012)

Figure 117. Apple iPad Mini – 16GB, Wi-Fi Only Main PCB



Source: IHS Teardown Research (November 2012)

Microsoft Surface

Figure 118. Microsoft Surface BOM

Components / Hardware Elements	Price
Retail Pricing (As of November 2012)	\$599
Total BOM Cost	\$271
Manufacturing Cost	\$13
BOM + Manufacturing	\$284
Major Cost Drivers	
Memory: 2GB DDR3L + 32GB eMMC NAND Flash + DRAM	\$34.00
Display & Touchscreen: 10.6" 1366x768 w/ Multitouch	\$101.00
Processors: Nvidia Tegra3	\$21.50
Camera(s): 1MP 720p BSI (Qty: 2)	\$5.00
User Interface & Sensors & Combo Module (WLAN/BT/FM)	\$20.00
Power Management	\$8.00
Battery: 7.4V 31.5Wh Li-Polymer	\$20.00
Mechanical / Electro-Mechanical / Other	\$36.00
Box Contents	\$25.00

Please note that these teardown assessments are preliminary in nature, account only for hardware and manufacturing costs and do not include additional expenses such as software, licensing, royalties or other expenditures.

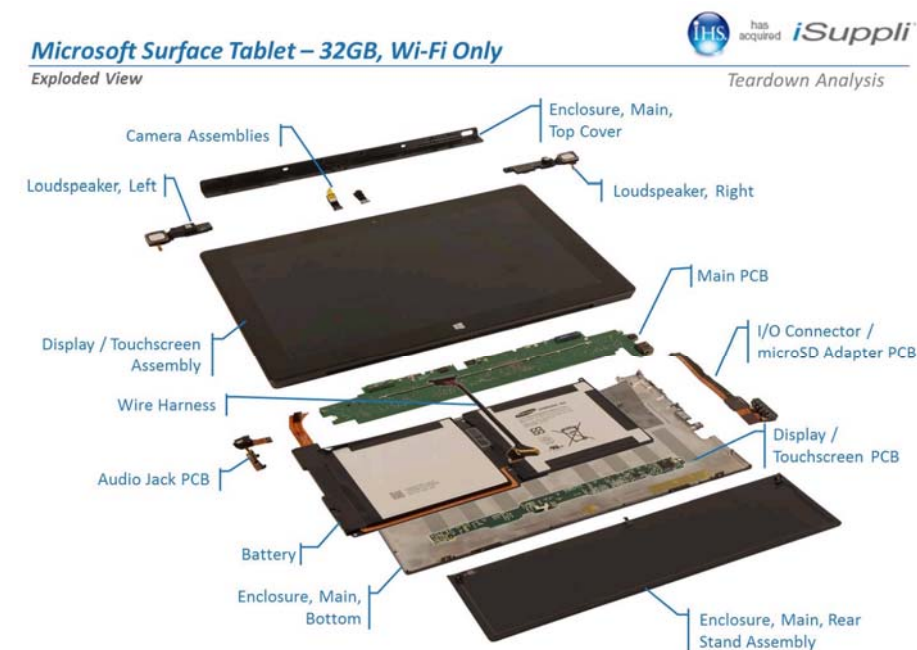
Source: IHS Teardown Research (November 2012)

Figure 119. Microsoft Surface RT Key Identified Vendors and Parts in Descending Order of Component Value

Manufacturer	Part Number	Description	Comment
Samsung	LTL106AL01-001	Display Module - 10.6" Diagonal, 1366x768 Pixels	
		Touchscreen / Display Window - 10.6" Diagonal, Glass Over ITO Film, Capacitive, Contains Atmel mXT1386E & mXT154E Master & Slave Controllers	
Samsung	KLMBG4GE4A-A001	Flash - eMMC NAND, 32GB	Conventional eMMC flash memory as applied by many handset/tablets OEMs
Nvidia	Tegra 3	Mobile Processor - SoC, Quad-Core ARM Cortex A9, 1.4GHZ, 1MB L2 Cache, 12 3D ULP GeForce GPU Cores, 1080p HD Video, Support DDR3-L1500 and LPDDR2-1066, 40nm Process	
Samsung SDI		Battery Pack - Li-Ion, 7.4V, 4250mAh, 31.5Wh	2 Cells, ~500Wh/L each
Micron Technology	MT41K512M8RH-125:E	SDRAM - DDR3L-1600, 4Gb, 512Mx8, 1.35V (Qty:4)	
Unimicron		8-Layer - FR4/RCF HDI, 1+6+1, Lead-Free	
Marvell	88W8797	WLAN / Bluetooth / FM - IEEE802.11 a/b/g/n, MIMO, Bluetooth V4.0, FM Radio Transceiver	
Texas Instruments	TPS6591104AA2	Power Management IC - w/ 3 Step-Down Converters, 1 Controller for external FETs, 8 LDOs	
IDT	V1038BVG	LVDS Transmitter	
Atmel	AT32UC3L0256	MCU - 32-Bit, RISC, 50MHz, 256KB Flash, 32KB SRAM, 8-Channel 12-Bit ADC, Capacitive Touch Module, 36 I/Os	
Wolfson Micro	WM8962BECSN	Audio Codec - Stereo, w/ Audio Enhancement DSP, and Integrated 2W Class D Amplifier	
		Camera Module - Contains Omnivision OV9726 1MP 720p Image Sensor, 1/6.5" Format, Fixed Lens (Qty: 2)	
ST Microelectronics		Gyroscope - MEMS	
Cypress Semiconductor	CY8C20466A-24LQXI	Touch Panel Controller - Capacitive, 32KB Flash, 2KB SRAM, 28 GPIOs, w/ Auto-tuning	
Rf Micro Devices	RFFM8500	WLAN FEM - 5GHz, IEEE802.11a/n/ac, PAM, LNA, w/ Integrated SPDT Switch, and Power Detector Coupler	
Kionix	KXTJ9-1007	Accelerometer - MEMS, 3-Axis, ±2g/±4g/±8g, Digital Output	
RF Micro Devices	RFFM8200	WLAN FEM - 2.4GHz, IEEE802.11b/g/n, PAM, LNA, w/ Integrated SP3T Switch, and Power Detector Coupler	
Texas Instruments	MSP430G2402IRSA16	MCU - Mixed Signal, 16-Bit RISC, 1MHz, 8KB Flash Memory, 256B RAM, 10-Bit 200 kps ADC, 10 I/Os	
From the Keyboard Accessory			
Freescale	MK10DN512ZCAB10	MCU - 32-Bit, ARM-M4 Core, 100MHz, 512KB Flash, 128KB RAM	
Atmel	mXT112E	Touchscreen Controller - Capacitive, 4 Point Multitouch, 12Bit x 12Bit Touch Position	

Source: IHS Teardown Research (November 2012)

Figure 120. Microsoft Surface Tablet – 32GB, Wi-Fi Only



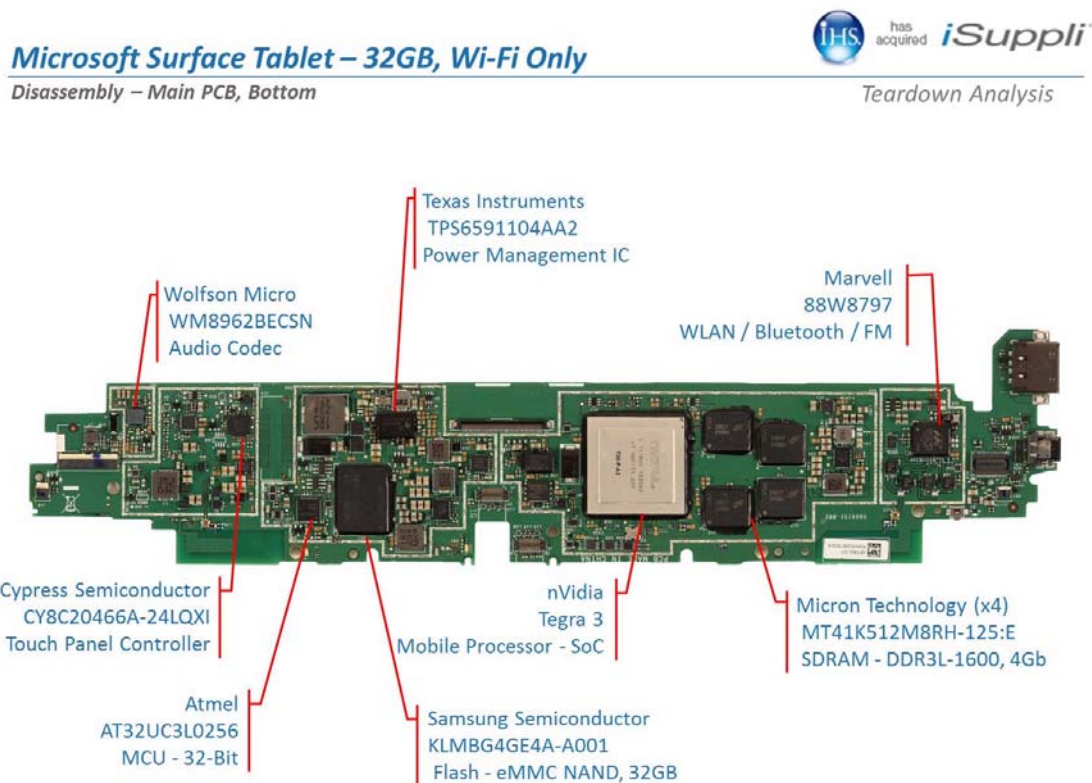
Source: IHS Teardown Research (November 2012)

Figure 121. Microsoft Surface Tablet – 32GB, Wi-Fi Only – Main PCB, Top



Source: IHS Teardown Research (November 2012)

Figure 122. Microsoft Surface Tablet – 32GB, Wi-Fi Only, Main PCB, Bottom



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Source: IHS Teardown Research (November 2012)

Kindle Fire HD

The low-end Kindle Fire HD—with a 7-inch display, 16 gigabytes of NAND flash and Wi-Fi wireless only—carries a bill of materials (BOM) cost of \$165.00. When the \$9.00 manufacturing cost is added in, the cost to produce this model of the Kindle Fire HD increases to \$174.00.

Figure 123. Preliminary BOM and Mfg Costs for Amazon Kind Fire HD (16gb, Wi-Fi Only)

Components / Hardware Elements	Price
Retail Pricing (As of November 2012)	\$199
Total BOM Cost	\$165
Manufacturing Cost	\$9
BOM + Manufacturing	\$174
Major Cost Drivers	
Memory: 1GB LPDDR2 + 16GB eMMC	
NAND Flash + DRAM	\$23.00
Display & Touchscreen: 7" 1280x800 w/ Multitouch	\$64.00
Processors: TI OMAP4460BCBS	\$16.50
Camera(s): 1MP 720p BSI	\$2.50
User Interface & Sensors & Combo Module (WLAN/BT/FM)	\$12.00
Power Management	\$7.00
Battery: 3.7V 16.4Wh Li-Polymer	\$15.00
Mechanical / Electro-Mechanical / Other	\$22.00
Box Contents	\$3.00

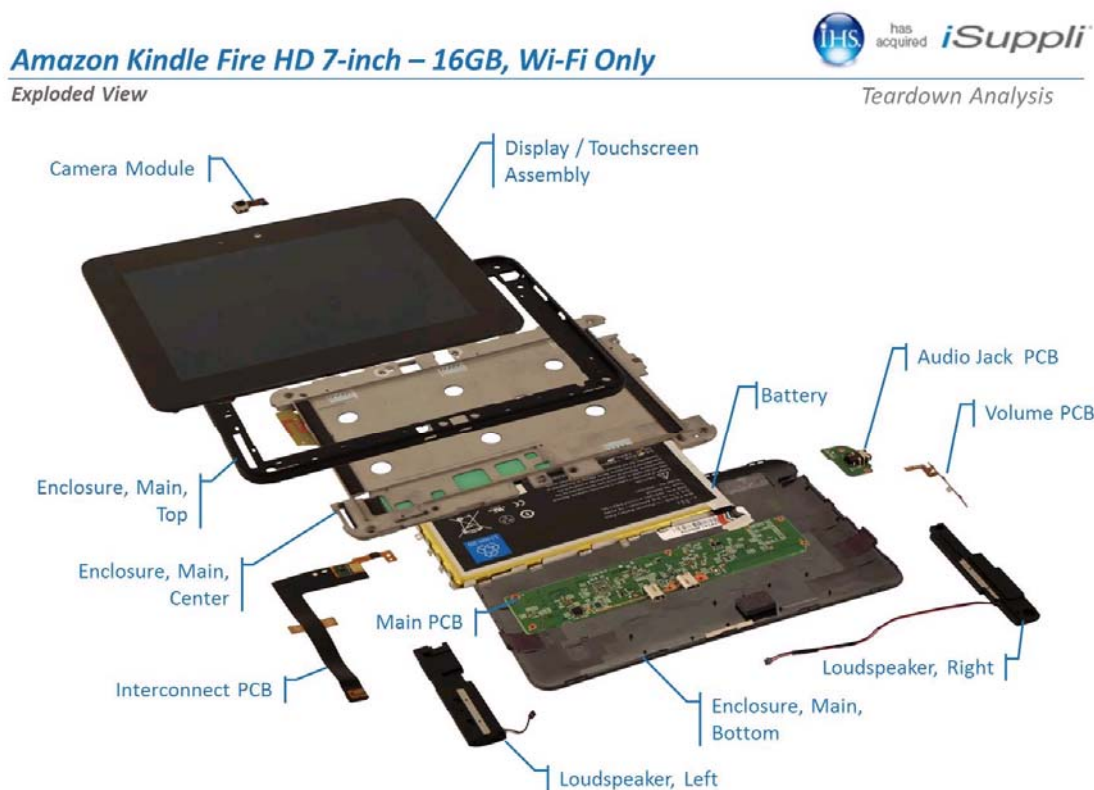
Source: IHS Teardown Research (November 2012)

Figure 124. Kindle Fire HD Key Identified Vendors and Parts – In Descending Order of Component Value

Manufacturer	Part Number	Description	Comment
LG Display		Display Module - 7" Diagonal, 1280x800 Pixels	LGD and Panasonic are the likely suppliers
		Touchscreen / Display Window - 7" Diagonal, Glass Over ITO Film, Capacitive, Contains Atmel ATMXT768-CU Controller	
Texas Instruments	OMAP4460BCBS	Application Processor - TI OMAP4, Dual-Core ARM Cortex-A9 1.5GHz, IVA 3 Hardware Accelerator, SGX540 3D Graphic Core, 1080P 2D/3D, 45nm Process, PoP	
Desay Battery		Battery Pack - Li-Polymer, 3.7V, 4400mAh, 16.43Wh	1 Cell ~545Wh/L
Samsung Semiconductor	KLMAG2GE4A-A001	Flash - eMMC NAND, 16GB	Conventional eMMC flash memory as applied by many handset/tablets OEMs
SK Hynix	H9TKNN8KDMP	SDRAM - Mobile DDR2, 1GB, PoP	
		WLAN Module - Contains Broadcom BCM43239KWB, 802.11a/b/g/n	
Texas Instruments	TWL6032A1B4YFF	Power Management IC - w/ 5 Step-Down DC-DC Converters & 11 LDOs, w/ USB OTG Module & Battery Charger	
Broadcom	BCM2076HB1KUVBG	Bluetooth / FM / GPS - Single Chip, Bluetooth V4.0, GPS, FM Radio Transceiver	
Dynamic Electronics		8-Layer - FR4/RCF HDI, 2+4+2, Lead-Free	
Wolfson Micro	WM8962BECSN	Audio Codec - Stereo, w/ Audio Enhancement DSP, and Integrated 2W Class D Amplifier	
		Camera Module - Contains OmniVision OV9726 1MP 720p Image Sensor, 1/6.5" Format, Fixed Lens	
Invensense	MPU-6050	Gyroscope / Accelerometer - 6-Axis, 16-Bit, $\pm 250/\pm 500/\pm 1000/\pm 2000$ dps, $\pm 2g/\pm 4g/\pm 8g/\pm 16g$, Digital Output, w/ Integrated Temperature Sensor	
Texas Instruments	TPD12S015AYFF	HDMI Companion IC - HDMI1.4, w/ Integrated Step-Up DC-DC Converter, I2C Level Shifter & ESD Clamps	

Source: IHS Teardown Research (November 2012)

Figure 125. Amazon Kindle Fire HD 7-inch – 16GB, Wi-Fi Only



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Source: IHS Teardown Research (November 2012)

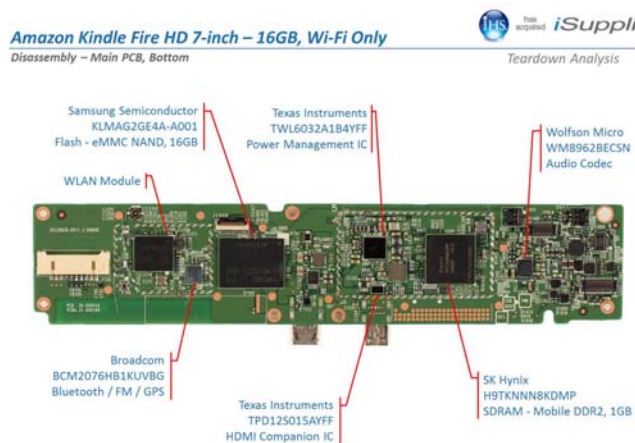
Figure 126. Amazon Kindle Fire HD 7-inch – 16GB, Wi-Fi Only
Main PCB, Top



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Source: IHS Teardown Research (November 2012)

Figure 127. Amazon Kindle Fire HD 7-inch – 16GB, Wi-Fi Only
Main PCB, Bottom



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Source: IHS Teardown Research (November 2012)

Galaxy Note 10.1

Table 1 below presents the preliminary results of the IHS iSuppli teardown analysis of the Samsung Galaxy Note 10.1 media tablet. Please note that this teardown assessment is preliminary in nature, accounts only for hardware and manufacturing costs and does not include additional expenses such as software, licensing, royalties or other expenditures.

Figure 128. Preliminary Summary of Major Component Costs in Samsung Galaxy Note 10.1

Components / Hardware Elements	
Retail Pricing (As of August 2012)	~\$640
Total BOM Cost	\$283
Manufacturing Cost	\$10.00
BOM + Manufacturing	\$293
Major Cost Drivers	
Memory	
NAND Flash + DRAM	\$45.00
Display & Touchscreen	
Display + Touchscreen	\$100.00
Processor	\$18.80
Camera(s)	\$15.00
Wireless Section - BB/RF/PA	\$15.00
User Interface & Sensors & Combo Module (WLAN/BT/FM)	\$18.00
Power Management	\$12.00
Battery	\$18.00
Mechanical / Electro-Mechanical / Other	\$35.00
Box Contents	\$6.00

Source: IHS Teardown Research (August 2012)

Figure 129. Preliminary Estimate of Key Identified Vendors and Parts in Samsung Galaxy Note 10.1 – In Descending Order of Component Value

Manufacturer	Part Number	Description	Comment
Samsung Mobile Display	LTL101AL01	Display Module - 10.1" Diagonal, 1280x800 Pixels, LED Edge-Lit, w/ Integrated Electro-Magnetic Resonance Sensor Board	LED edge-lit LCD display, with integrated Electro-Magnetic Resonance (EMR) sensor board
		Touchscreen / Display Window - 10.1" Diagonal, Glass Over ITO Film, Capacitive	
Samsung Semiconductor	K3PE0E000M-XGC1	SDRAM - Mobile DDR2, 2GB, PoP	Doubled the RAM capacity in Galaxy S3
Samsung Semiconductor	KLMA2GE4A-A002	Flash - eMMC NAND, 16GB	Conventional eMMC flash memory as
Samsung		Battery Pack - Li-Polymer, 3.7V, 7000mAh,	~520Wh/L energy density comparing to
Samsung Semiconductor	S5E4412A01	Apps Processor - Exynos 4 Quad, ARM Cortex A9 Quad-Core 1.4GHz, 32nm, PoP	Same Quad-Core processor in Galaxy S3
		Primary Camera Module - 5MP, BSI CMOS (TBD), Auto Focus Lens	
		Enclosure, Main, Center - Die-Cast Magnesium, w/ Injection Molded Plastic Frame	
DAP Corp		PCB - FR4/RCF HDI, Lead-Free, Halogen-Free (for Main PCB)	
Intel	PMB9811	Baseband / Power Management - Quad-Band GSM/EDGE, WCDMA/HSPA+, ARM Core, 40nm	Same baseband processor in Galaxy S3
Murata		BT / WLAN Module - BTv4.0, IEEE802.11 a/b/g/n	
		Secondary Camera Module - 1.9MP, BSI CMOS (TBD), Fixed Lens	
Intel	PMB5712	RF Transceiver - Quad-Band GSM/EDGE, WCDMA/HSPA+	Same RF transceiver in Galaxy S3
Wacom	W8008	Touch Digitizer Controller	Same solution seen in Samsung Series 7
Atmel	mXT1664S	Touchscreen Controller - Capacitive	Single chip solution comparing to 4-chips
Skyworks	SKY77604-31	PAM - Multi-Mode, Multi-Band, GSM/EDGE/UMTS	Same single PAM solution in Galaxy S3
Winbond	W949D6CBHX5I	SDRAM - Mobile DDR, 512Mb	
ST Microelectronics	LSM330DLC	Accelerometer / Gyroscope - 6-Axis, +- 2/4/8/16g, 16-Bit Data Output	Same accelerometer / gyroscope combo in Galaxy S3; also in addition to this
Maxim	MAX77686EWE	Power Management IC	Same PMIC in Galaxy S3
Silicon Image	Si9244BO	Mobile High-Definition Link Transmitter - TMDS Core, w/ HDMI Interface	Same MHL Transmitter in Galaxy S3
Doestek	DTC34LM85AM	LVDS Transmitter	
Wolfson Micro	WM1811AE	Audio Codec - 24-Bit, 2-Channel DAC & 2-Channel ADC, 100dB SNR, 2W Stereo Class D Speaker & Class W Headphone Driver, w/ Integrated LDOs	Same Audio Codec in Galaxy S3

Source: IHS Teardown Research (August 2012)

Figure 130. Semi-Analysis PC's

	PC Desktop		PC Notebook		PC Ultramobile		PC - Basic Tablet		PC - Premium Tablet	
Units (M, 2012)	148		193		15		75		75	
Factory Average Selling Price (\$)	\$305.56		\$502.63		\$729.39		\$122.10		\$305.74	
	Semiconductor Content	Share of Total Semi Content Cost	Semiconductor Content	Share of Total Semi Content Cost	Semiconductor Content	Share of Total Semi Content Cost	Semiconductor Content	Share of Total Semi Content Cost	Semiconductor Content	Share of Total Semi Content Cost
General Purpose	\$113.58	82%	\$119.69	84%	\$183.25	85%	\$19.53	55%	\$47.21	54%
Memory	\$16.66	12%	\$17.87	13%	\$28.60	13%	\$9.90	28%	\$29.81	34%
Microcomponent	\$86.55	62%	\$82.27	58%	\$125.12	58%	\$1.62	5%	\$0.94	1%
Logic IC	\$0.42	0%	\$3.58	3%	\$5.45	3%	\$2.04	6%	\$4.15	5%
Analog IC	\$5.22	4%	\$5.09	4%	\$8.12	4%	\$1.61	5%	\$3.30	4%
Discrete	\$4.06	3%	\$3.77	3%	\$5.43	3%	\$0.83	2%	\$1.82	2%
Optical	\$0.67	0%	\$7.11	5%	\$10.53	5%	\$3.53	10%	\$7.19	8%
Nonoptical Sensors	\$0.12	0%	\$0.31	0%	\$0.48	0%	\$0.89	3%	\$2.30	3%
Application Specific	\$25.07	18%	\$22.82	16%	\$32.29	15%	\$15.08	42%	\$37.92	43%
ASIC	\$0.00	0%	\$0.00	0%	\$0.00	0%	\$2.06	6%	\$15.06	17%
ASSP	\$25.07	18%	\$22.82	16%	\$32.29	15%	\$13.03	37%	\$22.85	26%
Total	\$ 139	100%	\$ 143	100%	\$ 216	100%	\$ 36	100%	\$ 87	100%
Total Semi Content as % of ASP	45%		28%		30%		29%		29%	

Source: Gartner (Dec 2011)

Figure 131. Top 20 Companies Revenue from Shipments of Total Memory - Data Processing - Compute (Millions of \$US)

Company Name	2012 Share (%)
Samsung Electronics	33%
SK Hynix	16%
Micron Technology	16%
SanDisk	12%
Toshiba	7%
Elpida Memory	7%
Nanya Technology	3%
Powerchip Technology	1%
NXP	1%
Winbond Electronics	1%
Macronix International	1%
Intel	0%
Cypress Semiconductor	0%
Atmel	0%
STMicroelectronics	0%
ProMOS Technologies	0%
Rohm	0%
Microchip Technology	0%
Integrated Silicon Solution	0%
Fujitsu Semiconductor	0%
Others	0%
Total Market	100%

Source: Citi Research, Gartner

Figure 132. Top 20 Companies Revenue from Shipments of Total Microcomponents - Data Processing - Compute (Millions of \$US)

Company Name	2012 Share (%)
Intel	85%
AMD	8%
Infineon Technologies	1%
Samsung Electronics	1%
Renesas Electronics	1%
NXP	1%
Sun Microelectronics	1%
STMicroelectronics	1%
Microchip Technology	0%
CEC Huada Electronic Design	0%
Inside Secure	0%
Fujitsu Semiconductor	0%
Shanghai Fudan Microelectronics	0%
Toshiba	0%
Atmel	0%
Nationz Technologies	0%
Via Technologies	0%
Marvell Technology Group	0%
Texas Instruments	0%
Panasonic	0%
Others	0%
Total Market	100%

Source: Citi Research, Gartner

Figure 133. Top 20 Companies Revenue from Shipments of Total General Purpose Logic - Data Processing - Compute (Millions of \$US)

Company Name	2012 Share (%)
Samsung Electronics	27%
Novatek	14%
Silicon Works	9%
Raydium Semiconductor	7%
Himax Technologies	7%
Texas Instruments	5%
NXP	4%
Magnachip Semiconductor	4%
Renesas Electronics	3%
Altera	3%
Xilinx	3%
Toshiba	2%
Ilitek	2%
Lattice Semiconductor	1%
Integrated Device Technology	1%
TLi	1%
ON Semiconductor	1%
DenMOS Technology	1%
Fairchild Semiconductor	1%
Intersil	1%
Others	2%
Total Market	100%

Source: Citi Research, Gartner

Figure 134. Top 20 Companies Revenue from Shipments of Total Analog - Data Processing - Compute (Millions of \$US)

Company Name	2012 Share (%)
Texas Instruments	29%
Maxim Integrated Products	11%
Richtek Technology	4%
ON Semiconductor	4%
NXP	3%
Intersil	3%
Linear Technology	3%
Global Mixed-mode Technology	3%
Integrated Device Technology	3%
Cirrus Logic	2%
International Rectifier	2%
Volterra	2%
Analog Devices	2%
BCD Semiconductor Manufacturing	2%
Alpha & Omega Semiconductor	1%
Infineon Technologies	1%
Anpec Electronics	1%
Fairchild Semiconductor	1%
Rohm	1%
Monolithic Power Systems	1%
Others	19%
Total Market	100%

Source: Citi Research, Gartner

Figure 135. Top 20 Companies Revenue from Shipments of Total Discrete - Data Processing - Compute (Millions of \$US)

Company Name	2012 Share (%)
Toshiba	11%
Infineon Technologies	10%
ON Semiconductor	9%
NXP	7%
Vishay	6%
International Rectifier	6%
STMicroelectronics	5%
Diodes	5%
Semtech	5%
Renesas Electronics	4%
Rohm	4%
Fairchild Semiconductor	3%
Pan Jit	3%
Lite-On Semiconductor	2%
Advanced Power Electronics	2%
Panasonic	2%
Alpha & Omega Semiconductor	2%
Microsemi	2%
Fuji Electric	2%
Magnachip Semiconductor	1%
Others	7%
Total Market	100%

Source: Citi Research, Gartner

Figure 136. Top 20 Companies Revenue from Shipments of Total Optoelectronics - Data Processing - Compute (Millions of \$US)

Company Name	2012 Share (%)
Omnivision	11%
Seoul Semiconductor	9%
Nichia	8%
LG	7%
Sony	5%
Samsung Electronics	5%
Toshiba	4%
Everlight Electronics	4%
Sharp	4%
Lite-On Technology	4%
Panasonic	4%
SK Hynix	3%
Lextar	3%
Kingbright	3%
Osram	2%
Samsung Electro-Mechanics	2%
STMicroelectronics	2%
Avago Technologies	2%
Renesas Electronics	2%
Citizen Electronics	2%
Others	13%
Total Market	100%

Source: Citi Research, Gartner

Figure 137. Top 20 Companies Revenue from Shipments of Nonoptical Sensors - Data Processing - Compute (Millions of \$US)

Company Name	2012 Share (%)
STMicroelectronics	24%
Analog Devices	18%
Asahi Kasei Microdevices	16%
Knowles	12%
Robert Bosch	10%
Maxim Integrated Products	8%
Rohm	3%
InvenSense	3%
Sanken	2%
MEMSIC	1%
Hokuriku Electric Industry	1%
Microchip Technology	1%
Mitsumi Electric	1%
BCD Semiconductor Manufacturing	0%
Yamaha	0%
Atmel	0%
Others	0%
Total Market	100%

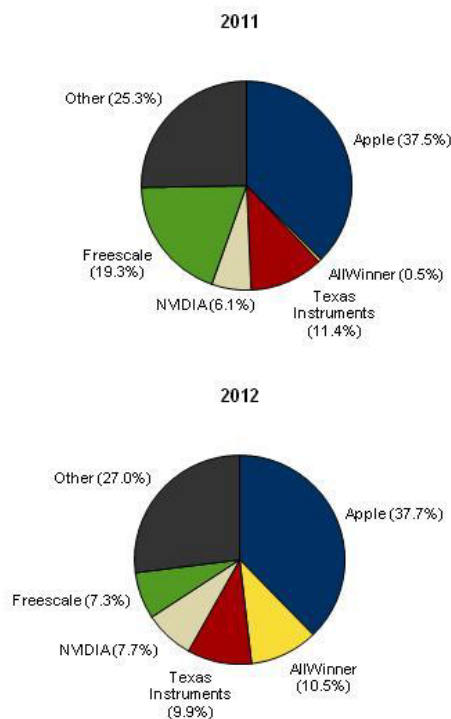
Source: Citi Research, Gartner

Figure 138. Top 20 Companies Revenue from Shipments of Total Application Specific - Data Processing - Compute (Millions of \$US)

Company Name	2012 Share (%)
Intel	32%
Nvidia	13%
AMD	8%
Samsung Electronics	7%
Texas Instruments	4%
Broadcom	3%
Qualcomm	3%
IBM Microelectronics	3%
Realtek Semiconductor	2%
STMicroelectronics	1%
Fujitsu Semiconductor	1%
Dialog Semiconductor	1%
Marvell Technology Group	1%
Mellanox Technologies	1%
Renesas Electronics	1%
Silicon Motion	1%
NXP	1%
Parade Technologies	1%
SanDisk	1%
Allwinner Technology	1%
Others	16%
Total Market	100%

Source: Citi Research, Gartner

Figure 139. Top Five eReaders & Tablet Application Processor Vendors (Unit Shipments)



Source: IDC

Figure 140. Global PC Shipment Forecast

(M Units)	1Q11	2Q11	3Q11	4Q11	1Q12	2Q12	3Q12	4Q12	1Q13E	2Q13E	3Q13E	4Q13E	2010	2011	2012	2013E	2014E	2015E
Desktop	37.0	38.0	40.3	39.5	38.7	36.6	36.5	36.6	35.0	34.9	36.6	37.5	157.0	154.8	148.4	144.1	145.0	144.5
YoY Change	-3%	-1%	2%	-4%	5%	-4%	-9%	-7%	-9%	-5%	0%	3%	7%	-1%	-4%	-3%	1%	0%
QoQ Change	-10%	3%	6%	-2%	-2%	-5%	0%	0%	-4%	0%	5%	2%						
% of Total PC Units	44%	44%	42%	41%	44%	43%	41%	42%	44%	43%	42%	42%	44%	43%	42%	43%	42%	41%
Portable	48.0	48.8	55.8	56.4	50.0	48.9	51.8	51.4	45.2	45.4	51.5	51.7	200.9	209.1	202.0	193.8	201.1	208.7
YoY Change	0%	5%	8%	3%	4%	0%	-7%	-9%	-9%	-7%	-1%	1%	19%	4%	-3%	-4%	4%	4%
QoQ Change	-12%	2%	14%	1%	-11%	-2%	6%	-1%	-12%	0%	13%	0%						
% of Total PC Units	56%	56%	58%	59%	56%	57%	59%	58%	56%	57%	58%	58%	56%	57%	58%	57%	58%	59%
Total Client PCs	85.0	86.9	96.1	95.9	88.6	85.5	88.3	87.9	80.3	80.3	88.1	89.2	357.9	363.9	350.4	337.9	346.1	353.1
YoY Change	-1%	2%	5%	0%	4%	-2%	-8%	-8%	-9%	-6%	0%	1%	14%	2%	-4%	-4%	2%	2%
QoQ Change	-11%	2%	11%	0%	-8%	-4%	3%	0%	-9%	0%	10%	1%						
Tablets	7.8	15.0	19.2	29.9	19.7	26.3	30.3	52.0	41.6	45.8	49.4	69.2	19.3	72.0	128.3	206.0	266.5	307.1
YoY Change	0%	338%	285%	176%	153%	75%	58%	74%	111%	74%	63%	33%	0%	273%	78%	60%	29%	15%
QoQ Change	-28%	93%	28%	56%	-34%	34%	15%	72%	-20%	10%	8%	40%						
eReaders	5.0	5.1	6.3	10.0	3.4	3.7	4.1	7.1	5.1	3.5	3.5	3.7	12.7	26.4	18.2	15.7	11.9	11.9
YoY Change	206%	155%	153%	52%	-33%	-28%	-36%	-28%	51%	-5%	-14%	-49%	0%	108%	-31%	-14%	-25%	1%
QoQ Change	-24%	2%	23%	58%	-66%	10%	10%	76%	-29%	-31%	0%	5%						

Source: Citi Research

Figure 141. Global PC and Tablet Shipment Forecast (Units)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013E	2014E	2015E
Desktop PC	113.6	106.9	107.9	116.5	131.0	146.1	151.6	163.2	157.4	146.0	157.0	154.8	148.4	144.1	145.0	144.5
% chg yr to yr	13%	-6%	1%	8%	12%	12%	4%	8%	-4%	-7%	7%	-1%	-4%	-3%	1%	0%
Laptop PC	25.8	27.3	29.6	37.8	46.8	62.7	80.2	107.3	142.2	168.8	200.9	209.1	202.0	193.8	201.1	208.7
% chg yr to yr	30%	6%	8%	27%	24%	34%	28%	34%	33%	19%	19%	4%	-3%	-4%	4%	4%
Total Client PC	139.4	134.2	137.6	154.2	177.8	208.8	231.8	270.5	299.6	314.8	357.9	363.9	350.4	337.9	346.1	353.1
% chg yr to yr	16%	-4%	2%	12%	15%	17%	11%	17%	11%	5%	14%	2%	-4%	-4%	2%	2%
Total Tablets											19.3	72.0	128.3	206.0	266.5	307.1
% chg yr to yr												273%	78%	60%	29%	15%

Source: Citi Research

Figure 142. PC Market Share

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
HP	15.2%	14.8%	14.6%	15.8%	17.7%	18.1%	19.1%	18.0%	17.1%	16.6%
Acer	3.1%	3.5%	4.7%	5.9%	7.8%	10.5%	12.2%	12.1%	10.2%	9.6%
Lenovo	2.3%	2.6%	6.3%	7.2%	7.5%	7.3%	7.9%	9.5%	12.1%	15.0%
Toshiba	3.3%	3.3%	3.5%	4.0%	4.0%	4.6%	5.0%	5.3%	5.3%	4.8%
ASUS	0.2%	0.5%	0.8%	1.3%	1.8%	3.5%	4.0%	5.1%	5.7%	6.9%
Apple	2.0%	2.0%	2.3%	2.4%	2.9%	3.3%	3.6%	4.0%	4.9%	4.9%
Samsung	0.8%	0.8%	0.8%	0.8%	0.9%	1.2%	2.1%	3.1%	3.9%	4.3%
Sony	2.0%	1.7%	1.6%	1.7%	1.8%	2.0%	2.0%	2.5%	2.4%	2.2%
Fujitsu	3.9%	3.9%	3.9%	3.5%	3.2%	2.7%	1.7%	1.6%	1.6%	1.7%
Others	67.2%	66.9%	61.6%	57.5%	52.3%	46.8%	42.4%	38.9%	36.8%	34.2%

Source: Citi Research

Figure 143. IT Tablet Market Share

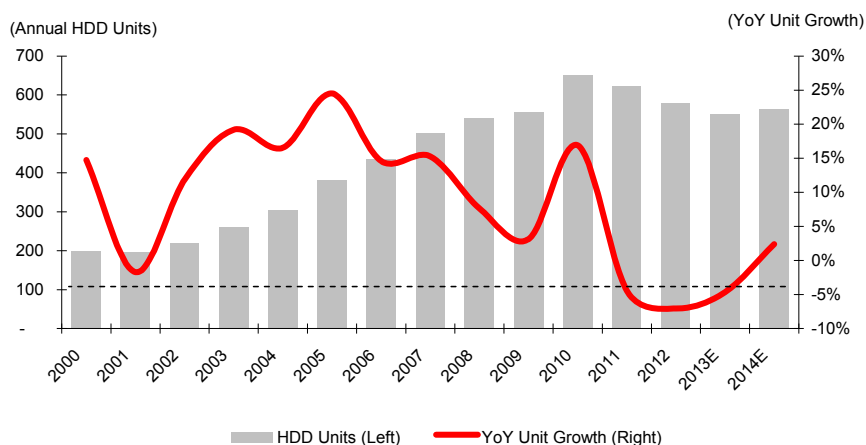
	2010	2011	2012
Apple	77%	56%	57%
Samsung	6%	8%	8%
Amazon	0%	7%	7%
Barnes & Noble	4%	5%	4%
Acer	0%	3%	3%
ASUS	0%	2%	3%
Research In Motion	0%	2%	2%
Lenovo	0%	1%	2%
Archos	1%	1%	1%
Toshiba	0%	1%	1%
Sony	0%	1%	1%
Coby	0%	1%	1%
Huawei	0%	0%	1%
ZTE	0%	1%	1%
Others	11%	12%	11%

Source: Citi Research

Enterprise Storage

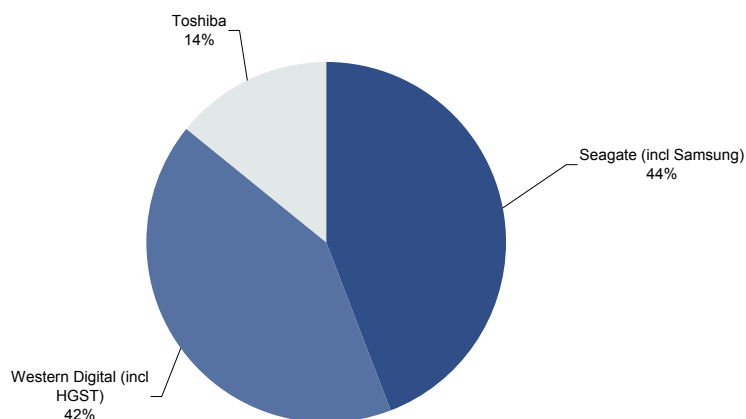
The Enterprise Storage market remains fragmented, with dedicated vendors such as EMC and Netapp capturing less than half of the total available market, while various server vendors such as, HP and IBM hold smaller shares and lag in terms of product portfolio and sales resource. Hard disk drives represent the largest single component cost for Storage vendors, and the industry has now consolidated into three major players--Seagate, Western Digital, and Toshiba.

Figure 144. HDD Shipments Forecast and Growth



Source: Citi Research

Figure 145. HDD Unit Market Share



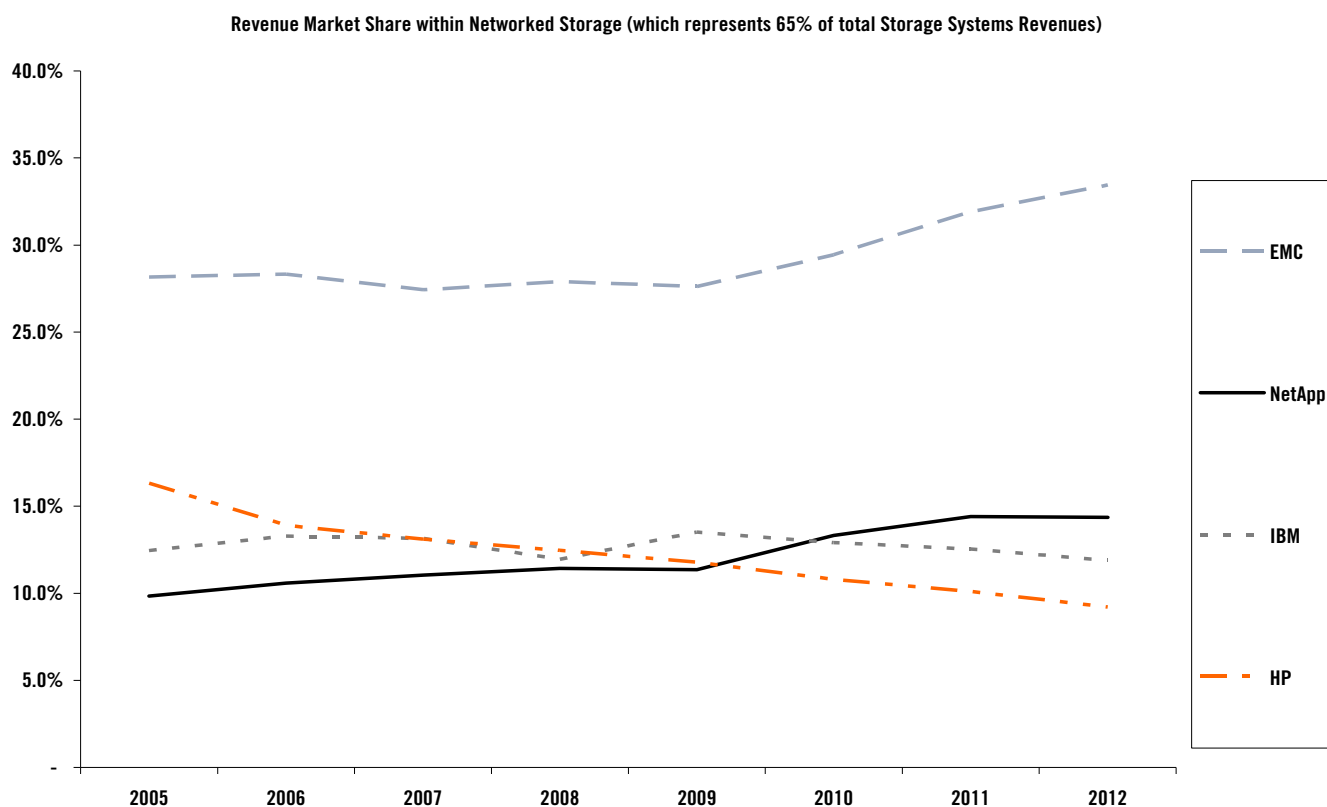
Source: Citi Research

Figure 146. Enterprise Storage Systems Revenue

	2007	2008	2009	2010	2011	2012	2013E	2014E	2015E	CAGR	
Enterprise Storage Systems	28.94	29.79	25.98	30.79	33.42	35.65	37.16	38.92	40.81	2007-2011	2011-2015
YoY		2.9%	-12.8%	18.5%	8.5%	6.7%	4.2%	4.7%	4.9%	3.7%	5.1%
Tape Automation	1.9	1.8	1.6	1.1	1	0.9	0.8	0.8	0.8		
YoY		-5.3%	-11.1%	-31.3%	-9.1%	-10.0%	-11.1%	0.0%	0.0%	-14.8%	-5.4%
Storage Services	31.7	32.8	31.4	32.4	33.9	35.7	37.8	40.2	42.7		
YoY		3.5%	-4.3%	3.2%	4.6%	5.3%	5.9%	6.3%	6.2%	1.7%	5.9%
Storage Software	11.2	12	11.6	12.8	13.7	14.7	14.9	16.7	17.8		
YoY		7.1%	-3.3%	10.3%	7.0%	7.3%	1.4%	12.1%	6.6%	5.2%	6.8%
Total	73.74	76.39	70.58	77.09	82.0	86.95	90.66	96.62	102.11		
YoY		3.6%	-7.6%	9.2%	6.4%	6.0%	4.3%	6.6%	5.7%	2.7%	5.6%
Overall IT Spending (Gartner: updated 1Q13)	3,181	3,403	3,239	3,544	3,618	3,766	3,917	4,081	4,235		
YoY		7.0%	-4.8%	9.4%	2.1%	4.1%	4.0%	4.2%	3.8%	3.3%	4.0%

Source: IDC Nov 2012, Gartner 1Q13

Figure 147. Revenue Market Share within Networked Storage



Source: IDC

Figure 148. Semi-Analysis Servers and Storage

Units (M, 2012)	Low End Server		High End Server		Direct/Fiber Attached Storage		Optical		Solid State Drives	
Factory Average Selling Price (\$)	\$2,887.24		\$27,205.61		\$4,531.82		\$31.85		\$172.86	
	Semiconductor Content	Share of Total Semi Content Cost	Semiconductor Content	Share of Total Semi Content Cost	Semiconductor Content	Share of Total Semi Content Cost	Semiconductor Content	Share of Total Semi Content Cost	Semiconductor Content	Share of Total Semi Content Cost
General Purpose	\$966.87	89%	\$2,977.40	67%	\$492.08	45%	\$3.23	38%	\$124.02	97%
Memory	\$150.65	14%	\$540.54	12%	\$14.30	1%	\$0.65	8%	\$122.53	96%
Microcomponent	\$757.37	69%	\$2,243.56	51%	\$440.12	40%	\$0.12	1%	\$0.00	0%
Logic IC	\$4.72	0%	\$51.60	1%	\$15.81	1%	\$0.02	0%	\$1.09	1%
Analog IC	\$42.29	4%	\$124.30	3%	\$12.94	1%	\$0.32	4%	\$0.30	0%
Discrete	\$10.84	1%	\$12.90	0%	\$6.36	1%	\$0.42	5%	\$0.10	0%
Optical	\$0.99	0%	\$4.51	0%	\$2.54	0%	\$1.69	20%	\$0.00	0%
Nonoptical Sensors	\$0.00	0%	\$0.00	0%	\$0.00	0%	\$0.06	1%	\$0.00	0%
Application Specific	\$124.80	11%	\$1,459.01	33%	\$599.60	55%	\$5.10	61%	\$3.69	3%
ASIC	\$11.57	1%	\$1,203.98	27%	\$235.08	22%	\$0.00	0%	\$0.00	0%
ASSP	\$113.23	10%	\$255.03	6%	\$364.52	33%	\$5.10	61%	\$3.69	3%
Total	\$ 1,092	100%	\$ 4,436	100%	\$ 498	100%	\$ 8	100%	\$ 128	100%
Total Semi Content as % of ASP	38%		16%		11%		26%		74%	

Source: Gartner (Dec 2011)

Figure 149. Top 20 Companies Revenue from Shipments of Total Memory - Data Processing - Storage (Millions of \$US)\$US)

Company Name	2012 Share (%)
Samsung Electronics	32%
Micron Technology	18%
Intel	17%
Toshiba	13%
SK Hynix	8%
SanDisk	4%
Winbond Electronics	3%
Elpida Memory	1%
Cypress Semiconductor	1%
Etron Technology	1%
Macronix International	1%
Elite Semiconductor Memory Technology	0%
GigaDevice Semiconductor	0%
Spansion	0%
Integrated Silicon Solution	0%
Eon Silicon Solution	0%
STMicroelectronics	0%
GSI Technology	0%
Chingis Technology	0%
Powerchip Technology	0%
Others	0%
Total Market	100%

Source: Citi Research, Gartner

Figure 150. Top 20 Companies Revenue from Shipments of Total Microcomponents - Data Processing - Storage (Millions of \$US)

Company Name	2012 Share (%)
Intel	85%
Toshiba	5%
AMD	4%
Broadcom	1%
Cavium Networks	1%
Panasonic	1%
IBM Microelectronics	1%
Applied Micro Circuits	0%
Renesas Electronics	0%
ON Semiconductor	0%
Infineon Technologies	0%
Fujitsu Semiconductor	0%
Rohm	0%
Seiko Epson	0%
Cypress Semiconductor	0%
NetLogic Microsystems	0%
Others	0%
Total Market	100%

Source: Citi Research, Gartner

Figure 151. Top 20 Companies Revenue from Shipments of Total General Purpose Logic - Data Processing - Storage (Millions of \$US)

Company Name	2012 Share (%)
Altera	42%
Xilinx	30%
Toshiba	18%
Lattice Semiconductor	4%
Microsemi	1%
Texas Instruments	1%
Rohm	1%
Atmel	1%
Fairchild Semiconductor	1%
Pericom Semiconductor	1%
Others	0%
Total Market	100%

Source: Citi Research, Gartner

Figure 152. Top 20 Companies Revenue from Shipments of Total Analog - Data Processing - Storage (Millions of \$US)

Company Name	2012 Share (%)
Texas Instruments	34%
Linear Technology	12%
Maxim Integrated Products	12%
Volterra	10%
Intersil	9%
Asahi Kasei Microdevices	6%
Richtek Technology	4%
International Rectifier	2%
Mitsumi Electric	2%
Toshiba	2%
BCD Semiconductor Manufacturing	2%
Rohm	1%
NXP	1%
Fairchild Semiconductor	1%
Cypress Semiconductor	1%
KEC	1%
Pericom Semiconductor	1%
Seiko NPC	1%
Microchip Technology	0%
O2Micro	0%
Others	0%
Total Market	100%

Source: Citi Research, Gartner

Figure 153. Top 20 Companies Revenue from Shipments of Nonoptical Sensors - Data Processing - Compute (Millions of \$US)

Company Name	2012 Share (%)
Renesas Electronics	24%
Toshiba	24%
Rohm	21%
Vishay	8%
NXP	7%
Fairchild Semiconductor	5%
Diodes	4%
Panasonic	4%
Mitsubishi	2%
Shindengen Electric	1%
Suzhou Good-Ark Electronics	1%
Others	0%
Total Market	100%

Source: Citi Research, Gartner

Figure 154. Top 20 Companies Revenue from Shipments of Total Application Specific - Data Processing - Compute (Millions of \$US)

Company Name	2012 Share (%)
Mitsubishi	16%
Sony	16%
Sharp	15%
Avago Technologies	11%
Nichia	7%
Rohm	6%
Sumitomo Electric Device Innovations	6%
Toshiba	6%
Panasonic	4%
Vishay	4%
Renesas Electronics	3%
Kodenshi	1%
Melexis Microelectronic Systems	1%
Toyoda Gosei	1%
ON Semiconductor	0%
Stanley Electric	0%
Others	0%
Total Market	100%

Source: Citi Research, Gartner

Figure 155. Top 20 Companies Revenue from Shipments of Nonoptical Sensors - Data Processing - Storage (Millions of \$US)

Company Name	2012 Share (%)
Rohm	35%
Asahi Kasei Microdevices	25%
Diodes	25%
Hokuriku Electric Industry	10%
MEMSIC	5%
Others	0%
Total Market	100%

Source: Citi Research, Gartner

Figure 156. Top 20 Companies Revenue from Shipments of Total Application Specific - Data Processing - Storage (Millions of \$US)

Company Name	2012 Share (%)
LSI	25%
Marvell Technology Group	21%
Texas Instruments	10%
MediaTek	5%
Intel	5%
PMC-Sierra	5%
Renesas Electronics	5%
Toshiba	3%
STMicroelectronics	3%
Panasonic	2%
Pioneer Micro Technology	2%
Sony	1%
IBM Microelectronics	1%
Alcor Micro	1%
Fujitsu Semiconductor	1%
ITE Tech	1%
Maxim Integrated Products	1%
Asahi Kasei Microdevices	1%
NXP	0%
Skymedi	0%
Others	7%
Total Market	100%

Source: Citi Research, Gartner

Consumer Electronics

Consumer electronics are electronic devices intended for the average person's use for entertainments, communications, or work. These electronics can range from smartphones and TV's to computers and calculators. OEM's design and develop consumer electronics and tend to have intense competition for market share. Due to the variety of consumer electronics it is difficult to pin the "big players" as each sub-segment has its own. However, some large companies in the consumer electronics space include: Apple, Samsung, Hewlett-Packard, LG Electronics, Toshiba, Huawei, and Nokia. The below charts are primarily focused on TV's, STB's, and Gaming consoles collectively. For deeper analysis on the various consumer electronics categories please see: pg. 48 for handsets, pg. 60 for PC & tablets, pg. 88 for TV's, pg. 93 for STB's, pg. 95 for gaming consoles, and pg. 113 for printers.

Figure 157. Semi-Analysis– TV's, STB, and Video Gaming Devices

Units (M, 2012)	LCD TV 200		Cable STB 47		IP STB 51		Video Game Consoles 33		Video Game Handhelds 26	
Factory Average Selling Price (\$)	\$137.45		\$52.00		\$37.49		\$194.22		\$148.80	
	Semiconductor Content	Share of Total Semi Content Cost	Semiconductor Content	Share of Total Semi Content Cost	Semiconductor Content	Share of Total Semi Content Cost	Semiconductor Content	Share of Total Semi Content Cost	Semiconductor Content	Share of Total Semi Content Cost
General Purpose	\$36.75	70%	\$15.07	59%	\$18.23	72%	\$22.13	29%	\$25.63	43%
Memory	\$6.24	12%	\$4.05	16%	\$5.27	21%	\$9.80	13%	\$11.01	19%
Microcomponent	\$1.97	4%	\$2.21	9%	\$2.44	10%	\$1.86	2%	\$0.00	0%
Logic IC	\$8.43	16%	\$0.35	1%	\$0.64	2%	\$0.31	0%	\$2.44	4%
Analog IC	\$4.71	9%	\$6.12	24%	\$6.77	27%	\$2.76	4%	\$1.00	2%
Discrete	\$3.40	6%	\$1.93	8%	\$2.67	10%	\$4.92	6%	\$4.10	7%
Optical	\$12.01	23%	\$0.40	2%	\$0.44	2%	\$2.48	3%	\$7.08	12%
Nonoptical Sensors	\$0.00	0%	\$0.00	0%	\$0.00	0%	\$0.00	0%	\$2.44	4%
Application Specific	\$16.12	30%	\$10.57	41%	\$7.23	28%	\$55.45	71%	\$30.86	52%
ASIC	\$1.40	3%	\$0.00	0%	\$0.00	0%	\$40.14	52%	\$22.60	38%
ASSP	\$14.72	28%	\$10.57	41%	\$7.23	28%	\$15.31	20%	\$8.26	14%
Total	\$52.87	100%	\$25.64	100%	\$25.47	100%	\$77.58	100%	\$58.92	100%
Total Semi Content as % of ASP	38%		49%		68%		40%		40%	

Source: Gartner (Dec 2011)

Figure 158. Top 20 Companies Revenue from Shipments of Total Memory - Consumer (Millions of \$US)

Company Name	2012 Share (%)
Samsung Electronics	25%
SK Hynix	16%
Toshiba	11%
Spansion	8%
Macronix International	7%
Elpida Memory	7%
Winbond Electronics	4%
Nanya Technology	4%
Micron Technology	3%
SanDisk	2%
Elite Semiconductor Memory Technology	1%
Etron Technology	1%
STMicroelectronics	1%
Fujitsu Semiconductor	1%
Microchip Technology	1%
Zentel Electronics	1%
ProMOS Technologies	1%
Rohm	1%
ON Semiconductor	1%
Atmel	0%
Others	3%
Total Market	100%

Source: Citi Research, Gartner

Figure 159. Top 20 Companies Revenue from Shipments of Total Microcomponents - Consumer (Millions of \$US)

Company Name	2012 Share (%)
Microchip Technology	14%
Renesas Electronics	13%
Freescale Semiconductor	12%
Fujitsu Semiconductor	12%
Atmel	7%
STMicroelectronics	5%
Analog Devices	4%
Datang Microelectronics Technology	3%
Samsung Electronics	3%
Panasonic	2%
Toshiba	2%
Winbond Electronics	2%
Holtek Semiconductor	2%
Intel	2%
Sony	2%
Texas Instruments	2%
Elan Microelectronics	2%
Cirrus Logic	1%
AMD	1%
Sonix Technology	1%
Others	9%
Total Market	100%

Source: Citi Research, Gartner

Figure 160. Top 20 Companies Revenue from Shipments of Total General Purpose Logic - Consumer (Millions of \$US)

Company Name	2012 Share (%)
Novatek	18%
Samsung Electronics	11%
Himax Technologies	10%
Renesas Electronics	10%
Xilinx	9%
Rohm	7%
Raydium Semiconductor	6%
Magnachip Semiconductor	5%
Toshiba	3%
Altera	3%
Sharp	2%
Texas Instruments	2%
Orise Technology	1%
Microsemi	1%
Lattice Semiconductor	1%
NXP	1%
Sitronix	1%
TLi	1%
Princeton Technology	1%
Ilitek	1%
Others	5%
Total Market	100%

Source: Citi Research, Gartner

Figure 161. Top 20 Companies Revenue from Shipments of Total Analog - Consumer (Millions of \$US)

Company Name	2012 Share (%)
Texas Instruments	17%
Maxim Integrated Products	9%
Analog Devices	6%
Cirrus Logic	4%
Sanken	4%
ON Semiconductor	4%
New JRC	4%
Intersil	3%
Power Integrations	3%
STMicroelectronics	3%
Wolfson Microelectronics	3%
Richtek Technology	3%
Monolithic Power Systems	2%
Asahi Kasei Microdevices	2%
Renesas Electronics	2%
Integrated Device Technology	2%
Toshiba	2%
Fairchild Semiconductor	2%
Magnachip Semiconductor	2%
NXP	2%
Others	22%
Total Market	100%

Source: Citi Research, Gartner

Figure 162. Top 20 Companies Revenue from Shipments of Total Discrete - Consumer (Millions of \$US)

Company Name	2012 Share (%)
Toshiba	13%
ON Semiconductor	9%
Rohm	8%
Infineon Technologies	8%
Mitsubishi	6%
International Rectifier	6%
Diodes	5%
Fairchild Semiconductor	5%
KEC	5%
STMicroelectronics	5%
NXP	4%
Renesas Electronics	3%
Panasonic	2%
Sanken	2%
Hangzhou Silan Microelectronics	2%
Vishay	2%
Jilin Sino-Microelectronics	2%
Isahaya Electronics	2%
Tianjin Zhonghuan Semiconductor	1%
Pan Jit	1%
Others	11%
Total Market	100%

Source: Citi Research, Gartner

Figure 163. Top 20 Companies Revenue from Shipments of Total Optoelectronics - Consumer (Millions of \$US)

Company Name	2012 Share (%)
Samsung Electronics	16%
Sony	12%
LG	10%
Nichia	7%
Panasonic	5%
Renesas Electronics	4%
Seoul Semiconductor	3%
Sharp	3%
Aptina	3%
Unity Opto Technology	3%
Samsung Electro-Mechanics	3%
Lextar	3%
Everlight Electronics	2%
Canon	2%
Omnivision	2%
Advanced Optoelectronic Technology	2%
Toshiba	2%
Rohm	2%
CREE	1%
Lite-On Technology	1%
Others	13%
Total Market	100%

Source: Citi Research, Gartner

Figure 164. Top 20 Companies Revenue from Shipments of Nonoptical Sensors - Consumer (Millions of \$US)

Company Name	2012 Share (%)
InvenSense	25%
STMicroelectronics	23%
Freescale Semiconductor	9%
Asahi Kasei Microdevices	8%
Robert Bosch	7%
Rohm	6%
Melexis Microelectronic Systems	5%
Sanken	3%
Omron	3%
Seiko Instruments	2%
Fujikura	2%
Maxim Integrated Products	2%
Microchip Technology	1%
Knowles	1%
MEMSIC	1%
Hokuriku Electric Industry	0%
Mitsumi Electric	0%
Murata Manufacturing	0%
Elmos Semiconductor	0%
VTI Technologies	0%
Others	0%
Total Market	100%

Source: Citi Research, Gartner

Figure 165. Top 20 Companies Revenue from Shipments of Total Application Specific - Consumer (Millions of \$US)

Company Name	2012 Share (%)
Broadcom	10%
Sony	7%
MStar Semiconductor	6%
Toshiba	5%
Samsung Electronics	5%
Renesas Electronics	4%
STMicroelectronics	4%
Panasonic	4%
MediaTek	4%
Texas Instruments	3%
IBM Microelectronics	3%
Sharp	3%
CSR	3%
Trident Microsystems	3%
MegaChips	3%
Fujitsu Semiconductor	2%
Rohm	2%
Marvell Technology Group	2%
Qualcomm	2%
Sigma Designs	1%
Others	26%
Total Market	100%

Source: Citi Research, Gartner

TV's

Liquid-crystal-display televisions (LCD TV) are television sets that use LCD display technology to produce images. LCD televisions are thinner and lighter than cathode ray tube (CRTs) of similar display size, and are available in much larger sizes. When manufacturing costs fell, this combination of features made LCDs practical for television receivers. In 2007, LCD televisions surpassed sales of CRT-based televisions worldwide for the first time and their sales figures relative to other technologies are accelerating. LCD TVs are quickly displacing the only major competitors in the large-screen market, the plasma display panel and rear-projection television. LCDs are, by far, the most widely produced and sold television display type. Key LCD TV manufacturers are Samsung, LG Electronics, Sony.

Figure 166. TFT-LCD Supply Chain

TFT-LCD Supply Chain Semiconductors

Driver IC SEC (05930.KS) Novatek (3034.TW) Himax (3222.TW) Panasonic Renesas Sharp (6753.JP) Hynix (00660.KS) Toshiba (6502.JP) Winbond (2344.TW)
CCFL Harison-Toshiba Sanken (6707.JP) Panasonic Stanley Electric (6923.JP) Kumho Electric (01210.KS) Wellypower (3080.TW)

Components

Glass Substrate GLW Asahi Glass (5201.JP) Nippon Electric Glass (5214.JP) AvanStrate Picvue (2333.TW)
TAC Film and Retardation Film Zeon (4205.JP) Konica (4902.JP) Fuji Film (4901.JP)
Polarizers Nitro Denko (6988.JP) Optimas (3051.TW) Sumitomo Chemical (4005.JP) Sanritz LG Chemical (05190.KS) Cheil Ind (01300.KS) Ace Digitech (36550.KS)
Backlight Module Coretronic (5371.TW) Forhouse (6120.TW) K-Bridge (6156.TW) Radiant Opto-Elec (6176.TW) Raygen (47440.KS) Taesan LCD (36550.KS) Empras
RGB Color Resist JSR (4185.JP) Fuji Film (4901.JP) Toyo Ink (4634.JP) Hitachi Chemical (4217.JP) Arch Chemicals (ARJ.US) Zeon Corp (4205.JP)
Liquid Crystal Merck Chisso
Color Filter (ex In-House) Toppan (7911.JP) DNP (7912.JP) Sintek (3049.TW) Toray (3402.JP) Cando (8055.TW) AMTC (8017.TW) CFI
TFT-LCD Panel SEC (05930.KS) AU Optonics (2409.TW) LGD (34220.KS) Chimei Innolux CPT (2475.TW) Panasonic Hannstar (6116.TW) Sharp (6753.JP) Toshiba (small/mid size panel) Hitachi (small/mid size panel)

End Products

Note Book HPQ IBM Quanta (2382.TW) Compal (2324.TW)
LCD TV TPV (903.HK) TECO (1504.TW) BenQ (2352.TW) Sampo (6137.TW) Tatung (2371.TW) Sharp (6753.JP) LGE (66570.KS) Panasonic Phillips Vizio Funai Electric Toshiba SEC (05930.KS) Sony (6758.TW)
TFT-LCD Monitors SEC (05930.KS) BenQ (2352.TW) Amtran (2489.TW) Jean (2442.TW) Lite-On Tech (2301.TW)

Source: Citi Research

Figure 167. LCD TV Unit Shipment By Region (Note LCD TVs = 87% of Total TV Units Shipped)

	2007	2008	2009	2010	2011	2012	2013E	2014E	2015E
Japan	7,720.9	8,767.8	12,534.1	23,387.7	19,367.8	6,290.1	6,610.0	7,440.0	7,620.0
North America	24,240.4	30,065.2	37,318.8	38,290.8	38,229.3	39,478.5	39,200.0	40,100.0	41,200.0
Western Europe	23,929.0	29,321.4	33,264.0	38,714.0	34,429.5	29,905.7	27,920.0	28,210.0	28,770.0
Eastern Europe	5,500.0	9,431.3	9,638.0	14,400.7	16,943.3	20,422.3	21,430.0	22,830.0	24,360.0
China	8,746.5	13,373.4	29,296.4	37,929.8	44,729.9	49,020.6	51,500.0	53,000.0	55,240.0
Asia Pacific	5,257.4	7,169.4	10,259.2	14,422.7	20,517.9	23,669.8	27,710.0	33,630.0	39,800.0
Latin America	2,400.0	5,481.5	8,226.0	16,123.2	19,472.2	21,735.6	23,950.0	28,300.0	29,370.0
Middle East and Africa	1,400.0	2,807.2	4,860.0	8,287.4	11,589.2	12,679.6	14,680.0	16,810.0	18,520.0
LCD Total	79,194.2	106,417.3	145,396.4	191,556.5	205,279.0	203,202.1	213,000.0	230,320.0	244,880.0

Source: NPDDisplaySearch

Figure 168. LCD TV Unit Shipment Growth

	2008	2009	2010	2011	2012	2013E	2014E	2015E
Japan	13.6%	43.0%	86.6%	(17.2%)	(67.5%)	5.1%	12.6%	2.4%
North America	24.0%	24.1%	2.6%	(0.2%)	3.3%	(0.7%)	2.3%	2.7%
Western Europe	22.5%	13.4%	16.4%	(11.1%)	(13.1%)	(6.6%)	1.0%	2.0%
Eastern Europe	71.5%	2.2%	49.4%	17.7%	20.5%	4.9%	6.5%	6.7%
China	52.9%	119.1%	29.5%	17.9%	9.6%	5.1%	2.9%	4.2%
Asia Pacific	36.4%	43.1%	40.6%	42.3%	15.4%	17.1%	21.4%	18.3%
Latin America	128.4%	50.1%	96.0%	20.8%	11.6%	10.2%	18.2%	3.8%
Middle East and Africa	100.5%	73.1%	70.5%	39.8%	9.4%	15.8%	14.5%	10.2%
LCD Total	34.4%	36.6%	31.7%	7.2%	(1.0%)	4.8%	8.1%	6.3%

Source: NPDDisplaySearch

Figure 169. LCD TV Penetration of Current Unit Sales and % of Installed Base

<u>LCD TV Penetration of</u>									
<u>Current Unit Sales</u>	2007	2008	2009	2010	2011	2012	2013E	2014E	2015E
Japan		87.5%	91.2%	94.1%	96.3%	98.1%	98.9%	99.2%	98.3%
North America		79.9%	88.7%	87.1%	88.3%	91.4%	93.5%	95.5%	96.7%
Western Europe		87.9%	91.0%	91.1%	93.0%	94.5%	95.5%	96.9%	97.1%
Eastern Europe		60.8%	79.7%	86.1%	90.8%	93.5%	94.9%	98.2%	98.2%
China		31.8%	69.0%	86.1%	91.0%	94.5%	96.5%	97.6%	97.8%
Asia Pacific		20.6%	31.3%	40.3%	54.4%	65.2%	77.4%	89.2%	97.0%
Latin America		23.8%	43.0%	63.7%	77.6%	86.6%	92.8%	97.8%	99.1%
Middle East and Africa		25.0%	40.5%	54.3%	66.1%	77.8%	85.9%	93.3%	98.7%
Total	39.7%	51.2%	69.0%	77.1%	82.6%	87.3%	91.6%	95.6%	97.7%

LCD TV Penetration (%) of Installed Base

	2007	2008	2009	2010	2011
ROW	2%	4%	7%	12%	18%
China	4%	7%	13%	21%	29%
North America	15%	25%	35%	44%	53%
Europe	16%	21%	28%	37%	46%
Japan	21%	28%	36%	54%	69%
Worldwide	8%	13%	19%	27%	35%

Source: NPDDisplaySearch

Figure 170. LCD TV Revenues By Region (US\$ 000s)

Region	2010	2011	2012	2013E	2014E	2015E	2016E
Japan	\$12,045,315	\$7,733,248	\$2,762,372	\$2,876,965	\$3,245,570	\$3,069,366	\$2,980,324
North America	\$22,210,750	\$20,697,512	\$20,047,739	\$20,224,917	\$21,288,610	\$20,831,108	\$19,774,366
Western Europe	\$20,655,526	\$18,673,050	\$16,690,047	\$14,381,488	\$14,366,197	\$13,794,237	\$13,080,230
Eastern Europe	\$6,681,960	\$8,331,079	\$10,242,114	\$9,570,802	\$9,984,151	\$10,108,292	\$8,800,150
China	\$19,648,312	\$23,348,920	\$24,972,084	\$26,038,917	\$26,047,174	\$24,759,701	\$23,363,755
Asia Pacific	\$7,200,697	\$9,216,265	\$9,857,215	\$9,670,274	\$10,871,939	\$11,754,714	\$11,996,097
Latin America	\$7,658,190	\$9,327,884	\$9,985,415	\$9,568,400	\$10,421,350	\$9,724,685	\$9,397,227
Middle East and Africa	\$4,042,306	\$5,529,169	\$5,858,634	\$5,564,035	\$5,880,996	\$5,878,954	\$5,692,038
Total	\$100,143,057	\$102,857,126	\$100,415,618	\$97,895,797	\$102,105,988	\$99,921,058	\$95,084,187

Source: NPDDisplaySearch

Figure 171. LCD TV Revenue Growth

Region	2010	2011	2012	2013E	2014E	2015E	2016E
Japan		-36%	-64%	4%	13%	-5%	-3%
North America		-7%	-3%	1%	5%	-2%	-5%
Western Europe		-10%	-11%	-14%	0%	-4%	-5%
Eastern Europe		25%	23%	-7%	4%	1%	-13%
China		19%	7%	4%	0%	-5%	-6%
Asia Pacific		28%	7%	-2%	12%	8%	2%
Latin America		22%	7%	-4%	9%	-7%	-3%
Middle East and Africa		37%	6%	-5%	6%	0%	-3%
Total		3%	-2%	-3%	4%	-2%	-5%

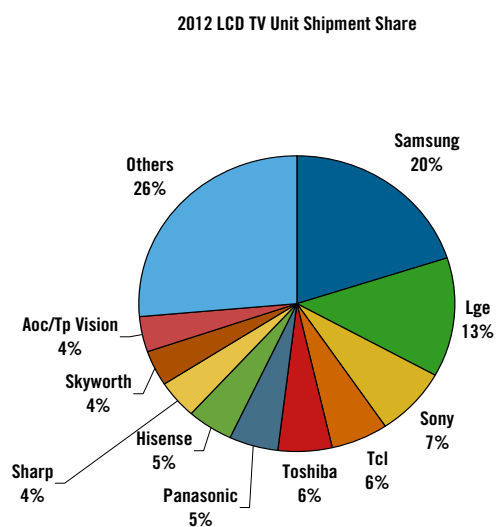
Source:

Figure 172. LCD Size Distribution, Average Size and Average ASP

LCD Size Distribution	2010	2011	2012	2013E	2014E	2015E	2016E
10"-14"	192	206	72	14	14	9	2
15"-19"	11549	10820	6157	4667	4317	3997	3696
20"-21"	1385	275	123	102			
22"-24"	17595	19885	17015	16341	17386	18719	19577
25"-29"	16157	12987	8912	8040	8524	8696	8891
30"-34"	74069	82551	80995	81818	85981	89825	92172
35"-39"	12347	9256	11265	16054	18663	20278	21726
40"-44"	38631	45489	46066	46925	50605	53820	56035
45"-49"	13732	15815	17706	18727	20149	21168	21656
50"-54"	1493	601	3543	6305	8959	10959	12506
55"-59"	3790	5759	8037	9206	9782	10578	11212
60"+	617	1635	3310	4802	5941	6832	7576
Total	191556	205279	203202	213000	230320	244880	255050
	2010	2011	2012	2013E	2014E	2015E	2016E
LCD Average Size (inches)	33.5	34.2	35.9	36.9	37.3	37.5	37.7
Y/Y Growth		2.0%	5.1%	2.6%	1.1%	0.7%	0.5%
LCD Average ASP (\$)	523	501	494	460	443	408	373
Y/Y Growth		-4%	-1%	-7%	-4%	-8%	-9%

Source: NPDDisplaySearch

Figure 173. 2012 LCD TV Unit Shipment Share

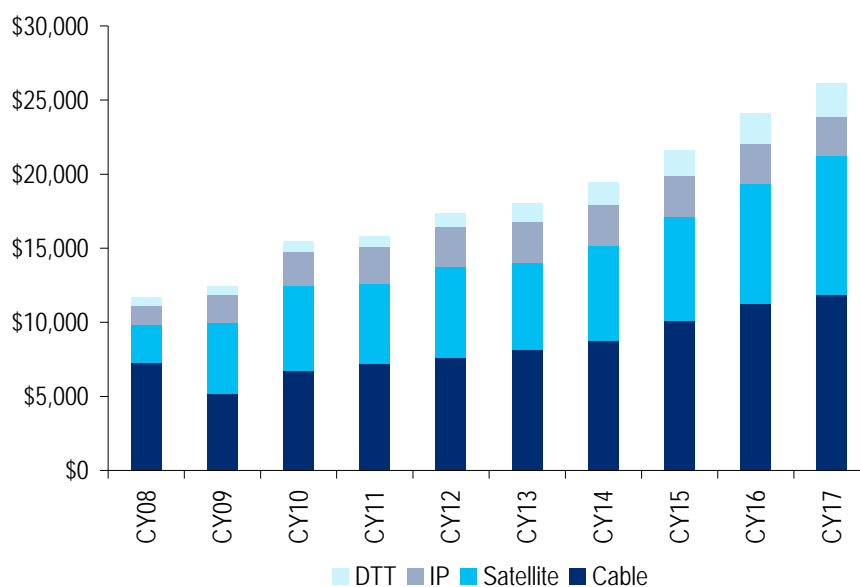


Source: NPDDisplaySearch

Set Top Boxes

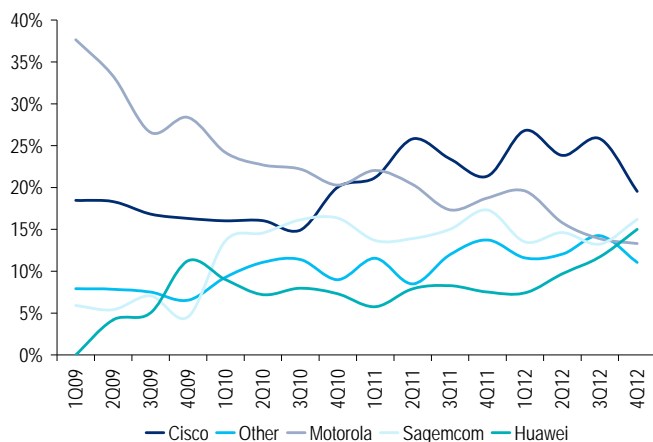
A set-top box (STB) connects to a television set and an external source of signal, turning the source signal into content in a form that can then be displayed on the television screen or other display device. We are concerned with four types of set-top boxes: 1) IP set-top boxes (providers include Cisco, Motorola, Sagemcom, Huawei, and ZTE); 2) Cable set-top boxes (providers include Cisco, Pace, Motorola, Samsung, and Skyworth Digital); 3) Satellite set-top boxes (providers include Pace, Technicolor, Echostar, Coship and Humax); and 4) Digital terrestrial television (DTT) set-top boxes (providers include Samsung, Sagemcom, Netgem, Pace, and Humax)

Figure 174. Forecast by Revenue Annually



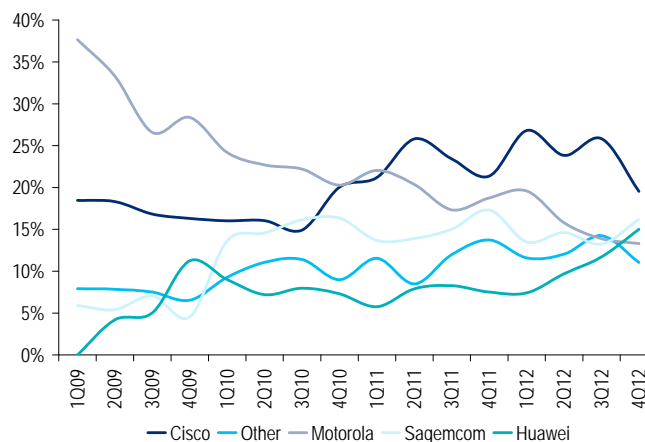
Source: Citi Research, Infonetics

Figure 175. Market Share by Revenues (qtrly) - Cable



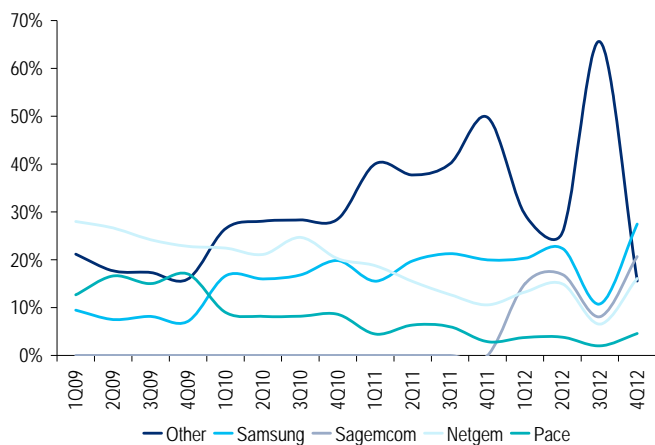
Source: Citi Research, Infonetics

Figure 176. Market Share by Revenues (qtrly) - IP



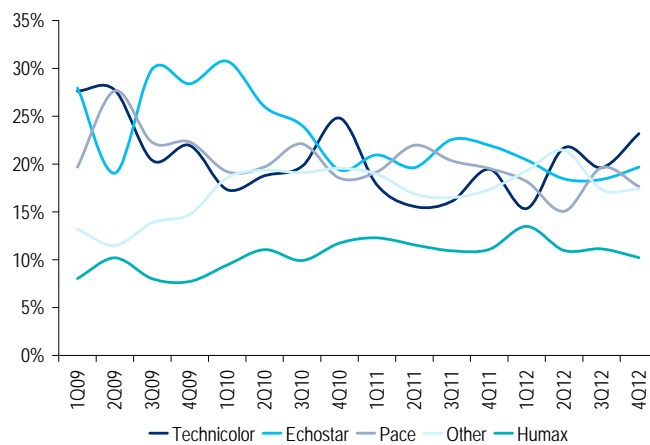
Source: Citi Research, Infonetics

Figure 177. Market Share by Revenues (qtrly) - DDT



Source: Citi Research, Infonetics

Figure 178. Market Share by Revenues (qtrly) - Satellite



Source: Citi Research, Infonetics

Gaming Consoles

A **gaming console** is an computer or customized computer system used for interactive entertainment which can be used with a TV, monitor, etc (as opposed to an arcade machine) to display the game. The terminology of a “gaming console” is used to distinguish the primary use of the device (i.e. PC, tablet, gaming console). Gaming consoles come in a variety of sized from handhelds to home computers.

Figure 179. Supply Chain – Gaming Consoles

Game Console Supply Chain Semiconductors

CPU
Toshiba (6502.JP)
IBM (Wii)
IBM (Xbox 360)

CPU (Foundry)
IBM (Xbox 360)
IBM (Wii)
Chartered (CSM.SP) (Wii)

CPU (Assembly + Test)
IBM (Xbox 360)
AMKR (Xbox 360)

Connector
Cheng Uei (2392.TW) (Xbox 360)

HDD
Toshiba (6502.JP) (PS3)
STX (Xbox 360)

ODD
Panasonic
Sony (6758.JP) (PS3)
Toshiba (6502.JP) (Xbox 360)
SEC (005930.KS) (Xbox 360)
Lite-On Tech (2301.TW) (Xbox 360)

Memory (ROM)
Macronix (2337.TW) (PS3)
Macronix (2337.TW) (Wii)

Memory (1T-SRAM)
MoSys (MOYS) (Wii)

Main Memory (256MB DRAM)
SEC (005930.KS) (Wii)

Memory (XDR)
SEC (005930.KS) (PS3)
Elpida (6665.JP) (PS3)

Memory (GDDR3)
SEC (005930.KS) (PS3)
SEC (005930.KS) (Xbox 360)
IFX (Xbox 360)

Semiconductors (ctd)

GPU
NVIDIA (PS3)
AMD (Xbox 360)
Renesas (6723.JP) (Xbox 360)
AMD (Wii)

GPU (Foundry)
TS semicon (PS3)
TSMC (2330.TW) (Xbox 360)
Renesas (6723.JP) (Wii)

GPU (Assembly + Test)
TS semicon (PS3)
ASE (2311.TW) (Xbox 360)

Southbridge
Toshiba (6502.JP) (PS3)
SIS (2363.TW) (Xbox 360)
Renesas (6723.JP) (Wii)

Southbridge (Foundry)
UMC (2303.TW) (Xbox 360)
TS semicon (PS3)

Southbridge (Assembly + Test)
Sony (6758.JP) (PS3)

WLAN
BRCM (PS3)
ATHR (Xbox 360) (acquired by Qualcomm)
IFX (Xbox 360)
Askey (2366.TW) (Xbox 360)
BRCM (Wii)

Components

Lens
Newmax (3630.TW) Xbox 360-Kinect)

Power Supply
NJRC (6911.JP) (PS3)
Chicony (2385.TW) (Xbox 360)
Delta (2308.TW) (PS3)
Delta (2308.TW) (Xbox 360)
Lite-On Tech (2301.TW) (Xbox 360)

Power Cable
I-sheng (6115.TW) (PS3)
Ji-Haw (3011.TW) (Xbox 360)

PCB
Compeq (2313.TW) (PS3)
NYPCB (8046.TW) (PS3)
HannStar Board (5469.TW) (Xbox 360)
YuFo (6194.TW) (Xbox 360)

Package Substrate
Shinko (6967.JP) (PS3)
Ibiden (4062.JP) (PS3)
Shinko (6967.JP) (Xbox 360)
Ibiden (4062.JP) (Xbox 360)
PPT (2446.TW) (Xbox 360)
NYPCB (8046.TW) (Xbox 360)

Assembly
Sony (6758.JP) (PS3)
Hon Hai (2317.TW) (PS3)
Asustek (2357.TW) (PS3)
CLS (Xbox 360)
FLEX (Xbox 360)
Nintendo (7974.JP) (Wii)
Foxconn Tech (2354.TW) (Wii)
Hoshiden (6804.JP) (Wii)

Casing
FLEX (Xbox 360)
Hon Hai (2317.TW) (Xbox 360)

Bluetooth
CSR (CSR.LN) (PS3)

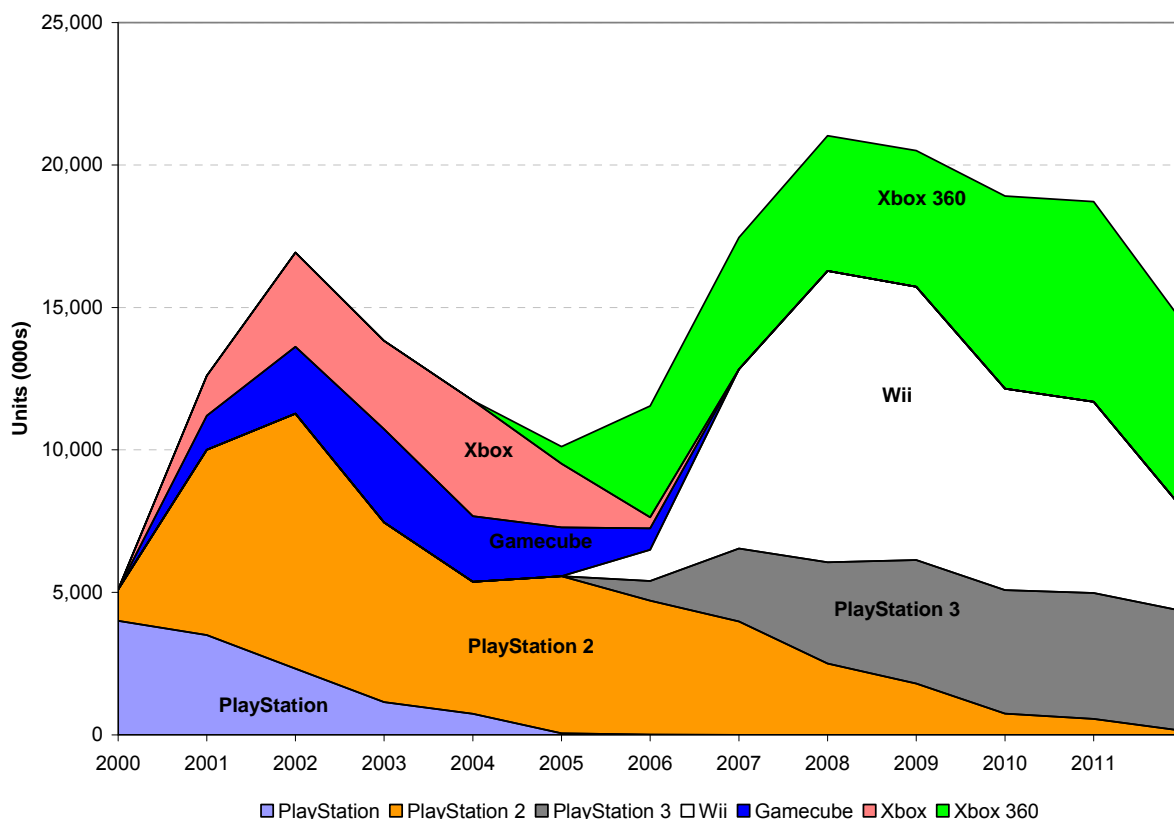
End Products

Game Consoles
Nintendo (7974.JP) (Wii)
IBM (Xbox 360)
Sony (6758.JP) (PS3)

Controller
Cheng Uei (2392.TW) (PS3)
KYE (PS3)

Source: Citi Research

Figure 180. Historical Console Unit Sales by Brand



Source: Citi Research

Figure 181. Historical Console Sales by Brand

(\$ MMs)	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012 LTM
PlayStation	\$400	\$350	\$140	\$62	\$38	\$3	\$1	\$0	\$0	\$0	\$0	\$0	\$0
PlayStation 2	\$330	\$1,950	\$1,815	\$1,187	\$732	\$826	\$628	\$522	\$326	\$190	\$75	\$21	\$15
PlayStation 3	\$0	\$0	\$0	\$0	\$0	\$0	\$399	\$1,287	\$1,483	\$1,452	\$1,375	\$1,289	\$1,128
Wii	\$0	\$0	\$0	\$0	\$0	\$0	\$271	\$1,558	\$2,570	\$2,098	\$1,376	\$711	\$502
Gamecube	\$0	\$241	\$350	\$362	\$228	\$166	\$73	\$0	\$0	\$0	\$0	\$0	\$0
Xbox	\$0	\$420	\$668	\$559	\$620	\$345	\$67	\$0	\$0	\$0	\$0	\$0	\$0
Xbox 360	\$0	\$0	\$0	\$0	\$0	\$231	\$1,506	\$1,741	\$1,424	\$1,302	\$1,830	\$2,053	\$1,834

Y/Y Growth	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012 LTM
PlayStation	--	-13%	-60%	-55%	-39%	-91%	-85%	--	--	--	--	--	--
PlayStation 2	--	491%	-7%	-35%	-38%	13%	-24%	-17%	-37%	-42%	-61%	-71%	-68%
PlayStation 3	--	--	--	--	--	--	--	222%	15%	-2%	-5%	-6%	-20%
Wii	--	--	--	--	--	--	--	475%	65%	-18%	-34%	-48%	-58%
Gamecube	--	--	45%	4%	-37%	-27%	-56%	--	--	--	--	--	--
Xbox	--	--	59%	-16%	11%	-44%	-81%	-99%	-88%	-89%	-89%	--	--
Xbox 360	--	--	--	--	--	--	552%	16%	-18%	-9%	41%	12%	-10%

Source: Citi Research

Telecommunications Equipment & Networking

Our Communications Equipment coverage spans several subsectors including Data Networking (Cisco, Juniper, F5 Networks, Riverbed Technologies), Optical (Ciena, Infinera, JDSU, Finisar, Oclaro) and Telecommunication Equipment (Ericsson, Alcatel, Arris, Adtran, Polycom, Tellabs).

Data Networking allows the exchange of information through communications protocols between interconnected computers. The overall data networking category is dominated by routers and switches, accounting for nearly 80% of total industry product revenues. After more than two decades, we believe data networking is a mature, pro-cyclical growth industry, highly correlated to overall corporate IT spending. Against this backdrop, we believe growth opportunities still exist in the carrier market given the still incomplete move to IP-based networks and Layer 4-7 switching/routing.

The optical market can be segmented in two broad swaths: legacy SONET/SDH equipment and wave division multiplexing equipment (WDM). The shortcomings of SONET/SDH include high capital costs, difficulty in provisioning new services, the need for redundant fiber pairs, and legacy costs. Wave Division Multiplexing (WDM) was developed in response to the capacity limitations and expense (capital and operating) inherent in SONET/SDH. In a WDM environment, multiple individual lightwaves of different frequencies (colors) are combined into one stream that is sent down a single fiber. This allowed for a significant boost in capacity compared to legacy SONET/SDH networks. The DWDM market can be further explained by segmenting the market into Metro versus Long Haul and by examination of the ROADM (reconfigurable add/drop multiplexer). Metro systems generally transmit over distances of less than 100Km, and do not require amplification devices, while Long Haul systems generally transmit data over distances greater than 100Km, and have at least one amplifier in a span.

Telecommunication Equipment companies provide a wide suite of products and services for both residential and business customers including optical, unified communications, broadband, access and transport products. In our view, telecommunication spending will likely be focused on the move to 100G coherent transport, OTN switching and carrier routing.

Figure 182. Semi-Analysis Telecom Equipment

	LAN Switches		FTTX CPE		Transport Infrastructure		Service Provider Routers and Switches		Enterprise WAN		WLAN Infrastructure		Mobile Infrastructure	
Units (M, 2012)	410.6		29.5		0.5		0.1		6.2		108.8		1.0	
Factory Average Selling Price (\$)	\$46.66		\$132.36		\$24,366.67		\$108,086.69		\$1,969.33		\$88.65		\$32,885.00	
	Semiconductor Content	Share of Total Semi Content Cost	Semiconductor Content	Share of Total Semi Content Cost	Semiconductor Content	Share of Total Semi Content Cost	Semiconductor Content	Share of Total Semi Content Cost	Semiconductor Content	Share of Total Semi Content Cost	Semiconductor Content	Share of Total Semi Content Cost	Semiconductor Content	Share of Total Semi Content Cost
General Purpose	\$2.69	39%	\$18.64	46%	\$1,129.92	38%	\$5,459.76	52%	\$148.31	45%	\$4.65	29%	\$1,480.54	62%
Memory	\$0.48	7%	\$1.06	3%	\$65.23	2%	\$836.74	8%	\$17.89	5%	\$0.39	2%	\$34.91	1%
Microcomponent	\$0.55	8%	\$2.75	7%	\$130.85	4%	\$788.79	7%	\$44.70	14%	\$0.03	0%	\$469.53	20%
Logic IC	\$0.37	5%	\$0.21	1%	\$365.11	12%	\$1,320.80	12%	\$26.56	8%	\$0.10	1%	\$806.02	34%
Analog IC	\$0.71	10%	\$3.72	10%	\$215.11	7%	\$1,172.73	11%	\$29.27	9%	\$3.45	21%	\$108.47	5%
Discrete	\$0.48	7%	\$1.92	5%	\$118.16	4%	\$631.39	6%	\$20.49	6%	\$0.38	2%	\$42.45	2%
Optical	\$0.11	2%	\$8.98	23%	\$235.46	8%	\$709.32	7%	\$10.00	3%	\$0.29	2%	\$19.17	1%
Nonoptical Sensors	\$0.00	0%	\$0.00	0%	\$2.05	0%	\$1.24	0%	\$0.14	0%	\$0.00	0%	\$2.33	0%
Application Specific	\$4.23	61%	\$20.16	52%	\$1,867.92	62%	\$5,126.33	48%	\$180.50	55%	\$11.58	71%	\$918.25	38%
ASIC	\$1.77	26%	\$0.00	0%	\$583.92	19%	\$3,167.15	30%	\$56.79	17%	\$0.26	2%	\$435.61	18%
ASSP	\$2.46	35%	\$20.16	52%	\$1,284.00	43%	\$1,959.19	19%	\$123.72	38%	\$11.32	70%	\$482.65	20%
Total	\$6.92	100%	\$38.80	100%	\$2,999.88	100%	\$10,587.33	100%	\$329.55	100%	\$16.22	100%	\$2,401.13	100%
Total Semi Content as % of ASP	15%		29%		12%		10%		17%		18%		7%	

Source: Gartner (Dec 2012)

Figure 183. Top 20 Companies Revenue from Shipments of Total Memory - Communications - Wired (Millions of \$US)

Company Name	2012 Share (%)
Micron Technology	37%
Renesas Electronics	9%
Samsung Electronics	8%
Broadcom	8%
Winbond Electronics	7%
Cypress Semiconductor	4%
Spansion	4%
GSI Technology	3%
SK Hynix	3%
Toshiba	2%
Integrated Silicon Solution	2%
Macronix International	2%
Atmel	2%
Etron Technology	2%
GigaDevice Semiconductor	1%
Elpida Memory	1%
Nanya Technology	1%
Integrated Device Technology	1%
Rohm	1%
Elite Semiconductor Memory Technology	1%
Others	2%
Total Market	100%

Source: Citi Research, Gartner

Figure 184. Top 20 Companies Revenue from Shipments of Total Microcomponents - Communications - Wired (Millions of \$US)

Company Name	2012 Share (%)
Freescale Semiconductor	23%
Cypress Semiconductor	13%
Texas Instruments	9%
Cavium Networks	9%
Intel	8%
Microchip Technology	6%
Broadcom	6%
Renesas Electronics	4%
Applied Micro Circuits	3%
NXP	3%
Atmel	3%
Analog Devices	3%
Toshiba	2%
AMD	2%
Silicon Laboratories	2%
Fujitsu Semiconductor	1%
Infineon Technologies	1%
Sony	1%
Panasonic	1%
IBM Microelectronics	0%
Others	0%
Total Market	100%

Source: Citi Research, Gartner

Figure 185. Top 20 Companies Revenue from Shipments of Total General Purpose Logic - Communications - Wired (Millions of \$US)

Company Name	2012 Share (%)
Xilinx	44%
Altera	36%
Texas Instruments	9%
Lattice Semiconductor	6%
Pioneer Micro Technology	1%
Fairchild Semiconductor	1%
Maxim Integrated Products	1%
Toshiba	1%
Microsemi	1%
NXP	0%
Integrated Device Technology	0%
Cypress Semiconductor	0%
Pericom Semiconductor	0%
Atmel	0%
Rohm	0%
STMicroelectronics	0%
QuickLogic	0%
Others	0%
Total Market	100%

Source: Citi Research, Gartner

Figure 186. Top 20 Companies Revenue from Shipments of Total Analog - Communications - Wired (Millions of \$US)

Company Name	2012 Share (%)
Texas Instruments	39%
Analog Devices	8%
Linear Technology	8%
Maxim Integrated Products	4%
Integrated Device Technology	3%
Monolithic Power Systems	3%
Volterra	3%
Richtek Technology	3%
International Rectifier	2%
O2Micro	2%
Pericom Semiconductor	2%
Intersil	2%
Micrel Semiconductor	2%
Fairchild Semiconductor	2%
STMicroelectronics	2%
ON Semiconductor	1%
Renesas Electronics	1%
Semtech	1%
Power Integrations	1%
Fujitsu Semiconductor	1%
Others	8%
Total Market	100%

Source: Citi Research, Gartner

Figure 187. Top 20 Companies Revenue from Shipments of Total Discrete - Communications - Wired (Millions of \$US)

Company Name	2012 Share (%)
Toshiba	20%
Fairchild Semiconductor	12%
Vishay	10%
STMicroelectronics	10%
International Rectifier	9%
Rohm	7%
ON Semiconductor	5%
Diodes	3%
Infineon Technologies	3%
Semtech	3%
Jilin Sino-Microelectronics	2%
M/A-COM Technology Solutions	2%
Microsemi	2%
Lite-On Semiconductor	2%
Renesas Electronics	2%
Shindengen Electric	2%
IXYS	1%
Panasonic	1%
Isahaya Electronics	1%
NXP	1%
Others	2%
Total Market	100%

Source: Citi Research, Gartner

Figure 188. Top 20 Companies Revenue from Shipments of Total Optoelectronics - Communications - Wired (Millions of \$US)

Company Name	2012 Share (%)
Mitsubishi	30%
Sumitomo Electric Device Innovations	22%
Avago Technologies	13%
Vishay	8%
Sony	5%
NTT Electronics	5%
Rohm	5%
Toshiba	4%
Renesas Electronics	2%
Kodenshi	2%
Hamamatsu Photonics	2%
Fairchild Semiconductor	1%
Nichia	1%
Panasonic	0%
ON Semiconductor	0%
Stanley Electric	0%
Others	0%
Total Market	100%

Source: Citi Research, Gartner

Figure 189. Top 20 Companies Revenue from Shipments of Nonoptical Sensors - Communications - Wired (Millions of \$US)

Company Name	2012 Share (%)
Maxim Integrated Products	100%
Others	0%
Total Market	100%

Source: Citi Research, Gartner

Figure 190. Top 20 Companies Revenue from Shipments of Total Application Specific - Communications - Wired (Millions of \$US)

Company Name	2012 Share (%)
Broadcom	26%
Marvell Technology Group	7%
Texas Instruments	6%
IBM Microelectronics	5%
Intel	4%
Lantiq	4%
Shenzhen HiSilicon Technologies	3%
Avago Technologies	3%
LSI	3%
Realtek Semiconductor	2%
Qualcomm	2%
Semtech	2%
Silicon Laboratories	2%
Entropic Communications	2%
MediaTek	2%
STMicroelectronics	1%
Global Unichip	1%
Mindspeed Technologies	1%
Cortina Systems	1%
Ikanos Communications	1%
Others	21%
Total Market	100%

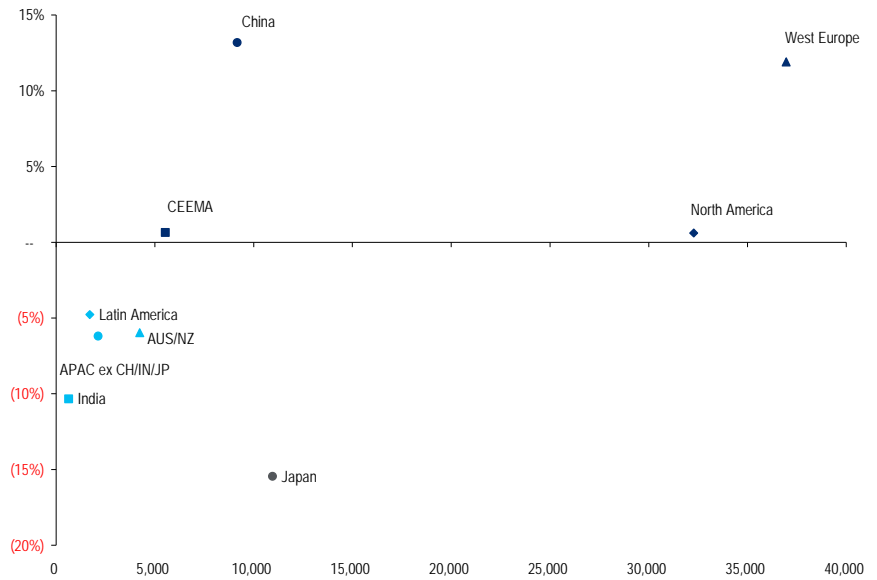
Source: Citi Research, Gartner

Figure 191. Global Carrier Capex Spending Details

		2007	2008	2009	2010	2011	2012E	2013E	2014E
Global	Wireline CapEx	100,108	107,968	94,755	97,807	103,469	100,933	103,596	98,682
	% y/y		7.9%	(12.2%)	3.2%	5.8%	(2.5%)	2.6%	(4.7%)
	Wireline Revenues	555,651	581,377	557,302	557,685	584,009	570,237	563,478	573,409
	% y/y		4.6%	(4.1%)	0.1%	4.7%	(2.4%)	(1.2%)	1.8%
	Wireline Capital Intensity	0.18x	0.19x	0.17x	0.18x	0.18x	0.18x	0.18x	0.17x
	Wireless CapEx	113,221	133,693	128,375	137,273	143,779	150,079	147,758	145,491
	% y/y		18.1%	(4.0%)	6.9%	4.7%	4.4%	(1.5%)	(1.5%)
	Wireless Revenues	769,326	897,065	905,514	976,298	1,075,246	1,093,556	1,135,909	1,171,485
	% y/y		16.6%	0.9%	7.8%	10.1%	1.7%	3.9%	3.1%
	Wireless Capital Intensity	0.15x	0.15x	0.14x	0.14x	0.13x	0.14x	0.13x	0.12x
North America	Total CapEx	219,141	247,374	223,774	240,266	253,703	258,137	257,667	249,927
	% y/y		12.9%	(9.5%)	7.4%	5.6%	1.7%	(0.2%)	(3.0%)
	Total Revenue	1,246,075	1,378,216	1,343,624	1,399,062	1,526,116	1,522,128	1,518,192	1,549,798
	% y/y		10.6%	(2.5%)	4.1%	9.1%	(0.3%)	(0.3%)	2.1%
	Total Capital Intensity	0.18x	0.18x	0.17x	0.17x	0.17x	0.17x	0.17x	0.16x
	Wireline CapEx	38,164.3	37,117.1	32,297.7	30,491.0	30,921.0	32,075.0	32,271.9	32,789.0
	% y/y		(2.7%)	(13.0%)	(5.6%)	1.4%	3.7%	0.6%	1.6%
	Wireline Revenues	208,767.6	210,592.9	204,129.3	204,702.7	222,267.7	227,464.1	227,720.0	233,605.2
	% y/y		0.9%	(3.1%)	0.3%	8.6%	2.3%	0.1%	2.6%
	Wireline Capital Intensity	0.18x	0.18x	0.16x	0.15x	0.14x	0.14x	0.14x	0.14x
Latin America	Wireless CapEx	12,713.2	15,277.8	15,737.4	19,975.3	21,606.7	22,248.5	23,682.8	24,791.6
	% y/y		20.2%	3.0%	26.9%	8.2%	3.0%	6.4%	4.7%
	Wireless Revenues	223,553.5	273,007.8	294,926.4	315,831.4	334,466.6	348,565.3	393,718.1	405,124.0
	% y/y		22.1%	8.0%	7.1%	5.9%	4.2%	13.0%	2.9%
	Wireless Capital Intensity	0.06x	0.06x	0.05x	0.06x	0.06x	0.06x	0.06x	0.06x
	Total CapEx	51,172.1	53,532.0	49,073.3	51,432.0	54,185.3	55,865.7	56,773.7	58,391.6
	% y/y		4.6%	(8.3%)	4.8%	5.4%	3.1%	1.6%	2.8%
	Total Revenue	317,912.9	344,776.3	342,243.2	350,781.9	380,924.9	394,190.9	400,609.7	410,208.3
	% y/y		8.4%	(0.7%)	2.5%	8.6%	3.5%	1.6%	2.4%
	Total Capital Intensity	0.16x	0.16x	0.14x	0.15x	0.14x	0.14x	0.14x	0.14x
West Europe	Wireline CapEx	1,752.1	2,274.6	1,690.7	1,941.5	2,099.1	1,788.6	1,703.3	1,692.7
	% y/y		29.8%	(25.7%)	14.8%	8.1%	(14.8%)	(4.8%)	(0.6%)
	Wireline Revenues	10,063.9	11,268.2	10,203.5	10,251.0	10,777.1	9,127.1	8,837.9	8,741.4
	% y/y		12.0%	(9.4%)	0.5%	5.1%	(15.3%)	(3.2%)	(1.1%)
	Wireline Capital Intensity	0.17x	0.20x	0.17x	0.19x	0.19x	0.20x	0.19x	0.19x
	Wireless CapEx	3,270.6	4,229.4	3,545.9	5,024.7	6,732.4	6,652.1	6,600.2	6,705.9
	% y/y		29.3%	(16.2%)	41.7%	34.0%	(1.2%)	(0.8%)	1.6%
	Wireless Revenues	21,713.3	26,086.6	24,810.2	32,123.3	38,444.1	36,780.0	38,142.7	39,827.9
	% y/y		20.1%	(4.9%)	29.5%	19.7%	(4.3%)	3.7%	4.4%
	Wireless Capital Intensity	0.15x	0.16x	0.14x	0.16x	0.18x	0.18x	0.17x	0.17x
Asia Pacific ex CHINA	Total CapEx	5,022.7	6,503.9	5,236.6	6,966.2	8,831.5	8,440.7	8,303.5	8,398.6
	% y/y		29.5%	(19.5%)	33.0%	26.8%	(4.4%)	(1.6%)	1.1%
	Total Revenue	31,030.2	36,358.4	34,052.1	41,116.6	49,459.5	46,154.7	47,211.5	48,810.4
	% y/y		17.2%	(6.3%)	20.7%	20.3%	(6.7%)	2.3%	3.4%
	Total Capital Intensity	0.16x	0.18x	0.15x	0.17x	0.18x	0.18x	0.18x	0.17x
	Wireline CapEx	5,174.3	7,334.3	5,402.7	6,653.4	7,402.4	6,653.4	7,402.4	8,105.7
	% y/y		41.7%	(26.3%)	23.1%	11.3%	0.0%	0.0%	9.5%
	Wireline Revenues	27,701.4	32,325.9	32,947.2	31,718.7	32,158.1	34,690.2	36,894.6	41,398.4
	% y/y		16.7%	1.9%	(3.7%)	1.4%	7.9%	6.4%	12.2%
	Wireline Capital Intensity	0.19x	0.23x	0.16x	0.21x	0.23x	0.23x	0.25x	0.24x
China	Wireless CapEx	18,229.1	23,212.3	29,190.8	22,303.3	24,536.5	27,847.9	26,825.8	26,490.3
	% y/y		27.3%	25.8%	(23.6%)	10.0%	13.5%	(3.7%)	(1.3%)
	Wireless Revenues	60,570.9	64,861.3	72,268.0	81,082.3	94,089.6	105,983.2	116,455.1	123,677.0
	% y/y		7.1%	11.4%	12.2%	16.0%	12.6%	9.9%	6.2%
	Wireless Capital Intensity	0.30x	0.36x	0.40x	0.28x	0.26x	0.26x	0.23x	0.21x
	Total CapEx	24,398.3	28,381.9	30,664.6	29,647.0	32,093.4	35,953.6	36,000.0	36,387.1
	% y/y		16.3%	8.0%	(3.3%)	8.3%	12.0%	0.1%	1.1%
	Total Revenue	88,272.2	97,187.2	105,215.2	112,801.0	126,247.7	140,673.4	153,349.7	165,075.4
	% y/y		10.1%	8.3%	7.2%	11.9%	11.4%	9.0%	7.6%
	Total Capital Intensity	0.28x	0.29x	0.29x	0.26x	0.26x	0.25x	0.26x	0.23x
India	Wireline CapEx	1,955.6	2,451.0	1,387.1	1,275.5	993.4	710.9	637.3	611.6
	% y/y		25.3%	(43.4%)	(8.0%)	(22.1%)	(28.4%)	(10.3%)	(4.0%)
	Wireline Revenues	3,901.0	4,414.5	4,051.5	4,811.3	5,824.7	5,750.2	6,105.1	6,398.5
	% y/y		13.2%	(8.2%)	18.8%	21.1%	(1.3%)	6.2%	4.8%
	Wireline Capital Intensity	0.50x	0.56x	0.34x	0.27x	0.17x	0.12x	0.10x	0.10x
	Wireless CapEx	9,295.9	7,753.1	3,874.1	9,987.6	4,323.5	3,147.6	2,839.0	2,755.7
	% y/y		(16.6%)	(50.0%)	157.8%	(56.7%)	(27.2%)	(9.8%)	(2.9%)
	Wireless Revenues	11,696.0	14,926.9	14,646.4	20,137.7	22,574.8	22,090.1	23,380.4	24,847.8
	% y/y		27.6%	(1.9%)	37.5%	12.1%	(2.1%)	5.8%	6.3%
	Wireless Capital Intensity	0.79x	0.52x	0.26x	0.50x	0.19x	0.14x	0.12x	0.11x
CEMEA	Total CapEx	11,232.6	11,636.6	5,256.0	11,251.8	5,316.9	3,858.5	3,476.3	3,367.3
	% y/y		3.6%	(54.8%)	114.1%	(52.7%)	(27.4%)	(9.9%)	(3.1%)
	Total Revenue	15,605.6	19,323.1	18,556.9	24,615.5	28,110.8	27,648.0	29,291.5	31,055.8
	% y/y		23.8%	(4.0%)	32.6%	14.2%	(1.6%)	5.9%	6.0%
	Total Capital Intensity	0.72x	0.60x	0.28x	0.46x	0.19x	0.14x	0.12x	0.11x
	Wireline CapEx	8,339.2	9,938.6	11,936.7	11,434.1	13,186.9	12,961.3	10,959.1	10,675.8
	% y/y		19.2%	20.1%	(4.2%)	15.3%	(1.7%)	(15.4%)	(2.6%)
	Wireline Revenues	44,940.8	50,080.0	53,674.8	53,525.6	57,103.9	56,168.9	46,880.4	45,461.9
	% y/y		11.4%	7.2%	(0.3%)	6.7%	(1.6%)	(16.5%)	(3.0%)
	Wireline Capital Intensity	0.19x	0.20x	0.22x	0.21x	0.23x	0.23x	0.23x	0.23x
Japan	Wireless CapEx	21,955.8	25,575.3	24,563.2	25,601.2	27,442.5	32,059.5	29,978.2	29,261.0
	% y/y		16.5%	(4.0%)	4.2%	7.2%	16.8%	(6.5%)	(2.4%)
	Wireless Revenues	132,861.6	147,642.1	158,570.7	170,897.9	196,543.1	206,936.1	186,646.5	193,808.6
	% y/y		11.1%	7.4%	7.8%	15.0%	5.3%	(9.8%)	3.8%
	Wireless Capital Intensity	0.17x	0.17x	0.15x	0.15x	0.14x	0.15x	0.16x	0.15x
	Total CapEx	30,159.0	35,621.3	36,079.4	36,657.0	39,821.0	45,154.5	41,057.0	39,936.8
	% y/y		18.1%	1.3%	1.6%	8.6%	13.4%	(9.1%)	(2.7%)
	Total Revenue	182,855.0	204,409.8	219,881.7	236,337.8	267,525.9	277,100.9	246,835.9	246,538.1
	% y/y		11.8%	7.6%	7.5%	13.2%	3.6%	(10.9%)	(0.1%)
	Total Capital Intensity	0.16x	0.17x	0.16x	0.16x	0.15x	0.16x	0.17x	0.16x

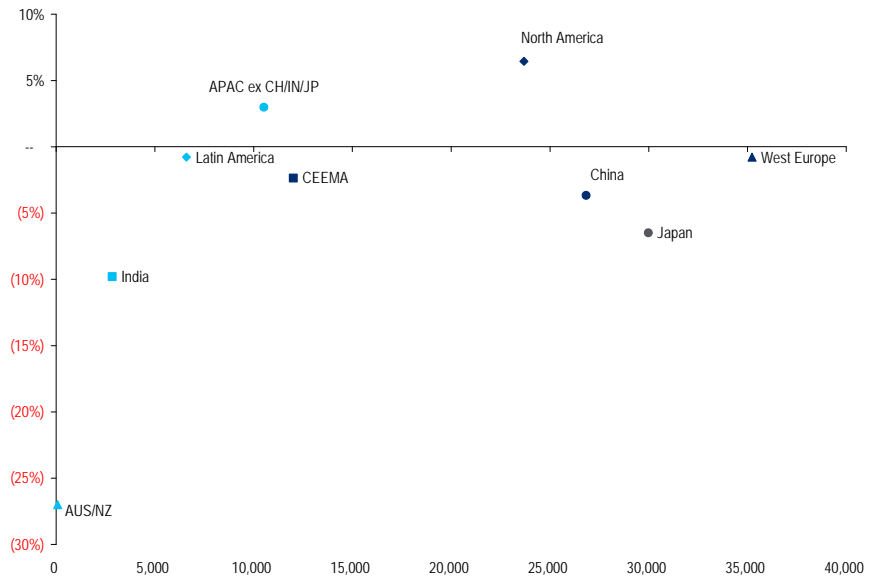
Source: Citi Research, Company Reports

Figure 192. Wireline Capex Spending



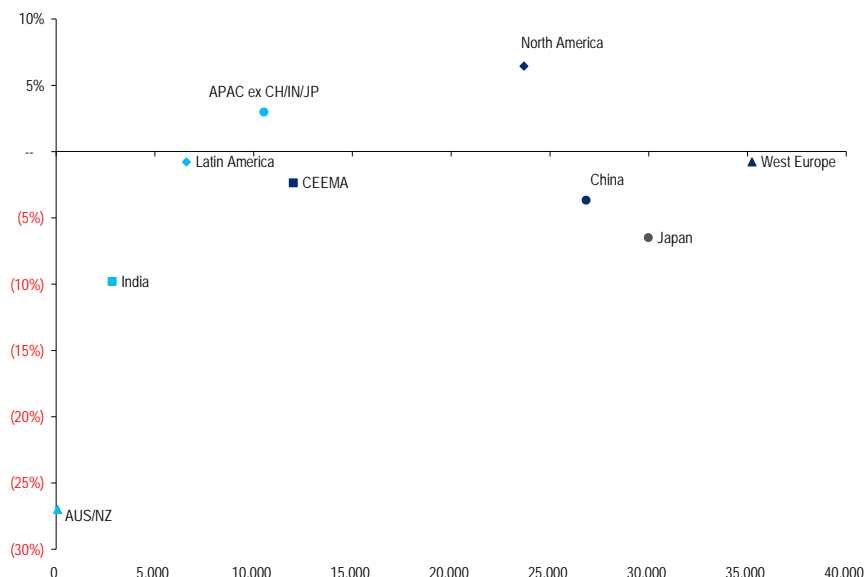
Source: Citi Research

Figure 193. Wireless Capex Spending



Source: Citi Research

Figure 194. Total Capex Spending



Source: Citi Research

Figure 195. Customer Concentration as a Percentage of FY 2012 Revenue

	Verizon	AT&T	Qwest	Level 3	Comcast	Time Warner	China Mobile	China Telecom	China Unicom	Additional Comments
Tellabs	24%	<10%								
Adtran										1 unnamed customer at 23% of 2012 revenue
Arris					31%	18%				
Ciena		14%								
Infinera										no customers over 10% of FY2012 revenue
Juniper	10.3%									
Alcatel-Lucent	11%	10%								10 largest customers account for 44% of 2012 revenue
Ericsson										10 largest customers account for 46% of 2012 revenue
Finisar										Cisco & Huawei account for ~10% fiscal 2012 revenue
Oclaro										Most recent qtr post OPXT merger; Huawei (10%), Alcatel-Lucent(10%), Cisco (11%)
Riverbed										Arrow and Avnet accounted for 17% and 11% of FY2012 revenue, respectively
FFIV										Avnet and Ingram Micro accounted for 17.1% and 13.8% of FY2012 revenue, respectively
JDS Uniphase										no customers over 10% of FY2012 revenue
Polycom										ScanSource accounted for more than 10% of FY12 revenue
Cisco										no customers over 10% of FY2012 revenue

Source: Citi Research, Company Reports

Figure 196. Revenues and Revenue Growth Rates

REVENUES (M in local currency)	FY_2007	FY_2008	FY_2009	FY_2010	FY_2011	FY_2012
North American						
Adtran	476.78	500.68	484.19	605.67	717.23	620.12
Arris	992.19	1,144.56	1,107.81	1,087.51	1,088.75	1,353.66
Ciena	779.77	902.45	652.63	1,236.64	1,741.97	1,833.92
Cisco	34,922.00	39,540.00	36,117.00	40,040.00	43,218.00	46,061.00
F5	525.67	650.17	653.08	881.97	1,151.83	1,377.25
Finisar	418.55	440.18	541.24	629.88	948.79	952.58
Infinera	309.34	353.43	309.10	454.35	404.88	438.44
JDS Uniphase	1,397.20	1,531.20	1,295.70	1,373.40	1,816.20	1,682.70
Juniper	2,836.09	3,572.38	3,315.91	4,093.30	4,448.73	4,365.37
Oclaro	202.81	235.49	230.60	392.55	467.41	385.46
Polycom	929.91	1,069.32	966.98	1,218.49	1,495.80	1,414.39
Riverbed	236.41	333.35	395.94	551.89	728.48	839.68
Tellabs	1,913.40	1,729.00	1,525.70	1,642.10	1,285.70	1,052.60
European						
Alcatel-Lucent	17,792.00	16,984.30	15,157.00	15,658.00	15,327.00	14,446.00
Ericsson	187,780.00	208,930.00	206,477.00	203,348.00	226,921.00	227,779.00

*From Infonetics and excludes consumer electronics and software like mobile phones, mobile video devices, client security software, and home networking equipment.
*Also excludes revenue from management systems, service and support, product maintenance, managed services, and professional services

REVS Y/Y% CHG	FY_2007	FY_2008	FY_2009	FY_2010	FY_2011	FY_2012
North American						
Adtran		5.0%	(3.3%)	25.1%	18.4%	(13.5%)
Arris		15.4%	(3.2%)	(1.8%)	0.1%	24.3%
Ciena		15.7%	(27.7%)	89.5%	40.9%	5.3%
Cisco		13.2%	(8.7%)	10.9%	7.9%	6.6%
F5		23.7%	0.4%	35.0%	30.6%	19.6%
Finisar		5.2%	23.0%	16.4%	50.6%	0.4%
Infinera		14.3%	(12.5%)	47.0%	(10.9%)	8.3%
JDS Uniphase		9.6%	(15.4%)	6.0%	32.2%	(7.4%)
Juniper		26.0%	(7.2%)	23.4%	8.7%	(1.9%)
Oclaro		16.1%	(2.1%)	70.2%	19.1%	(17.5%)
Polycom		15.0%	(9.6%)	26.0%	22.8%	(5.4%)
Riverbed		41.0%	18.8%	39.4%	32.0%	15.3%
Tellabs		(9.6%)	(11.8%)	7.6%	(21.7%)	(18.1%)
European						
Alcatel-Lucent		(4.5%)	(10.8%)	3.3%	(2.1%)	(5.7%)
Ericsson		11.3%	(1.2%)	(1.5%)	11.6%	0.4%
Average						
Median						
		13.1%	(4.7%)	26.4%	16.0%	0.7%
		14.3%	(7.2%)	23.4%	18.4%	0.4%

*From Infonetics and excludes consumer electronics and software like mobile phones, mobile video devices, client security software, and home networking equipment.
*Also excludes revenue from management systems, service and support, product maintenance, managed services, and professional services

Source: Citi Research

Figure 197. Gross and Operating Margins (FY 2007 – FY 2012)

GROSS MARGINS	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012
North American						
Adtran	59.4%	59.7%	59.3%	59.3%	57.8%	51.0%
Arris	27.6%	34.3%	41.8%	39.0%	37.7%	34.2%
Ciena	46.7%	51.2%	44.6%	45.7%	42.6%	40.9%
Cisco	64.8%	65.4%	65.0%	65.2%	63.3%	62.4%
F5	78.0%	77.7%	79.1%	81.3%	82.8%	84.0%
Finisar	39.2%	37.2%	34.6%	31.0%	34.9%	31.9%
Infinera	41.2%	42.6%	35.8%	47.2%	42.8%	37.9%
JDS Uniphase	37.7%	42.8%	42.9%	44.6%	47.6%	46.1%
Juniper	67.9%	67.9%	65.7%	67.5%	65.5%	64.3%
Oclaro	15.1%	23.2%	23.4%	28.0%	26.8%	18.6%
Polycom	58.6%	57.9%	56.8%	58.8%	60.0%	58.9%
Riverbed	73.2%	74.8%	75.9%	76.8%	76.8%	75.5%
Tellabs	35.2%	38.2%	43.6%	48.1%	39.5%	38.7%
European						
Alcatel-Lucent	32.1%	34.1%	33.7%	33.9%	35.0%	30.1%
Ericsson	39.3%	35.5%	34.0%	36.5%	35.1%	31.6%
Average		49.5%	49.1%	50.9%	49.9%	47.1%
Median		42.8%	43.6%	47.2%	42.8%	40.9%

OPERATING MARGINS	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012
North American						
Adtran	21.9%	22.7%	21.5%	25.4%	26.4%	9.4%
Arris	11.7%	13.0%	18.6%	15.4%	12.5%	12.1%
Ciena	11.3%	11.2%	(7.6%)	(2.3%)	1.0%	1.9%
Cisco	29.6%	29.5%	27.1%	29.2%	26.2%	27.7%
F5	29.5%	25.4%	28.1%	34.1%	38.2%	38.3%
Finisar	10.2%	6.4%	5.6%	7.1%	15.6%	9.4%
Infinera	5.4%	2.5%	(15.7%)	4.8%	(7.6%)	(9.4%)
JDS Uniphase	0.9%	5.1%	2.2%	7.1%	12.7%	9.1%
Juniper	21.3%	24.2%	20.2%	24.0%	20.6%	15.6%
Oclaro	(28.5%)	(8.3%)	(4.9%)	3.8%	0.4%	(13.7%)
Polycom	17.1%	15.8%	14.2%	14.7%	17.2%	11.1%
Riverbed	18.1%	17.2%	19.0%	25.6%	29.4%	26.4%
Tellabs	2.9%	5.1%	8.5%	13.0%	(4.6%)	(0.4%)
European						
Alcatel-Lucent	14.3%	2.7%	(0.4%)	1.4%	3.4%	(0.4%)
Ericsson	12.5%	11.2%	11.9%	12.0%	11.0%	14.8%
Average		12.3%	9.9%	14.3%	13.5%	10.1%
Median		11.2%	11.9%	13.0%	12.7%	9.4%

Source: Citi Research

Figure 198. Telecom Equipment Capex by Equipment Type

	C03	C04	C05	C06	C07	C08	C09	C10	C11	C12
Total Capex Amount	168,736,740,834	193,143,749,910	203,636,567,252	250,862,372,650	279,209,848,500	309,858,321,332	296,424,848,983	297,307,170,447	306,222,302,276	317,367,763,537
Total % Change YoY		14.5%	5.4%	23.2%	11.3%	11.0%	(4.3%)	0.3%	3.0%	3.6%
Customer Premise Equipment	4,288,227,269	4,042,562,645	4,580,255,464	7,584,644,158	7,836,422,380	7,993,946,400	7,783,718,764	9,342,896,334	10,415,619,037	10,626,722,233
% of telecom equipment market	4.0%	3.3%	3.5%	4.9%	4.7%	4.6%	4.8%	5.9%	6.4%	6.3%
% growth YoY		(5.7%)	13.3%	65.6%	3.3%	2.0%	(2.6%)	20.0%	11.5%	2.0%
Broadband aggregation equipment	7,949,208,894	9,506,396,107	10,006,251,735	12,032,649,683	11,688,080,585	10,824,610,900	10,164,335,840	11,421,402,842	11,493,094,871	11,766,483,442
% of telecom equipment market	7.4%	7.7%	7.7%	7.8%	7.0%	6.2%	6.3%	7.2%	7.1%	7.0%
% growth YoY		19.6%	5.3%	20.3%	(2.9%)	(7.4%)	(6.1%)	12.4%	0.6%	2.4%
IP routers and CES	2,851,261,379	3,904,319,294	5,073,196,932	8,405,313,580	10,468,401,277	11,862,319,897	10,838,885,616	13,296,816,001	14,736,483,983	14,993,073,112
% of telecom equipment market	2.7%	3.2%	3.9%	5.4%	6.3%	6.8%	6.7%	8.4%	9.0%	8.9%
% growth YoY		36.9%	29.9%	65.7%	24.5%	13.3%	(8.6%)	22.7%	10.8%	1.7%
Mobile infrastructure	41,047,018,914	48,514,481,800	51,956,859,169	57,155,080,362	57,639,453,796	59,751,944,121	56,318,738,271	49,971,839,857	53,684,799,852	57,973,559,391
% of telecom equipment market	38.3%	39.5%	40.1%	36.8%	34.6%	34.1%	34.9%	31.5%	32.9%	34.5%
% growth YoY		18.2%	7.1%	10.0%	0.8%	3.7%	(5.7%)	(11.3%)	7.4%	8.0%
Optical equipment	8,413,390,883	9,410,597,909	10,412,985,319	11,066,626,808	12,721,217,901	13,444,131,848	11,880,772,990	11,306,267,128	12,247,341,365	11,850,929,961
% of telecom equipment market	7.9%	7.7%	8.0%	7.1%	7.6%	7.7%	7.4%	7.1%	7.5%	7.0%
% growth YoY		11.9%	10.7%	6.3%	15.0%	5.7%	(11.6%)	(4.8%)	8.3%	(3.2%)
Video Infrastructure	601,163,104	434,684,155	550,340,773	1,193,445,877	1,448,035,117	1,541,740,136	1,566,851,847	1,518,002,768	1,709,682,964	1,982,554,296
% of telecom equipment market	0.6%	0.4%	0.4%	0.8%	0.9%	0.9%	1.0%	1.0%	1.0%	1.2%
% growth YoY		(27.7%)	26.6%	116.9%	21.3%	6.5%	1.6%	(3.1%)	12.6%	16.0%
IP voice infrastructure	1,144,556,741	1,625,312,017	2,148,748,062	3,020,726,128	3,603,343,009	3,357,153,840	2,764,501,969	2,631,086,490	2,625,503,975	2,691,682,180
% of telecom equipment market	1.1%	1.3%	1.7%	1.9%	2.2%	1.9%	1.7%	1.7%	1.6%	1.6%
% growth YoY		42.0%	32.2%	40.6%	19.3%	(6.8%)	(17.7%)	(4.8%)	(0.2%)	2.5%
TDM voice infrastructure	26,692,018,316	28,381,431,916	29,604,810,957	35,493,701,451	37,533,036,564	36,528,661,993	29,941,546,805	25,813,633,834	21,353,775,985	19,897,368,477
% of telecom equipment market	24.9%	23.1%	22.9%	22.9%	22.5%	20.9%	18.6%	16.3%	13.1%	11.8%
% growth YoY		6.3%	4.3%	19.9%	5.7%	(2.7%)	(18.0%)	(13.8%)	(17.3%)	(6.8%)
All other telecom/datacom network equipment	14,124,705,039	16,903,026,890	15,142,010,432	19,185,939,563	23,767,880,872	29,694,229,973	29,928,092,537	33,469,879,116	34,749,416,355	36,367,954,692
% of telecom equipment market	13.2%	13.8%	11.7%	12.4%	14.3%	17.0%	18.6%	21.1%	21.3%	21.6%
% growth YoY		19.7%	(10.4%)	26.7%	23.9%	24.9%	0.8%	11.8%	3.8%	4.7%
Telecom Datacom Equipment Market	107,111,550,539	122,722,812,733	129,475,458,843	155,138,127,610	166,705,871,501	174,998,739,108	161,187,444,639	158,771,824,370	163,015,718,387	168,150,327,784
% growth YoY		14.6%	5.5%	19.8%	7.5%	5.0%	(7.9%)	(1.5%)	2.7%	3.1%
Non-telecom/datacom network equipment	61,625,190,296	70,420,937,179	74,161,108,408	95,724,245,040	112,503,976,998	134,859,582,223	135,237,404,344	138,535,346,077	143,206,583,889	149,217,435,754
% growth YoY		14.3%	5.3%	29.1%	17.5%	19.9%	0.3%	2.4%	3.4%	4.2%

Source: Infonetics

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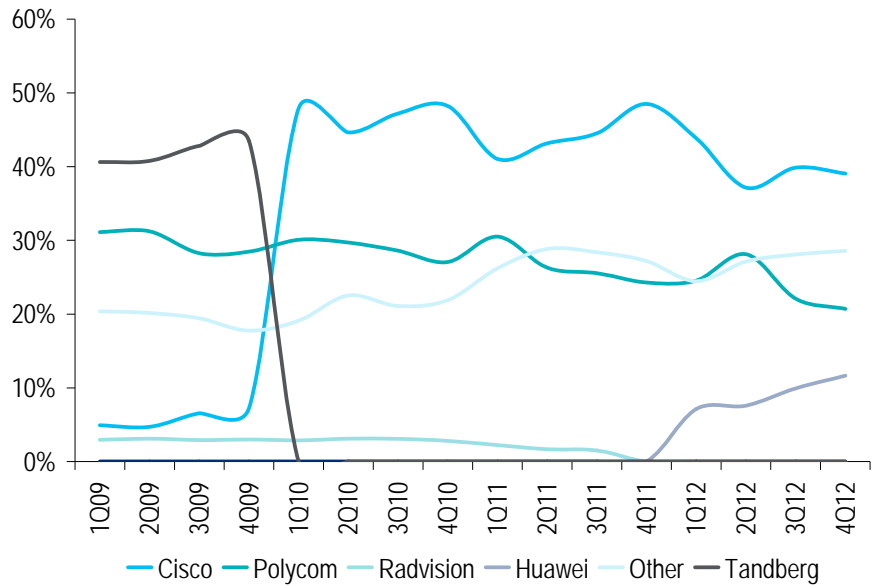
Source: Infonetics

Figure 200. Telecom Equipment Market Size (Revs) and Market Share (2012) By Major Categories - continued

	Broadband Aggregation, Middleware and CPE												Wireless Infrastructure				
	Telco			Cable		Customer Premise Equipment				Video Infrastructure (encoders and							
	DSL Aggregati on	PON	Ethernet FTTH	CMTS	Universal Edge QAM	DSL	Cable	FTTH	Set Top Box*	Telco IPTV*	Cable*	Satellite*	2G/3G	LTE	Wimax	Ethernet Routers and Gateways**	Microwave Equipment (for backhaul)**
2012 Size (Revs, \$billions): CAGR (2012-2017):	\$1.9 -6.7%	\$4.5 2.9%	\$0.3 1.6%	\$1.1 17.3%	\$0.3 10.3%	\$3.3 -8.7%	\$2.4 14.1%	\$2.0 7.3%	\$14.6 2.8%	\$0.3 6.5%	\$0.3 8.0%	\$0.1 8.1%	\$35.2 -5.0%	\$6.9 16.2%	\$1.1 -21.6%	\$3.0 1.7%	\$4.3 7.5%
Aastra																	
Acme Packet																	
Actiontec	2%																
Adtran	15%		2%													2%	
Adva																2%	
Alcatel-Lucent	25%	15%	14%			2%		14%					9%	18%		22%	10%
ALOE Systems																	
Alvarion														8%			
Arris				30%	17%		24%				13%						
Aruba																	
AudioCodes																	
Avaya																	
AVM						3%											
Broadsoft																	
Brocade																	
Calix	9%	2%	19%														
Casa Systems				4%													
Cerragon																	8%
Ciena																2%	
Cisco			9%	53%	30%		17%		11%	6%	15%		1%	2%		13%	
Comtrend						3%											
Concurrent											10%						
Dasan Networks		3%						2%									
Dialogic																	
D-Link						8%											
Echostar									3%								
ECI Telecom	3%																
Ericsson					1%					5%		38%	39%	23%		2%	24%
Extreme Networks																	
Fiberhome		7%						8%									
Fujitsu	2%	2%	5%					2%						4%			
Genband																	
Genexis			6%														
Harmonic					36%					10%	12%	35%					
Hitachi		1%															
HP																	
Huawei	20%	33%	4%			19%		27%	3%	13%	17%		16%	14%	37%	20%	19%
Humax									3%								
IBM																	
Infinera																	
Iskratel	1%		1%														
Italtel																	
Juniper																4%	
Mavenir																	
Meru																	
Metaswitch																	
Microsoft																	
Mitel																	
Mitsubishi		4%						3%									
Motorola	1%	2%		13%	8%	1%	17%	1%	8%	13%	20%						
Movius																	
NEC	2%	1%												8%	2%		17%
NetGear						4%	10%										
NewNet															8%		
Nokia Siemens	1%												20%	17%			4%
OneAccess																	
Pace						5%			12%								
PacketFront			10%														
Polycom																	
Radisys																	
Ruckus																	
Sagemcom						5%											
Samsung														8%	29%		
Sansay																	
Seachange																	
Shoretel																	
Siemens																	
Sonus																	
Spectralink																	
Sumitomo	1%	1%															
Technicolor						8%	9%		12%								
Tellabs	3%															6%	
Thomson																	
Tilgin			5%														
Toshiba																	
TP-Link						14%											
Transmode																	
Ubee Interactive							8%										
Ubiquoss		2%															
UTStarcom	1%									3%							
Vocera																	
Xener																	
Xirrus																	
Yamaha																	
Zhone	2%	1%	7%														
ZTE	8%	21%	7%			13%		31%		17%			8%	5%	7%	13%	4%
ZyXel						6%											

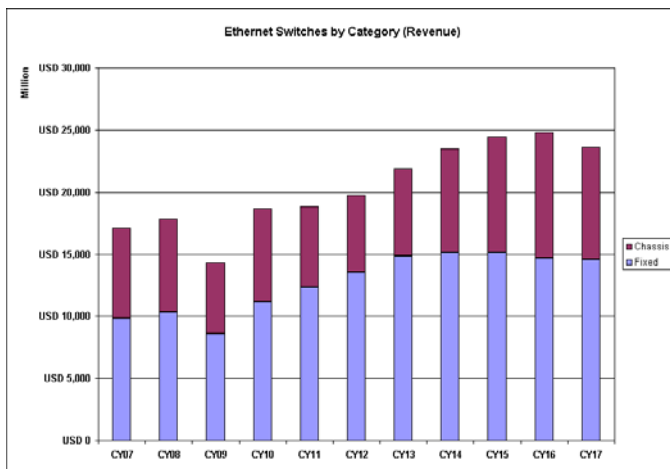
Source: Infonetics

Figure 201. Revenue Market Share Trends of Video Conferencing Equipment Providers Globally



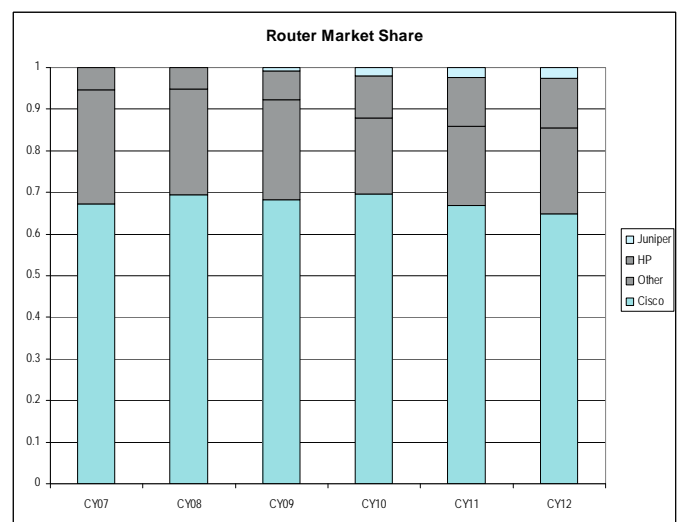
Source: Infonetics

Figure 202. Ethernet Switches by Category (Revenue)



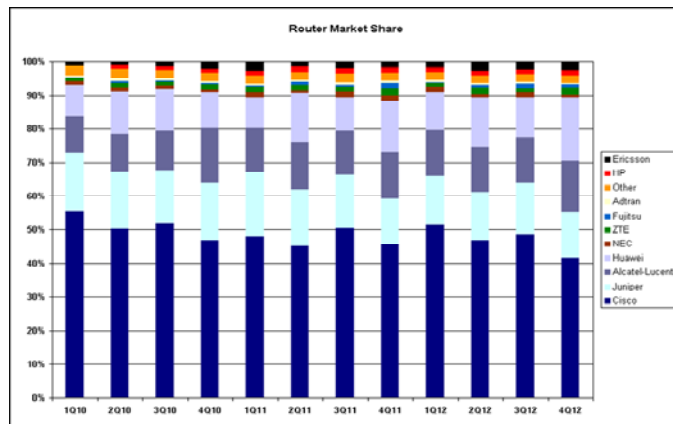
Source: Infonetics

Figure 203. Router Market Share



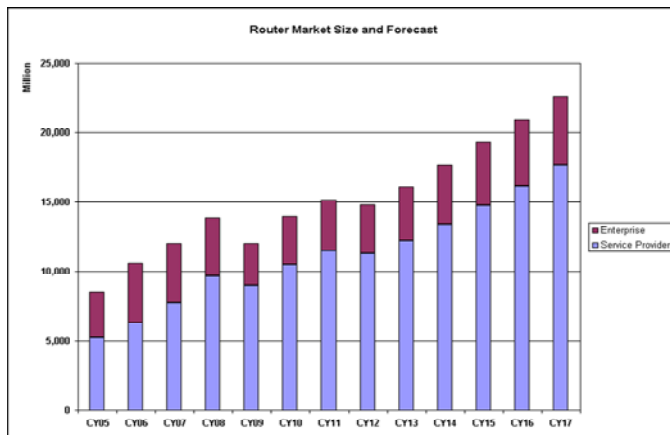
Source: Infonetics

Figure 204. Router Market Share



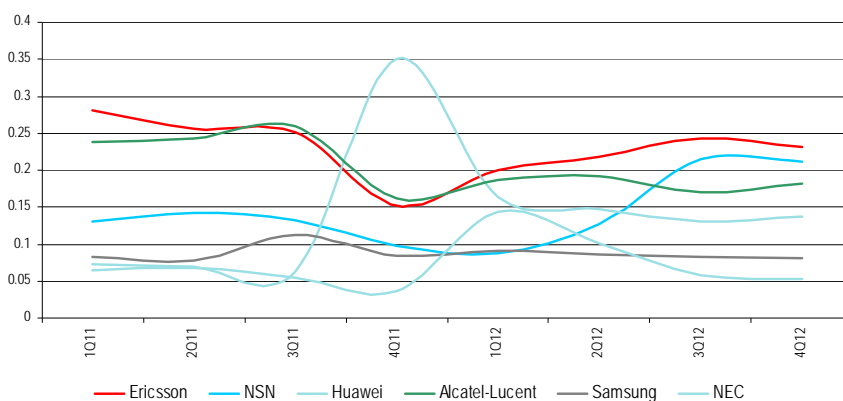
Source: Infonetics

Figure 205. Router Market Size and Forecast



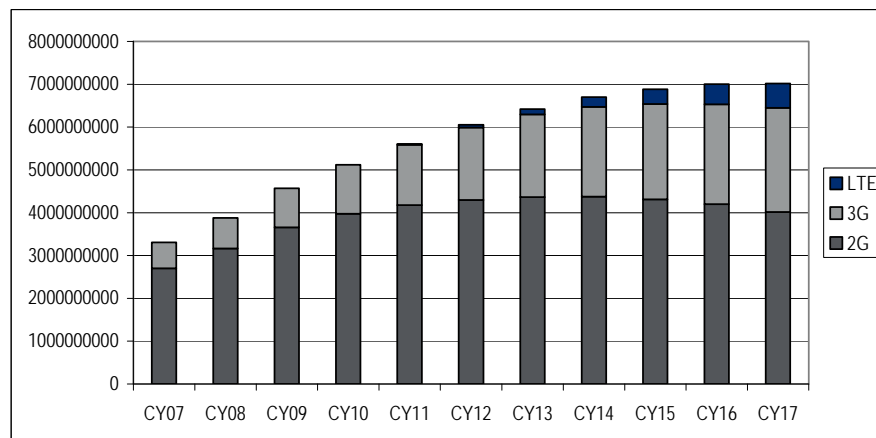
Source: Infonetics

Figure 206. Market Share in LTE



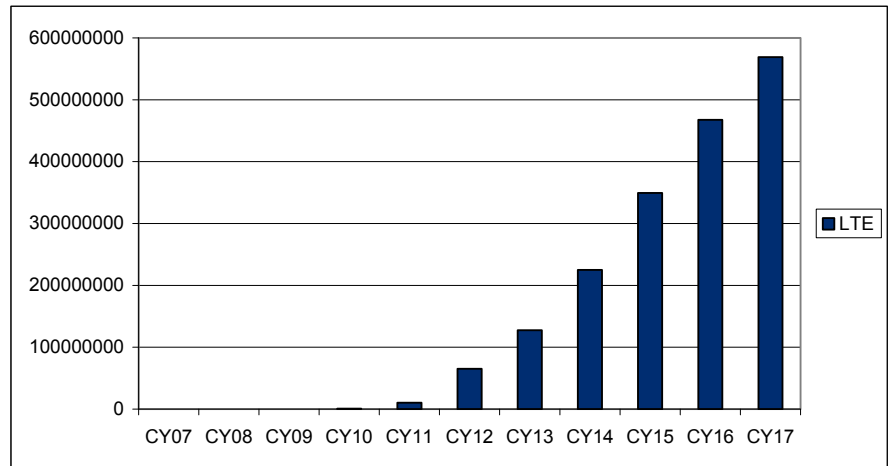
Source: Infonetics

Figure 207. Wireless Subscribing by Technology



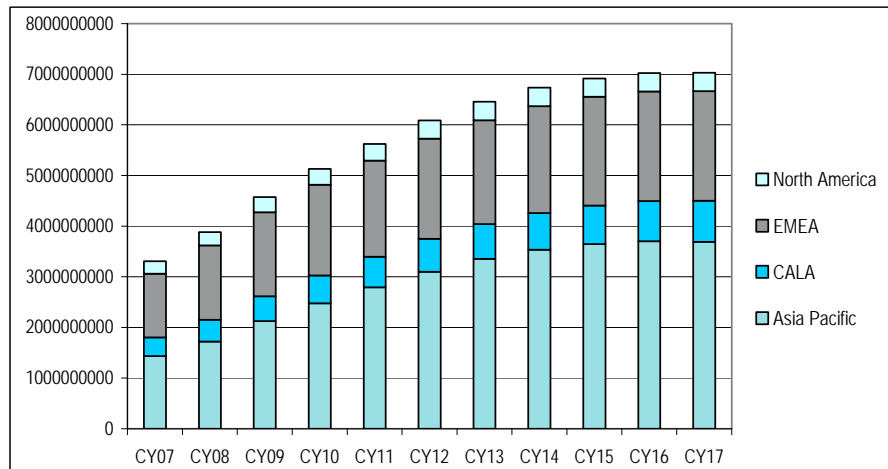
Source: Infonetics

Figure 208. LTE Subscribers Growth



Source: Infonetics

Figure 209. Global Wireless Subscriber Growth



Source: Infonetics

Figure 210. LTE Deployment

Country	Operator	Launched	DEM Vendors (E-UTRAN & EPC)
Sweden	TeliaSonera	14-Dec-09	Ericsson, Huawei, Nokia Siemens Networks
Norway	TeliaSonera (NetCom)	14-Dec-09	Ericsson, Huawei, Nokia Siemens Networks
Uzbekistan	MTS	28-Jul-10	Huawei, ZTE
Uzbekistan	UCell (TeliaSonera)	9-Aug-10	ZTE
Poland	Aero2 (LTE FDD and TDD)	7-Sep-10	Huawei, Ericsson
USA	MetroPCS	21-Sep-10	Ericsson
Austria	Austria Telekom (A1 Telekom)	5-Nov-10	Cisco, Huawei, Ericsson
Sweden	Tele2	15-Nov-10	Huawei, Nokia Siemens Networks
Sweden	TeleNor	15-Nov-10	Huawei
Hong Kong	CSL Limited	25-Nov-10	ZTE, Huawei
Finland	TeliaSonera	30-Nov-10	Nokia Siemens Networks
Germany	Vodafone	1-Dec-10	Ericsson, Huawei, Cisco
USA	Verizon Wireless	5-Dec-10	Alcatel-Lucent, Ericsson, Nokia Siemens Networks, Cisco
Finland	Elisa	8-Dec-10	Nokia Siemens Networks
Denmark	TeliaSonera	9-Dec-10	Nokia Siemens Networks
Estonia	EMT (TeliaSonera)	17-Dec-10	Ericsson, Nokia Siemens Networks
Japan	NTT DoCoMo	24-Dec-10	Alcatel-Lucent, Ericsson, Fujitsu, NEC, Nokia Siemens Networks
Germany	T-Mobile (Deutsche Telekom)	5-Apr-11	Huawei, Nokia Siemens Networks
Philippines	Smart Communications	16-Apr-11	Nokia Siemens Networks
Lithuania	Omnitel	28-Apr-11	Huawei
Latvia	LMT (TeliaSonera)	31-May-11	Nokia Siemens Networks
Singapore	M1	21-Jun-11	Huawei
USA	Mosaic Telecom	Jul-11	Nokia Siemens Networks
Germany	O2 (Telefonica)	1-Jul-11	Huawei, Nokia Siemens Networks
South Korea	SK Telecom	1-Jul-11	LG Ericsson, Nokia Siemens Networks, Samsung, NEC
South Korea	LG U+	1-Jul-11	Samsung, Nokia Siemens Networks
Canada	Rogers Wireless	7-Jul-11	Alcatel-Lucent, Ericsson
Austria	T-Mobile	28-Jul-11	Huawei, Nokia Siemens Networks
Canada	Bell Mobility	14-Sep-11	Alcatel-Lucent, Ericsson, Huawei
Saudi Arabia	Mobily (LTE TDD)	14-Sep-11	Nokia Siemens Networks, Samsung, Alcatel-Lucent
Saudi Arabia	STC (LTE TDD)	14-Sep-11	Alcatel-Lucent, Huawei, Nokia Siemens Networks
Saudi Arabia	Zain	14-Sep-11	Nokia Siemens Networks
USA	AT&T Mobility	18-Sep-11	Alcatel-Lucent, Ericsson, Cisco, Juniper Networks
UAE	Etisalat	25-Sep-11	Huawei, ZTE
Australia	Telstra	27-Sep-11	Huawei, Ericsson
Denmark	TDC	10-Oct-11	
Austria	3 (H3G Austria)	18-Nov-11	Nokia Siemens Networks, ZTE
Puerto Rico	AT&T Mobility	20-Nov-11	
Puerto Rico	Claro	24-Nov-11	Alcatel-Lucent
Kyrgyzstan	Saima Telecom	09-Dec-11	
Finland	DNA	13-Dec-11	Ericsson
Uruguay	Antel	13-Dec-11	Alcatel-Lucent
Brazil	Sky Brazil (LTE TDD)	13-Dec-11	Nokia Siemens Networks
USA	Cricket	21-Dec-11	
Singapore	SingTel	22-Dec-11	NEC, Ericsson
Kuwait	Viva	27-Dec-11	
Armenia	Vivacell-MTS	28-Dec-11	
Bahrain	Viva Bahrain	1-Jan-12	
Hungary	T-Mobile	1-Jan-12	Cisco, Ericsson
South Korea	KT	3-Jan-12	Nokia Siemens Networks, Samsung, Intel
Russia	Yota	15-Jan-12	Huawei, Samsung
Canada	TELUS	10-Feb-12	Huawei, Nokia Siemens Networks, Alcatel-Lucent
USA	Peoples Telephone Co-op	14-Feb-12	
Japan	Softbank Mobile XGP/LTE TDD	24-Feb-12	Huawei, ZTE, Ericsson, Nokia Siemens Networks
Portugal	TMN (Portugal Telecom)	12-Mar-12	Huawei
Portugal	Vodafone Portugal	12-Mar-12	
Portugal	Optimus	15-Mar-12	
Japan	eMobile (eAccess)	15-Mar-12	Huawei, Ericsson
USA	US Cellular	22-Mar-12	Nokia Siemens Networks
USA	Panhandle (PTCI)	Mar-12	
Croatia	T-Mobile/Hrvatski Telekom	23-Mar-12	Nokia Siemens Networks
Croatia	VIPNet (Austria Telekom)	23-Mar-12	Huawei, ZTE, Ericsson
Australia	NBN Co (LTE TDD)	2-Apr-12	Ericsson
India	Bharti Airtel (LTE TDD)	10-Apr-12	ZTE
Angola	Movicel	14-Apr-12	Huawei
Puerto Rico	Open Mobile	19-Apr-12	Ericsson
Moldova	IDC	21-Apr-12	
Sweden	3 (LTE FDD and TDD)	23-Apr-12	ZTE
Hong Kong	China Mobile HK	25-Apr-12	Ericsson, ZTE
Hong Kong	PCCW	25-Apr-12	
USA	Cellcom	30-Apr-12	

Source: Infonetics

Figure 211. LTE Deployment - Continued

Country	Operator	Launched	OEM Vendors (E-UTRAN & EPC)
USA	Pioneer Cellular	30-Apr-12	
Netherlands	Vodafone	1-May-12	
Hong Kong	Hutchison 3 HK	2-May-12	
Netherlands	Ziggo	3-May-12	
Netherlands	Tele2	8-May-12	
Netherlands	KPN	11-May-12	
Netherlands	T-Mobile	11-May-12	
Namibia	MTC	16-May-12	
USA	BendBroadband	17-May-12	
Tanzania	Smile	30-May-12	
UAE	Du	12-Jun-12	
Colombia	Une-EPN	12-Jun-12	Huawei
Guam	IT&E	12-Jun-12	
Azerbaijan	Azercell	19-Jun-12	
Czech Rep	Telefonica O2	19-Jun-12	
Mauritius	Orange	21-Jun-12	
UK	UK Broadband (LTE TDD)	28-Jun-12	
Hungary	Telenor Hungary	5-Jul-12	
Dominican Republic	Orange Dominicana	9-Jul-12	
Slovenia	Si.mobil	12-Jul-12	Nokia Siemens Networks
USA	Sprint Nextel	15-Jul-12	Ericsson, Alcatel-Lucent, Samsung
Oman	Omantel (LTE TDD)	16-Jul-12	
Mauritius	Emtel	Jul-12	
Australia	Optus	31-Jul-12	NEC, Nokia Siemens Networks
Slovak Republic	Telefonica O2	2-Aug-12	
Hong Kong	Smartone (Vodafone)	28-Aug-12	Ericsson
Russia	MTS (LTE TDD)	1-Sep-12	Nokia Siemens Networks
USA	C Spire Wireless	10-Sep-12	Alcatel-Lucent
Singapore	StarHub	19-Sep-12	Nokia Siemens Networks
Japan	KDDI	21-Sep-12	Hitachi, Nokia Siemens Networks, NEC, Samsung
Japan	Softbank Mobile	21-Sep-12	Huawei, ZTE, Ericsson, Nokia Siemens Networks
Canada	MTS (Allstream)	25-Sep-12	
Denmark	3 Denmark	28-Sep-12	
Philippines	Globe	28-Sep-12	
Luxembourg	Tango	1-Oct-12	
Guam	DoCoMo Pacific	4-Oct-12	
Tajikistan	Babilon-Mobile	6-Oct-12	
Norway	TeleNor	10-Oct-12	Huawei, Cisco
South Africa	Vodacom	10-Oct-12	Nokia Siemens Networks
USA	Alaska Communications	12-Oct-12	
Mexico	Telefónica Movistar	15-Oct-12	
Luxembourg	Orange	29-Oct-12	
UK	EE (Everything Everywhere)	30-Oct-12	
Uganda	Smile	Oct-12	
Belgium	Belgacom / Proximus	5-Nov-12	
USA	Bluegrass Cellular	5-Nov-12	
Antigua-Barb	Digicel	6-Nov-12	
Mexico	Telcel	6-Nov-12	Ericsson, Huawei
Italy	Vodafone	6-Nov-12	
Italy	TIM (Telecom Italia)	7-Nov-12	Alcatel-Lucent, Nokia Siemens Networks
Montenegro	Telenor	8-Nov-12	
Greece	Cosmote	16-Nov-12	
Moldova	Moldcell	16-Nov-12	
USA	Strata Networks	19-Nov-12	
Moldova	Orange Moldova	19-Nov-12	
Romania	Vodafone	20-Nov-12	
Kuwait	Zain	21-Nov-12	Huawei
France	Orange	22-Nov-12	Alcatel-Lucent
USA	Shentel	23-Nov-12	
Estonia	Tele2	27-Nov-12	
France	SFR	28-Nov-12	Alcatel-Lucent, Nokia Siemens Networks
Switzerland	Swisscom	29-Nov-12	Ericsson
South Africa	MTN	1-Dec-12	ZTE, Ericsson
Romania	Orange	12-Dec-12	
Brazil	Claro	13-Dec-12	
Angola	Unitel	16-Dec-12	
Bolivia	Entel Movil	16-Dec-12	
Greece	Vodafone	18-Dec-12	
Puerto Rico	Sprint Nextel	18-Dec-12	
Kazakhstan	Altel	25-Dec-12	
Sri Lanka	Dialog Axiata (LTE TDD)	30-Dec-12	Huawei
Paraguay	Vox	Dec-12	
Sri Lanka	Mobitel	31-Dec-12	

Source: Infonetics

Printing

A printer is a peripheral that is either directly or indirectly connected to a computer workstation via a network. Single function printers do not have the ability to also copy, fax, print, or scan while multi function printers can perform several functions. Printers typically are inkjet or laser. Inkjet printer use either a continuous, controlled flow of ink or a staccato ejection of ink, often referred to as "drop on demand." Ink is typically ejected through a multinozzled head. Laser printers replicate the image of an entire page on an intermediate medium (usually a photosensitive drum) before transferring it to paper. A laser-based device uses a laser as the scanning instrument.

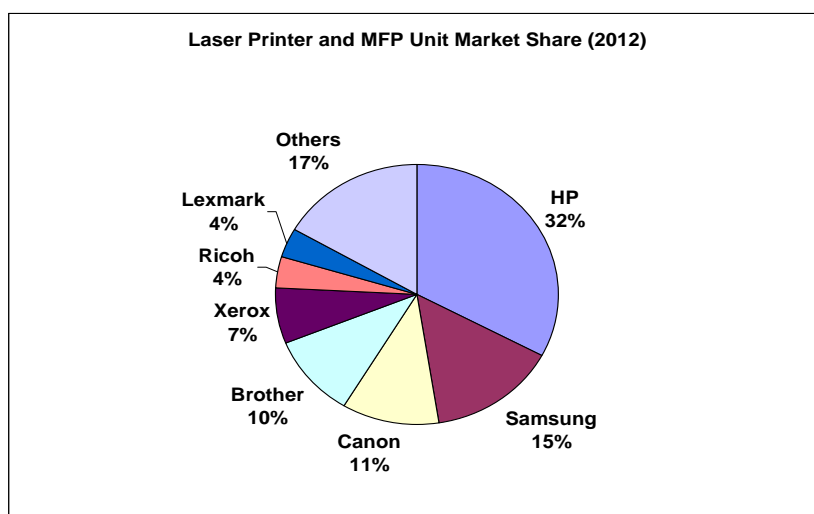
Key printer vendors are Xerox, Canon, Ricoh, Samsung, Hewlett Packard, Lexmark, Brother.

Figure 212. Historical & Forecasted Printer Shipments (2007-2014E)

Shipments (in 000s)									2007-2011	2011-2014E
	2007	2008	2009	2010	2011	2012	2013E	2014E	CAGR	CAGR
Impact	4,001	3,857	3,528	4,150	4,804	4,309	4,057	3,774	4.7%	-7.7%
Inkjet	91,737	85,556	76,971	82,483	80,286	70,177	69,296	69,552	-3.3%	-4.7%
- of which MFP	62,050	62,161	58,904	65,369	66,309	59,157	59,420	60,456	3.0%	-3.0%
Monochrome Laser	31,491	30,644	25,178	31,821	33,967	32,143	32,377	34,026	1.9%	0.1%
- of which MFP			9,189	11,961	13,932	14,568	15,238	16,631		6.1%
Color Laser	5,876	6,425	5,679	6,643	7,000	6,905	7,381	8,003	4.5%	4.6%
- of which MFP			2,467	3,091	3,547	3,899	4,391	4,929		11.6%
Total Units	133,105	126,482	111,356	125,091	126,057	113,534	113,111	115,356	-1.4%	-2.9%
- of which MFP			70,561	80,423	83,790	81,615	85,608	90,301		2.5%
Total Revenues (K)				\$ 57,326	\$ 59,338	\$ 58,543	\$ 56,706	\$ 56,279		-1.7%
- of which MFP				\$ 42,829	\$ 45,055	\$ 45,836	\$ 45,291	\$ 45,279		0.2%

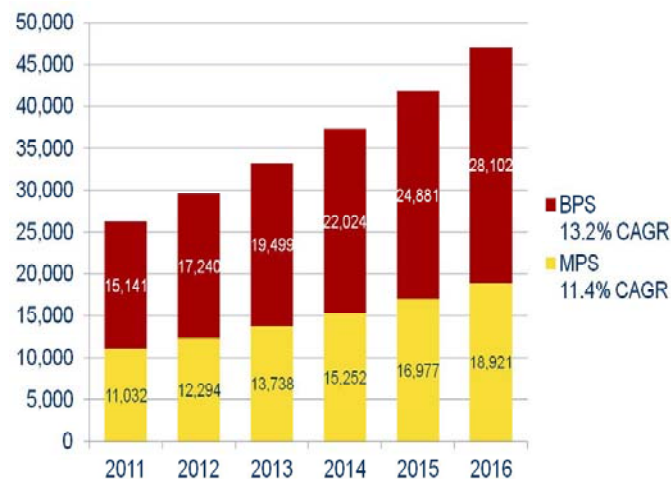
Source: IDC, March 2013

Figure 213. Laser Printer & MFP Unit Market Share (2012)



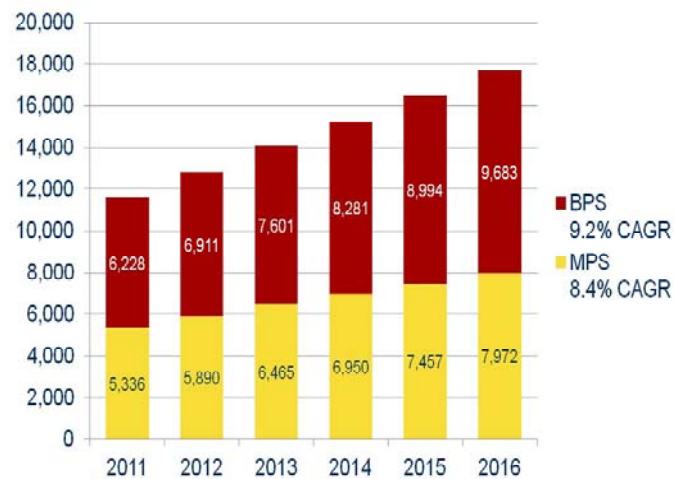
Source: IDC

Figure 214. Basic and Managed Print Services Model



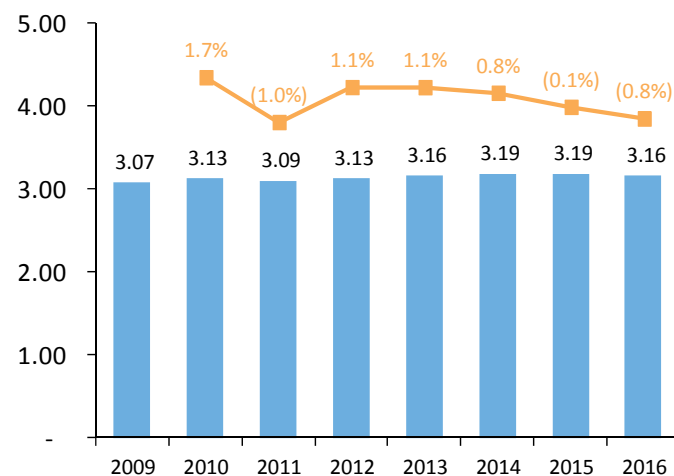
Source: IDC

Figure 215. US Basic and Managed Print Services Model



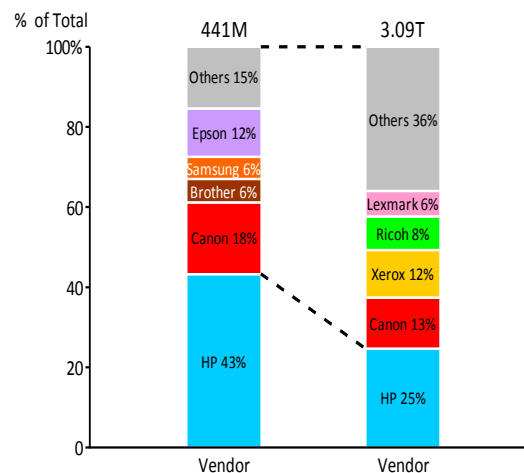
Source: IDC

Figure 216. Page Volume Forecast



Source: IDC

Figure 217. Share of Installed Base vs Page Volume Share (2011)



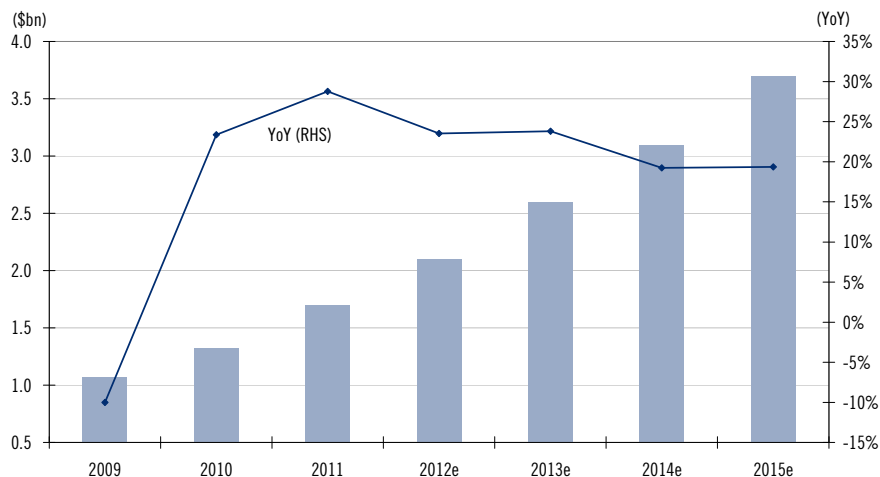
Source: IDC

3D Printing

The term 3D printing is defined as the fabrication of a product (such as an intricate jet engine part) through the deposition of a material or binder using a print head, nozzle or other printer technology. We view 3D printing as one of several emerging additive manufacturing techniques—the terms 3D printing and additive manufacturing are essentially interchangeable. We believe the global market is approaching \$2bn, of which materials are nearly 30%. Wohlers Associates forecasts compound annual growth of over 20% while the Consumer Electronics Association (US) expects the industry to grow to \$5bn by 2017.

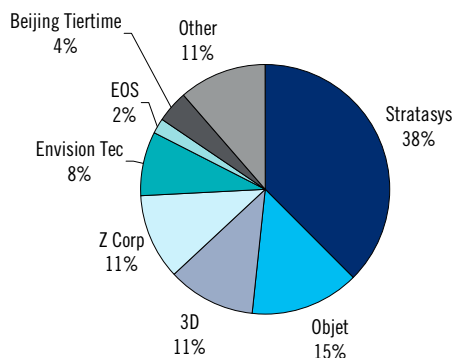
The two largest listed names in the US are 3D Systems (DDD) and Stratasys (SSYS), and are averaging organic growth of 21% with an additional lift from acquisitions. ExOne completed its IPO on Feb 7. We also expect more consolidation in this sector, as evidenced by GE Aviation's acquisition of Morris Technologies and Rapid Quality Manufacturing in November 2012.

Figure 218. 3D Printing Market



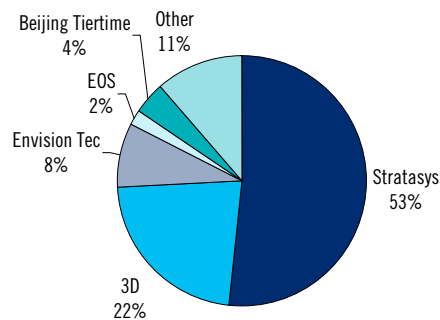
Source: Wohlers Associates, Citi Research

Figure 219. Market share for 3D printers (CY11)



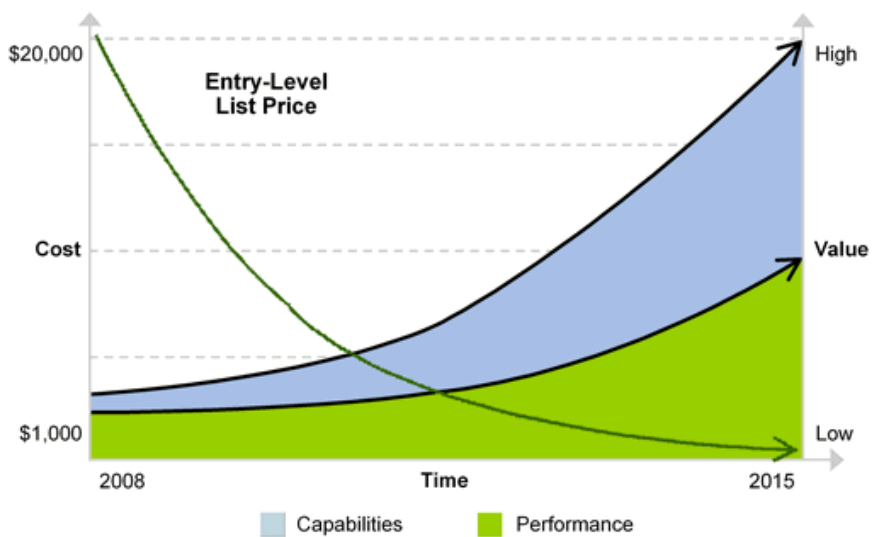
Source: Wohlers Associates, Citi Research

Figure 220. Market share for 3D printers (CY11) – after M&A



Source: Wohlers Associates, Citi Research

Figure 221. 3D Printer Price, Cost and Value Curves



Source: Gartner (January 2013)

Automotive/Aerospace

Automotive product cycles and major platform generally get refreshed every 3-4 years. This should be considered when looking at infotainment (GPS, bluetooth, DVD players, etc.) and regulatory requirements in the automotive space. Many electronic component companies are seeing an opportunity in Auto's as electronic content growth historically grows 7-10% annually (with Europe having the highest content per vehicle). While infotainment is likely to eventually become commoditized looking at those companies with exposure to regulatory standard (MPG standards, emissions, sensors, etc.) will likely have a longer term opportunity.

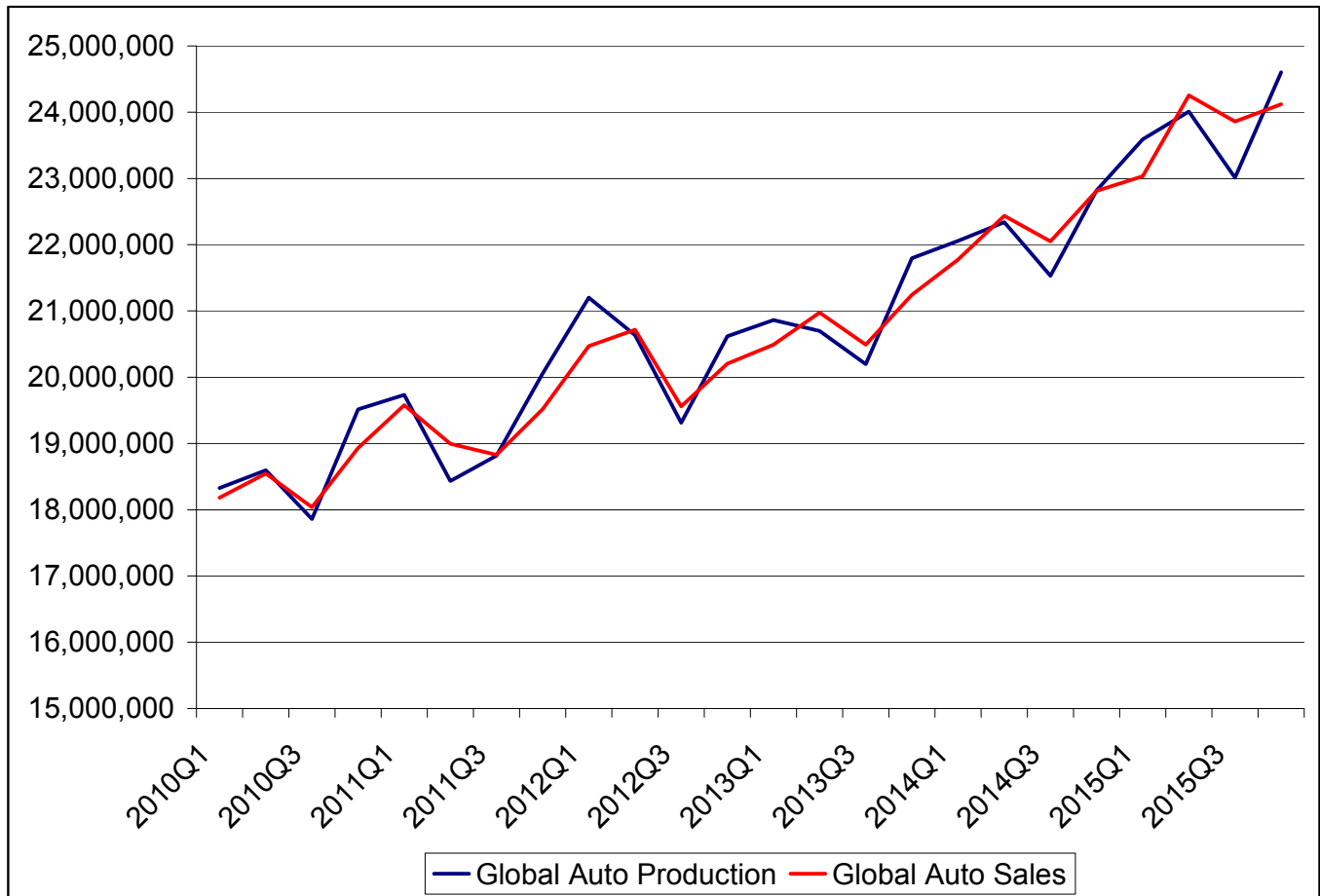
Similar to automotives we see a similar transition in aerospace to include more infotainment options for passengers (ex. Screens in the headrest, directTV, etc). Additionally there is a much longer term trend to increase the use of electronics to reduce the weight of planes, support more efficient control tower to cockpit interactions, etc.

Figure 222. Citigroup Global Light Vehicle Registration Forecasts

Market	2009	% Chg	2010	% Chg	2011	% Chg	2012	% Chg	2013E	% Chg	2014E	% Chg	2015E	% Chg	7yr CAGR
Germany	3,982	+20.0%	3,110	-21.9%	3,403	9.4%	3,298	-3.1%	3,000	-9.0%	3,000	+0.0%	3,100	+3.3%	-0.7%
UK	2,192	-9.8%	2,261	+3.1%	2,207	-2.4%	2,291	+3.8%	2,250	-1.8%	2,200	-2.2%	2,200	+0.0%	-1.3%
Italy	2,339	-2.1%	2,128	-9.0%	1,920	-9.8%	1,519	-20.9%	1,450	-4.5%	1,450	+0.0%	1,500	+3.4%	-7.5%
France	2,666	+6.2%	2,669	+0.1%	2,633	-1.3%	2,283	-13.3%	2,100	-8.0%	2,100	+0.0%	2,100	+0.0%	0.2%
Spain	1,060	-20.1%	1,098	+3.6%	912	-16.9%	769	-15.7%	750	-2.5%	800	+6.7%	900	+12.5%	-9.5%
Other Europe	2,750	-19.3%	3,164	+15.1%	3,298	+4.2%	3,090	-6.3%	2,850	-7.8%	2,950	+3.5%	3,000	+1.7%	-0.6%
W Europe Total	14,989	-2.5%	14,430	-3.7%	14,373	-0.4%	13,250	-7.8%	12,400	-6.4%	12,500	+0.8%	12,800	+2.4%	-2.4%
E Europe- Ex Russia	1,745	-31.6%	1,872	+7.3%	1,992	6.4%	1,954	-1.9%	2,000	+2.4%	2,100	+5.0%	2,200	+4.8%	8.8%
Total Europe - Ex Russia	16,734	-6.7%	16,302	-2.6%	16,365	0.4%	15,204	-7.1%	14,400	-5.3%	14,600	+1.4%	15,000	+2.7%	-1.3%
US	10,430	-21.2%	11,589	+11.1%	12,778	+10.3%	14,492	+13.4%	15,000	+3.5%	15,500	+3.3%	16,000	+3.2%	-0.6%
Canada	1,455	-11.0%	1,555	+6.9%	1,583	+1.8%	1,678	+6.0%	1,700	+1.3%	1,725	+1.5%	1,750	+1.4%	0.6%
Mexico	751	-26.2%	816	+8.7%	899	+10.2%	981	+9.1%	1,048	+6.8%	1,130	+7.8%	1,200	+6.2%	0.4%
China (pass car Ex SUV)	7,460	+48.0%	9,494	+27.3%	10,124	+6.6%	10,738	+6.1%	11,700	+9.0%	12,516	+7.0%	13,159	+5.1%	14.9%
China SUV / truck	5,500	+47.5%	7,747	+40.9%	7,876	+1.7%	8,382	+6.4%	9,300	+11.0%	10,484	+12.7%	11,841	+12.9%	17.7%
China total	12,960	+47.8%	17,241	+33.0%	18,000	+4.4%	19,120	+6.2%	21,000	+9.8%	23,000	+9.5%	25,000	+8.7%	16.1%
Japan	4,609	-9.3%	4,956	+7.5%	4,210	-15.1%	5,370	+27.6%	4,780	-11.0%	5,000	+4.6%	4,800	-4.0%	1.8%
Mercosur	3,554	+7.4%	4,042	+13.7%	4,376	+8.3%	4,322	-1.2%	4,400	+1.8%	4,600	+4.5%	4,800	+4.3%	7.1%
Russia	1,460	-50.4%	1,905	+30.5%	2,654	+39.3%	2,935	+10.6%	3,000	+2.2%	3,100	+3.3%	3,200	+3.2%	2.6%
India (FY Mar-Apr)	1,326	+1.8%	1,677	+26.5%	2,196	+30.9%	2,250	+2.5%	2,218	-1.4%	2,395	+8.0%	2,874	+20.0%	8.2%
South Korea	1,384	+19.9%	1,465	+5.9%	1,475	+0.7%	1,508	+2.2%	1,500	-0.5%	1,500	+0.0%	1,550	+3.3%	3.0%
Indonesia	486	-20.0%	765	+57.4%	894	+16.9%	1,116	+24.8%	1,241	+11.2%	1,447	+16.6%	1,647	+13.8%	
Other (Incl China SUV & LCV)	10,206	-34.5%	11,642	+14.1%	11,653	+0.1%	11,702	+0.4%	11,413	-2.5%	11,500	+0.8%	12,000	+4.3%	
Global Lt Veh Total	63,900	-3.3%	72,400	+13.3%	75,500	+4.3%	79,000	+4.6%	80,000	+1.3%	83,772	+4.7%	88,071	+5.1%	2.5%
LCVs	10,100		12,300	+21.8%	13,200	+7.3%	13,400	+1.5%	13,000	-3.0%	13,500	+3.8%	14,000	+3.7%	4.4%
Global Car Total	53,800	-4.0%	60,100	+11.7%	62,300	+3.7%	65,600	+5.3%	67,000	+2.1%	70,272	+4.9%	74,071	+5.4%	2.2%
Emerging Markets	33,872	+4.7%	41,425	+22.3%	44,139	+6.6%	45,888	+4.0%	47,820	+4.2%	50,772	+6.2%	54,233	+6.8%	5.5%
Mature Markets	30,028	-10.9%	30,975	+3.2%	31,361	+1.2%	33,112	+5.6%	32,180	-2.8%	33,000	+2.5%	34,220	+3.7%	-1.0%

Source: ACEA, Autodata, China Association of Automobile Manufacturers and Citi Research estimates

Figure 223. JD Power Units & Sales Outlook



Source: JD Power

Figure 224. Boeing & Airbus Deliver Forecast

	Citi Forecast												
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013E	2014E	2015E
737NG	173	202	212	302	330	290	372	376	372	415	432	488	504
747	19	15	13	14	16	14	8	0	9	31	23	22	18
767	24	9	10	12	12	10	13	12	20	26	21	18	14
777	39	36	40	65	83	61	88	74	73	83	100	100	100
787	0	0	0	0	0	0	0	0	3	46	66	102	125
Other	26	23	15	5	0	0	0	0	0	0	0	0	0
Boeing	281	285	290	398	441	375	481	462	477	601	642	730	761
% Y/Y Change	(26%)	1%	2%	37%	11%	(15%)	28%	(4%)	3%	26%	7%	14%	4%
A320	233	233	289	339	367	386	402	401	421	455	474	474	474
A330/A340	64	75	80	86	79	85	86	91	87	103	111	119	99
A350	0	0	0	0	0	0	0	0	0	0	0	10	30
A380	0	0	0	0	1	12	10	18	26	30	25	30	35
Other	8	12	9	9	6	0	0	0	0	0	0	0	0
Airbus	305	320	378	434	453	483	498	510	534	588	610	633	638
% Y/Y Change	1%	5%	18%	15%	4%	7%	3%	2%	5%	10%	4%	4%	1%
Narrow	432	458	516	646	697	676	774	777	793	870	906	962	978
Wide	154	147	152	186	197	182	205	195	218	319	346	401	421
Total	586	605	668	832	894	858	979	972	1,011	1,189	1,252	1,363	1,399
% Y/Y Change	(14%)	3%	10%	25%	7%	(4%)	14%	(1%)	4%	18%	5%	9%	3%
Y/Y Growth													
Narrow	(15%)	6%	13%	25%	8%	(3%)	14%	0%	2%	10%	4%	6%	2%
Wide	(13%)	(5%)	3%	22%	6%	(8%)	13%	(5%)	12%	46%	8%	16%	5%
% Y/Y Change	(14%)	3%	10%	25%	7%	(4%)	14%	(1%)	4%	18%	5%	9%	3%

Source: Citi Research

Figure 225. Top 20 Companies Revenue from Shipments of Total Memory - Automotive (Millions of \$US)

Company Name	2012 Share (%)
Micron Technology	30%
Spansion	16%
Samsung Electronics	12%
Toshiba	10%
Integrated Silicon Solution	9%
Seiko Instruments	5%
Rohm	4%
Cypress Semiconductor	3%
SK Hynix	2%
SanDisk	2%
Macronix International	2%
STMicroelectronics	2%
Atmel	1%
Microchip Technology	1%
Elpida Memory	1%
Ramtron International	0%
Winbond Electronics	0%
ON Semiconductor	0%
Elite Semiconductor Memory Technology	0%
GSI Technology	0%
Others	0%
Total Market	100%

Source: Citi Research, Gartner

Figure 226. Top 20 Companies Revenue from Shipments of Total Microcomponents - Automotive (Millions of \$US)

Company Name	2012 Share (%)
Renesas Electronics	40%
Freescale Semiconductor	20%
Texas Instruments	7%
STMicroelectronics	6%
Denso	6%
Infineon Technologies	5%
Fujitsu Semiconductor	4%
Microchip Technology	3%
Toshiba	3%
Intel	1%
Panasonic	1%
Analog Devices	1%
JSC Sitronics	1%
NXP	0%
Atmel	0%
Rohm	0%
Sony	0%
Silicon Laboratories	0%
Micronas	0%
Cypress Semiconductor	0%
Others	0%
Total Market	100%

Source: Citi Research, Gartner

Figure 227. Top 20 Companies Revenue from Shipments of Total General Purpose Logic - Automotive (Millions of \$US)

Company Name	2012 Share (%)
NXP	22%
Seiko Epson	20%
Xilinx	18%
ON Semiconductor	10%
Altera	8%
Samsung Electronics	5%
Princeton Technology	3%
Microsemi	3%
JSC Sitronics	2%
Rohm	2%
Texas Instruments	1%
Lattice Semiconductor	1%
Pioneer Micro Technology	1%
Seiko Instruments	1%
Toshiba	1%
Fairchild Semiconductor	1%
EM Microelectronic	0%
Himax Technologies	0%
Others	0%
Total Market	100%

Source: Citi Research, Gartner

Figure 228. Top 20 Companies Revenue from Shipments of Total Analog - Automotive (Millions of \$US)

Company Name	2012 Share (%)
Linear Technology	14%
Sanken	14%
Analog Devices	14%
ON Semiconductor	12%
Maxim Integrated Products	6%
Texas Instruments	5%
Renesas Electronics	4%
Rohm	3%
Toshiba	3%
Infineon Technologies	3%
Intersil	2%
Fairchild Semiconductor	2%
Asahi Kasei Microdevices	2%
JSC Sitronics	2%
Fuji Electric	1%
Microchip Technology	1%
STMicroelectronics	1%
Microsemi	1%
Ricoh	1%
Cirrus Logic	1%
Others	7%
Total Market	100%

Source: Citi Research, Gartner

Figure 229. Top 20 Companies Revenue from Shipments of Total Discrete - Automotive (Millions of \$US)

Company Name	2012 Share (%)
Renesas Electronics	15%
Infineon Technologies	11%
Rohm	8%
ON Semiconductor	8%
NXP	7%
Denso	7%
Toyota	6%
Fuji Electric	5%
Vishay	5%
Mitsubishi	5%
Shindengen Electric	4%
Toshiba	3%
Sanken	3%
Fairchild Semiconductor	3%
International Rectifier	2%
Hitachi	2%
STMicroelectronics	2%
Robert Bosch	1%
Nihon Inter Electronics	0%
Alpha & Omega Semiconductor	0%
Others	2%
Total Market	100%

Source: Citi Research

Figure 230. Top 20 Companies Revenue from Shipments of Total Optoelectronics - Automotive (Millions of \$US)

Company Name	2012 Share (%)
Osram	15%
Stanley Electric	12%
Philips Electronics	9%
Sony	9%
Nichia	7%
Aptina	6%
Avago Technologies	5%
Rohm	4%
Toshiba	4%
Optek Technology	4%
Panasonic	3%
Hamamatsu Photonics	2%
Denso	2%
Seoul Semiconductor	2%
Kingbright	2%
Vishay	2%
Omnivision	2%
Lite-On Technology	2%
Toyoda Gosei	2%
Kodak	1%
Others	5%
Total Market	100%

Source: Citi Research

Figure 231. Top 20 Companies Revenue from Shipments of Nonoptical Sensors - Automotive (Millions of \$US)

Company Name	2012 Share (%)
Robert Bosch	20%
Infineon Technologies	15%
Denso	12%
Sanken	10%
Freescale Semiconductor	6%
Micronas	5%
Mitsubishi	5%
Analog Devices	5%
NXP	4%
STMicroelectronics	4%
Melexis Microelectronic Systems	4%
Murata Manufacturing	3%
Fuji Electric	2%
Optek Technology	2%
Honeywell	2%
Elmos Semiconductor	1%
Fujikura	0%
Diodes	0%
MEMSIC	0%
Toyota	0%
Others	1%
Total Market	100%

Source: Citi Research, Gartner

Figure 232. Top 20 Companies Revenue from Shipments of Total Application Specific - Automotive (Millions of \$US)

Company Name	2012 Share (%)
STMicroelectronics	17%
Infineon Technologies	12%
NXP	10%
Robert Bosch	8%
Renesas Electronics	7%
Texas Instruments	6%
Freescale Semiconductor	5%
Panasonic	5%
Toshiba	3%
CSR	3%
Denso	3%
ON Semiconductor	2%
Fujitsu Semiconductor	2%
Elmos Semiconductor	2%
Rohm	2%
Melexis Microelectronic Systems	2%
Atmel	2%
Samsung Electronics	1%
Qualcomm	1%
Toyota Industries	1%
Others	6%
Total Market	100%

Source: Citi Research, Gartner

Solar

Solar power fits into the tech supply chain as semiconductors are primarily used in making photovoltaic cells used to generate power. Solar companies are generally considered in two categories, “upstream” and “downstream.” Upstream companies engage in product manufacturing, R&D, and distribution while downstream companies distribute the product directly to consumers, install solar systems, etc. Examples of upstream players in solar are Yingli Green & Trina Solar and while downstream (the project developers) are First Solar & MEMC Electronic Materials.

Figure 233. Solar Systems Food Chain

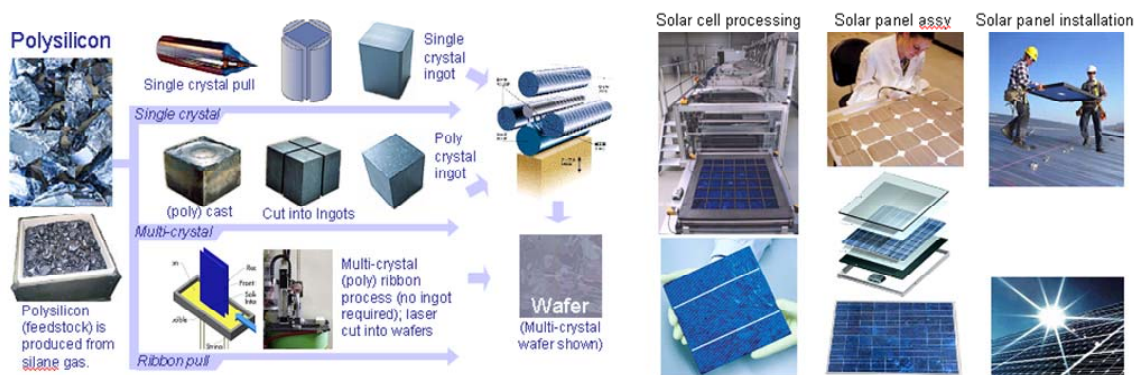
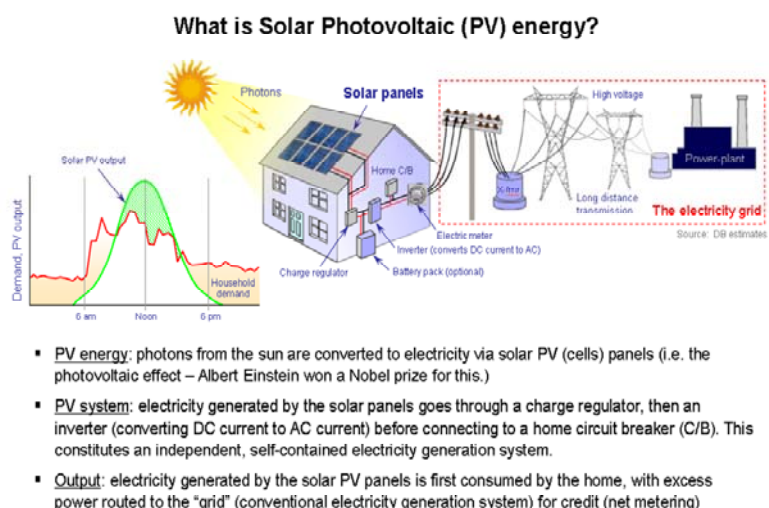


Figure 24: PV System—How it works



Source: Citi Research

Figure 234. Explanation of PV Energy, System, Net Metering



Source: Citi Research

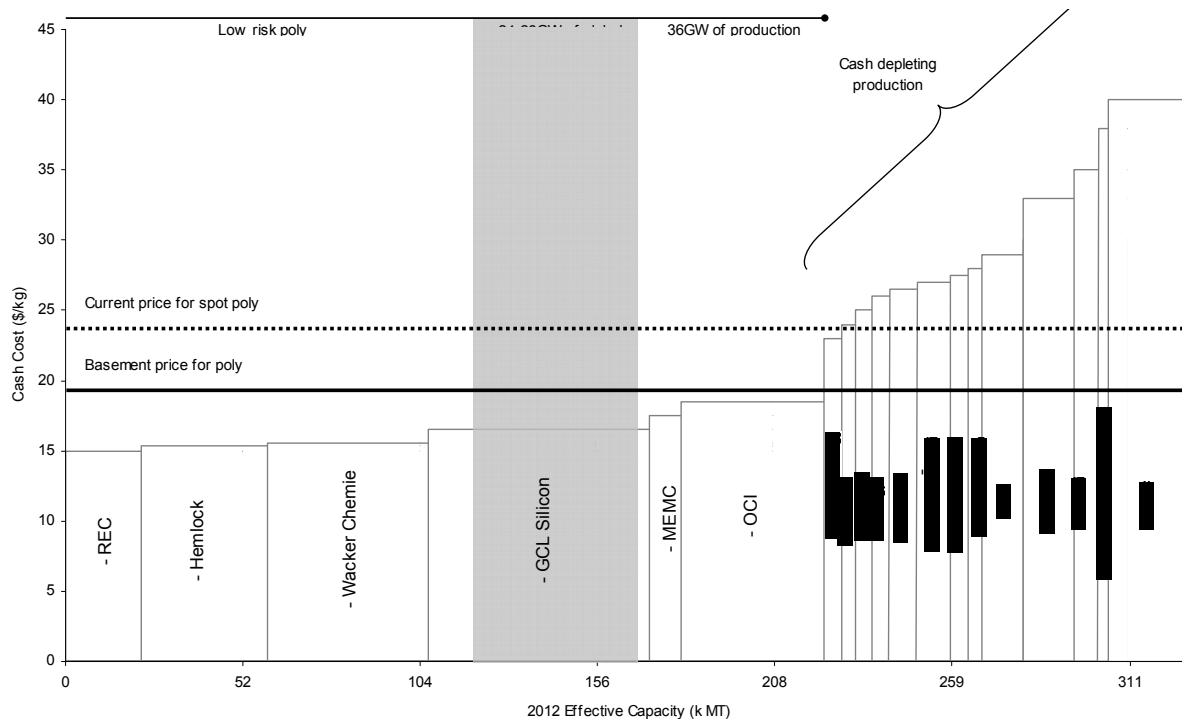
Figure 235. Solar PV Demand Forecast (2012-2020 estimated)

MWs	Incremental PV Installs													
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Africa	20	20	20	140	225	550	800	1,000	1,200	1,500	2,000	2,500	3,000	3,500
Australia	20	20	100	60	85	450	400	500	600	700	800	900	1,000	1,100
Belgium	50	50	500	434	422	550	450	500	600	700	800	900	1,000	1,100
Canada	0	0	50	145	249	550	450	500	600	700	800	900	1,000	1,100
China	40	30	200	450	3,240	4,200	5,100	5,355	5,623	5,904	6,199	6,509	6,834	7,176
France	50	100	100	707	1,067	500	550	500	600	700	800	900	1,000	1,100
Germany G	700	800	1,500	1,419	668	0	0	100	200	300	400	500	600	700
Germany R	700	800	3,000	5,973	6,584	5,850	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500
Greece	20	20	50	150	227	500	550	600	700	800	900	1,000	1,100	1,200
India	0	0	20	95	300	700	1,200	1,500	2,000	3,000	4,000	5,000	6,000	7,000
Israel	50	50	50	185	370	400	550	500	600	700	800	900	1,000	1,100
Italy G	50	100	350	1,630	3,655	0	0	500	600	700	800	900	1,000	1,100
Italy R	100	400	300	1,869	3,844	4,000	4,500	2,500	3,000	3,500	4,000	4,500	5,000	5,500
Japan	300	300	500	900	1,155	3,200	4,500	5,000	6,000	7,000	8,000	9,000	10,000	11,000
Korea	50	300	100	148	157	200	200	200	250	300	350	400	450	500
Latin America	10	10	10	30	140	400	550	1,000	2,000	3,000	4,000	5,000	6,000	7,000
SE Asia	0	0	20	360	420	500	700	1,000	2,000	3,000	4,000	5,000	6,000	7,000
Spain	600	2,500	100	275	444	400	400	500	1,000	1,500	2,000	2,500	3,000	3,500
UK	0	0	0	115	125	400	250	300	300	300	300	300	300	300
USA G	20	50	50	265	669	1,050	1,900	2,000	2,500	3,000	3,500	4,000	4,500	5,000
USA R	180	300	300	719	1,043	1,650	1,900	2,000	2,500	3,000	3,500	4,000	4,500	5,000
ROE	200	200	800	620	320	350	350	500	500	500	500	500	500	500
ROW	50	50	100	1,757	2,236	550	800	1,000	1,500	2,000	2,500	3,000	3,500	4,000
Total	3,210	6,100	8,220	18,446	27,645	26,950	29,600	31,055	38,373	46,304	54,449	62,609	70,784	78,976
Y/Y %		90.0%	34.8%	124.4%	49.9%	-2.5%	9.8%	4.9%	23.6%	20.7%	17.6%	15.0%	13.1%	11.6%

Yearly PV Demand Forecast by Country

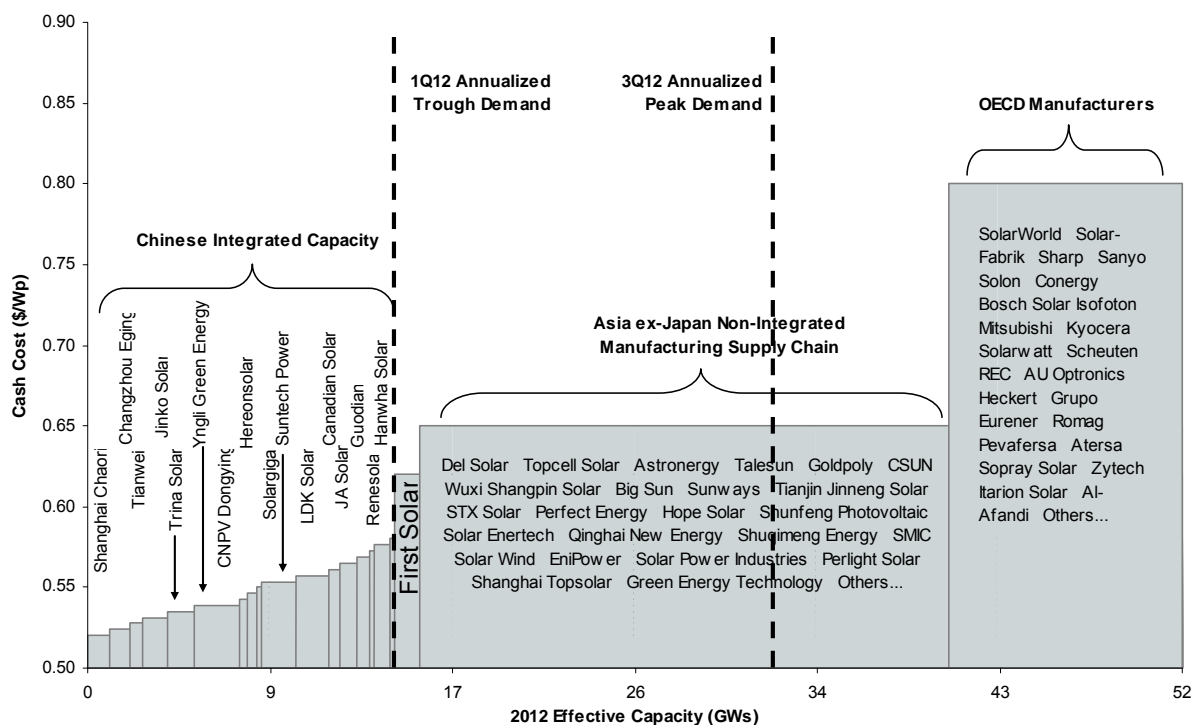
Source: Citi Research

Figure 236. Polysilicon Production Cash Cost



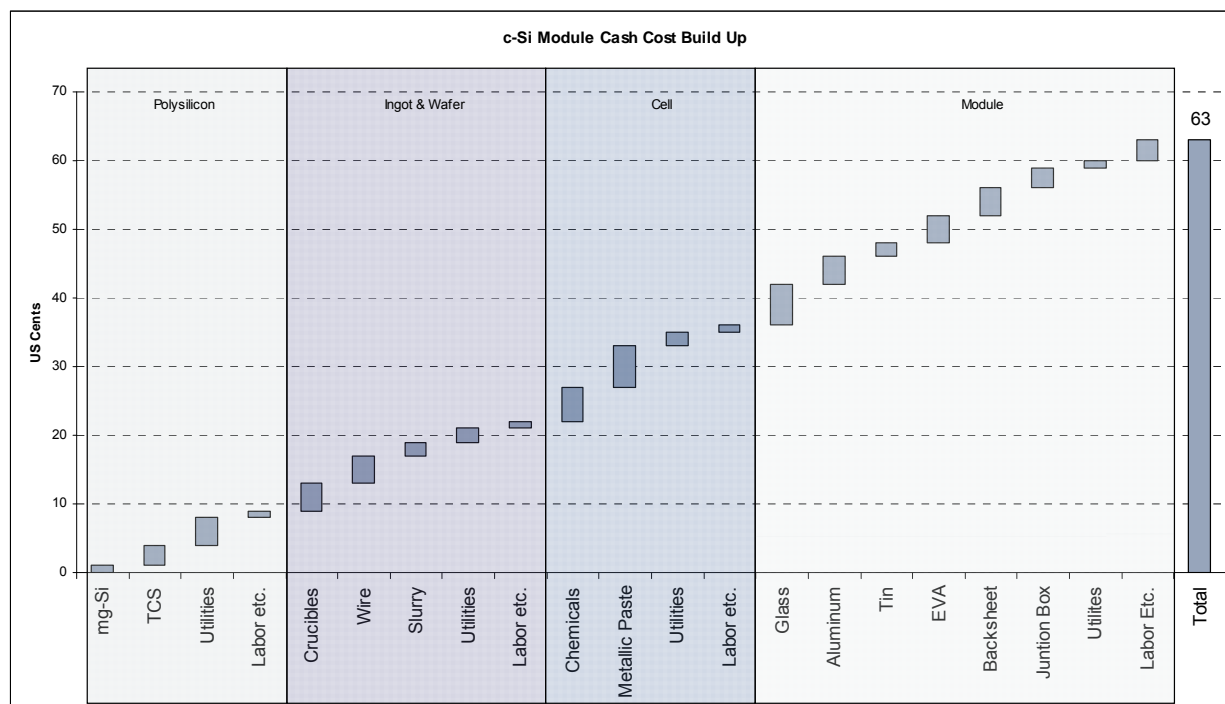
Source: Citi Research

Figure 237. Silicon to Module Production Cash Cost



Source: Citi Research

Figure 238. Module Production Cash Cost



Source: Citi Research

Figure 239. Picture of Solar Inverter

Solar power inverters, also known as photovoltaic PV inverters, are electronic systems that convert the DC power generated by solar panels into AC power that is needed for local use, or into power that can be fed into the electricity grid. An inverter is half power management system and half embedded computer.



Source: IHS Teardown Research, December 2011

Figure 240. Solar Inverter Bill of Materials

Component Family Summary by Assembly for the Power-One Inc. Aurora PVI-4.2-OUTD-S-US Solar Power Inverter (Cost in U.S. Dollars)

Cost Type	Component Family	Component Cost
Direct Material Cost	Mechanical	\$212.11
	Passive	\$189.57
	Electro Mechanical	\$104.71
	Module	\$38.16
	Integrated Circuit	\$36.79
	Discrete Semi	\$22.40
	Accessories	\$18.89
	Literature & Packaging	\$8.39
	Display	\$7.46
	Optical Semi	\$2.89
	Battery	\$0.10
	Direct Material Cost Total	\$641.47
Conversion Cost	Test	\$21.93
	Assembly	\$10.49
	Amortized Setup, Staging & Allocation	\$10.21
	Insertion	\$5.24
Conversion Cost Total		\$47.87
Grand Total		\$689.35

Source: IHS Teardown Research, December 2011

Selected Companies

3D Systems Corp

3D Systems Corp. develops, manufactures and markets worldwide 3D printing, rapid prototyping and manufacturing printers and parts solutions, which produce three-dimensional objects more quickly than traditional manufacturing. It also provides scanners for a variety of medical and mechanical X-Ray film digital archiving. The company's products are used to rapidly design, communicate, prototype and produce real, functional parts. It provides 3D authoring tools for digital imaging and design including 3D CAD modeling, feature capture, manipulation, replication and measurement. The company's 3D authoring solutions integrate 3D content creation and manipulation via CAD modeling, reverse engineering and inspection software that enable its customers to process 3D scanned data directly within a parametric CAD environment. It also offers proprietary software printer drivers together with pre-sale and post-sale services, ranging from applications development and custom engineered production solutions to installation, warranty and maintenance services. 3D Systems was founded by Charles W. Hull in 1986 and is headquartered in Rock Hill, SC.

Figure 241. 3D Systems (DDD) Results and Forecasts

	2008	2009	2010	2011	2012	Street 2013E	Street 2014E
Revenues	138.9	112.8	159.9	230.4	353.6	471.55	576.8
- y/y growth	-11.2%	-18.8%	41.7%	44.1%	53.5%	33.3%	22.3%
Gross Margins	41.0%	44.1%	46.3%	47.3%	51.2%		
Operating Margins	-3.7%	3.9%	13.1%	15.1%	18.6%		
EPS	-0.09	0.02	0.28	0.47	0.83	1.05	1.33
- y/y growth	15.2%	117.9%	1560.0%	68.7%	78.6%	25.9%	26.9%
Cash	25.47	24.97	37.36	179.13	155.87		
Debt	11.75	8.47	8.28	138.88	88.15		
Net Cash/Shr	-0.05	0.11	0.45	0.36	0.65		
Tangible Book Value/Shr	0.75	0.77	0.80	1.23	1.47		

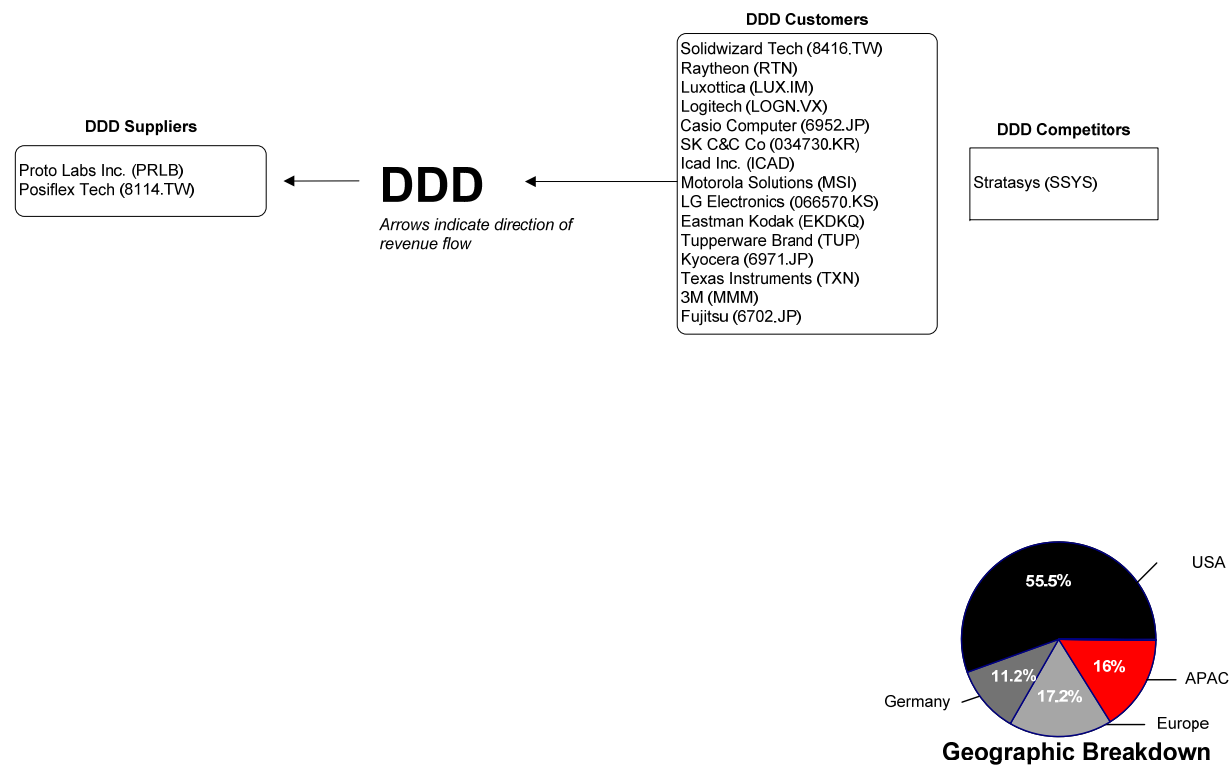
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, FactSet

Figure 242. 3D Systems Corp. (DDD)

Sector: 3D Printing

3D Systems Corp. (DDD)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Kevin Chang

AAC Technologies Holdings

AAC Technologies Holdings is a leading manufacturer of a wide range of acoustic components, including speakers, receivers, microphones and headsets. Its established customers include traditional handset OEMs such as Nokia, Motorola, Sony Ericsson, smartphone vendors like RIM and Chinese local handset vendors.

Figure 243. AAC Technologies (2018.HK) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	2528.5	2500.1	3844.4	4890.4	7671.3	9442.0	10447.0	9671.6	12652.0
- <i>y/y growth</i>	26.2%	-1.1%	53.8%	27.2%	56.9%	23.1%	36.2%	2.4%	21.1%
Gross Margins	41.7%	44.9%	45.1%	44.0%	43.8%	44.4%		46.3%	
Operating Margins	27.8%	30.6%	32.9%	29.6%	30.9%	31.4%		33.3%	
EPS	0.54	0.57	0.92	1.02	1.74	2.17	2.36	2.36	2.85
- <i>y/y growth</i>	18.0%	5.9%	62.3%	10.2%	71.4%	24.4%	35.5%	8.8%	20.6%
Cash	1456.9	1970.8	2078.9	1696.7	1144.0	1835.1		2695.6	
Debt	227.5	212.5	554.7	1099.6	1248.1	1262.4		1262.4	
Net Cash/Shr	1.2	1.6	1.7	1.4	0.9	1.5		2.2	
Tangible Book Value/Shr	2.9	3.3	4.0	4.8	6.0	7.1		8.1	

(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 244. AAC Technologies (2018.HK)

Sector: PC & Enterprise Hardware

ACC Technologies (2018.HK)

ACC Tech

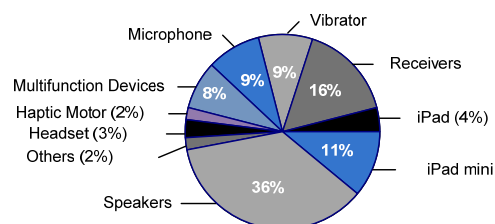
Arrows indicate direction of revenue flow

ACC Tech Customers

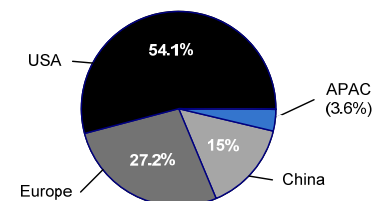
Apple (AAPL)
Nokia (NOK1V)
HTC (2498.TW)
Samsung (005930.KS)
ZTE (763.HK)
Huawei

ACC Tech Competitors

GoerTek (002241.SZ)
NXP (NXPI)



Segment Breakdown



Geographic Breakdown

Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Kevin Chang

Acer

Starting in 1976 as a developer of microprocessor-based products, Acer has grown into one of the top global PC brands and manufacturers.

Figure 245. Acer (2353.TW) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	546274.1	573982.5	629059.0	475342.0	429511.4	380417.7	418649.7	397696.2	441569.8
- y/y growth	18.2%	5.1%	9.6%	-24.4%	-9.6%	-11.4%	-2.5%	4.5%	5.5%
Gross Margins	10.5%	10.2%	10.3%	8.1%	10.1%	10.5%		10.4%	
Operating Margins	2.6%	2.7%	2.9%	-1.3%	0.2%	0.1%		0.0%	
EPS	4.44	4.22	5.60	-2.44	-1.03	0.15	0.70	-0.04	1.16
- y/y growth	-17.5%	-4.9%	32.6%	-143.6%	57.9%	114.2%	168.1%	-130.3%	65.4%
Cash	24110.7	55272.3	68809.4	59312.7	49263.9	49977.8		50394.4	
Debt	13471.8	12919.9	27077.5	23546.2	18294.3	18294.3		18294.3	
Net Cash/Shr	7.6	16.0	18.3	13.4	12.8	13.0		13.1	
Tangible Book Value/Shr	31.1	34.4	34.7	28.0	26.6	26.7		26.5	

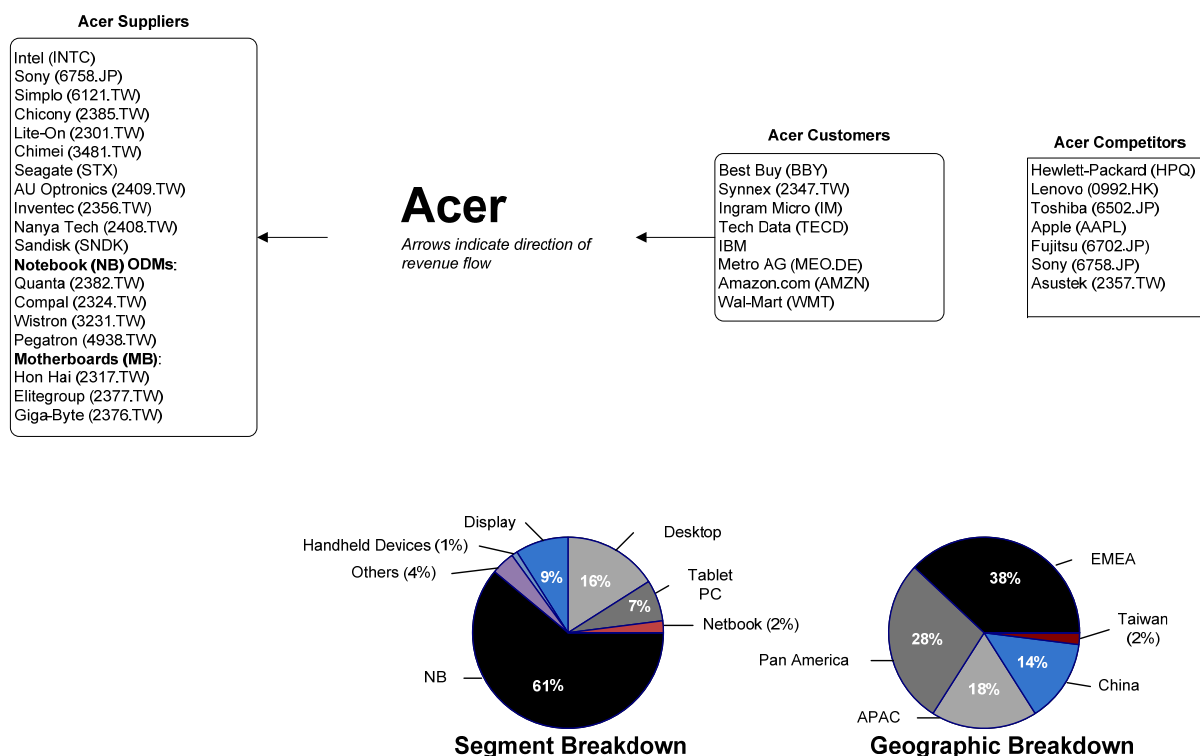
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 246. Acer (2353.TW)

Sector: PC & Enterprise Hardware

Acer (2353.TW)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Kevin Dennean, CFA

Adtran Technology

Adtran, Inc. designs, manufactures, markets and services network access solutions for use across Internet protocol (IP), Asynchronous Transfer Mode (ATM), and Time Division Multiplexed (TDM) architectures in both wireline and wireless network applications. The company's solutions are deployed by providers of telecommunications services and small and mid-sized businesses and enterprises and enable voice, data, video and Internet communications across copper, fiber and wireless networks. These products are used primarily, but not exclusively, in the last mile, or local loop, of a service provider's network, and in local area networks on a customer's premises. The company was incorporated in 1985 and is headquartered in Huntsville, Alabama. Sales to United States represented ~90% of sales in 2011. Sales to AT&T and Qwest accounted for 10% and 25% of sales respectively, in 2011.

Figure 247. Adtran (ADTN) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	500.7	484.2	605.7	717.2	620.1	615.4	622.7	672.3	672.4
- y/y growth	5.0%	-3.3%	25.1%	18.4%	-13.5%	-0.8%	0.4%	9.2%	8.0%
Gross Margins	59.7%	59.3%	59.3%	57.8%	51.0%	49.2%		51.0%	
Operating Margins	22.7%	21.5%	25.4%	26.4%	9.4%	9.2%		13.9%	
EPS	1.22	1.17	1.78	2.12	0.78	0.76	0.68	1.11	0.87
- y/y growth	12.0%	-3.9%	52.3%	18.7%	-63.1%	-3.0%	-13.0%	46.6%	27.0%
Cash	138.2	196.6	189.2	202.3	228.9	265.0		327.2	
Debt	48.3	47.8	47.5	46.5	46.0	46.0		46.0	
Net Cash/Shr	1.4	2.4	2.2	2.4	2.9	3.5		4.5	
Tangible Book Value/Shr	5.9	7.2	9.2	10.7	10.9	11.2		12.1	

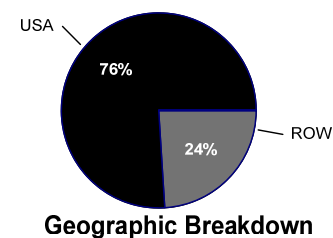
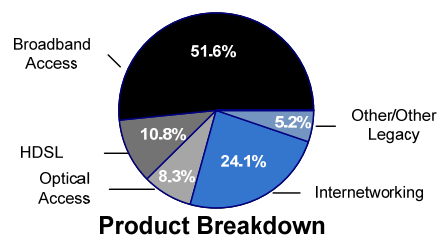
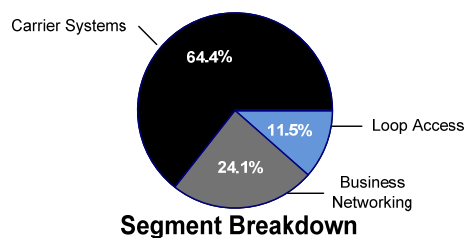
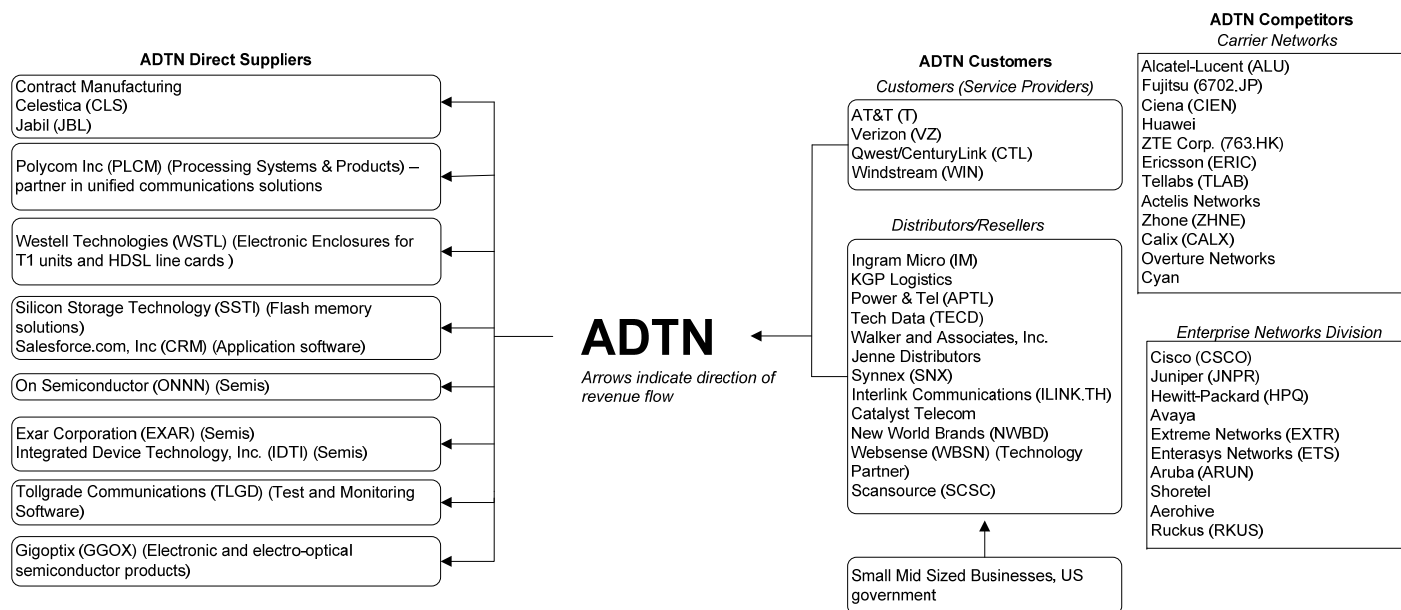
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 248. Adtran (ADTN)

Sector: Communications Equipment

ADTRAN, Inc. (ADTN)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Shahriar Pourreza, CFA

Advanced Energy Industries Inc

Advanced Energy Industries operates under two key business segments: Thin Films and Solar

Energy. The latter segment has become a greater contributor to consolidated results recently with the rapid growth of North America inverter sales. Advanced Energy is a leading provider of components and subsystems to a variety of industries utilizing high-technology manufacturing processes. The firm's suite of products in power conversion are critical to the production of semiconductors, flat panel displays, data storage products, solar PV, architectural glass, and other advanced product applications. Targeting both OEMs and end users, Advanced Energy's operations reach around the globe with regional centers in North America, Asia, and Europe, in addition to its growing manufacturing base in China. Advanced Energy continues to enter new markets vis-à-vis strategic acquisitions and partnerships, as well as through internally developed proprietary, process-focused technologies - all key elements that further strengthen the company's position in process-critical, scalable, highly-patented technologies. Recently, more focus has been turned to the inverter segment (Solar Energy) which now comprises of greater than 50% of consolidated results. Founded in 1981, the company is headquartered in Fort Collins, Colorado and has 1,500 employees.

Figure 249. Advanced Energy Industries (AEIS) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	328.9	186.4	471.3	516.8	451.9	518.1	561.5	571.8	664.1
- y/y growth	-14.5%	-43.3%	152.8%	9.7%	-12.6%	14.6%	24.2%	10.4%	18.3%
Gross Margins	39.5%	29.2%	43.5%	40.2%	37.7%	39.4%		39.5%	
Operating Margins	7.2%	-15.6%	16.1%	13.4%	9.4%	13.2%		14.4%	
EPS	0.46	-0.83	1.32	0.95	0.60	1.12	1.05	1.63	1.65
- y/y growth	-46.9%	-280.3%	257.9%	-28.1%	-36.1%	85.2%	73.2%	45.4%	57.5%
Cash	149.7	177.5	140.6	143.2	172.2	203.0		247.4	
Debt	0.1	0.0	0.0	0.0	0.0	0.0		0.0	
Net Cash/Shr	3.5	4.2	3.2	3.3	4.4	5.1		6.3	
Tangible Book Value/Shr	7.1	6.5	6.4	7.2	7.1	8.6		10.5	

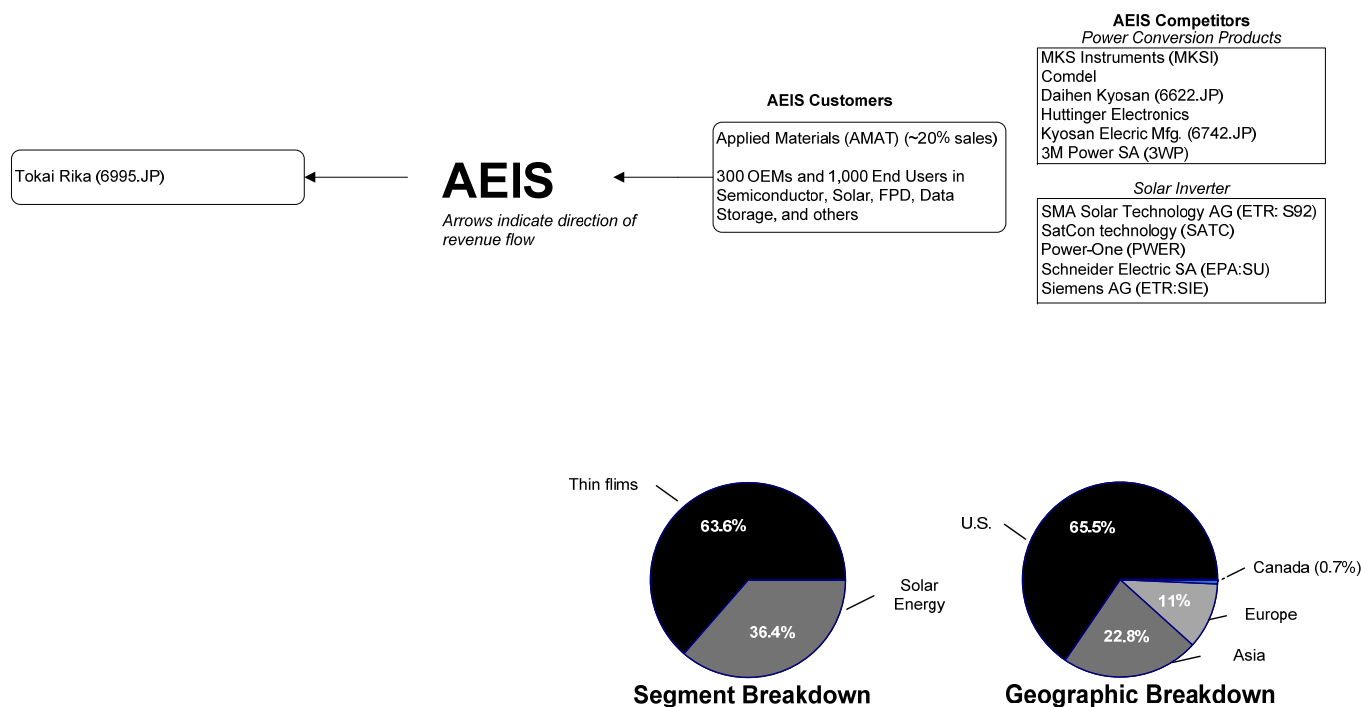
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 250. Advanced Energy Industries (AEIS)

Sector: Semiconductor Components

Advanced Energy Industries Inc. (AEIS)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Glen Yeung

Advanced Micro Devices

Advanced Micro Devices Inc (AMD) is the world's second-largest producer of microprocessors, with ~20% global PC CPU market share. The company generates revenue from the PC end-market from sales of its microprocessors, graphics processors and PC chipsets. Advanced Micro is a fabless company utilizing Global Foundries and Taiwan Semiconductor Manufacturing Company to manufacture its chips.

Figure 251. Advanced Micro Devices (AMD) Results & Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	5808.0	5403.0	6494.0	6568.0	5422.0	4772.8	4698.1	5247.8	4919.3
- y/y growth	-3.4%	-7.0%	20.2%	1.1%	-17.4%	-12.0%	-13.4%	10.0%	4.7%
Gross Margins	39.9%	42.1%	45.6%	44.8%	22.8%	39.8%		41.5%	
Operating Margins	-16.7%	-9.5%	8.7%	5.6%	-19.5%	-1.0%		6.0%	
EPS	-4.01	0.45	0.64	0.66	-1.60	-0.32	-0.26	0.16	0.02
- y/y growth	32.8%	111.3%	41.7%	3.5%	-340.2%	79.9%	83.6%	149.0%	106.1%
Cash	1096.0	2676.0	1789.0	1765.0	1002.0	953.9		1063.5	
Debt	4988.0	4560.0	2192.0	2016.0	2042.0	2044.0		2044.0	
Net Cash/Shr	-5.9	-2.3	-0.5	0.3	-1.4	-1.4		-1.3	
Tangible Book Value/Shr	-1.0	0.3	0.9	1.8	-0.2	-0.3		0.0	

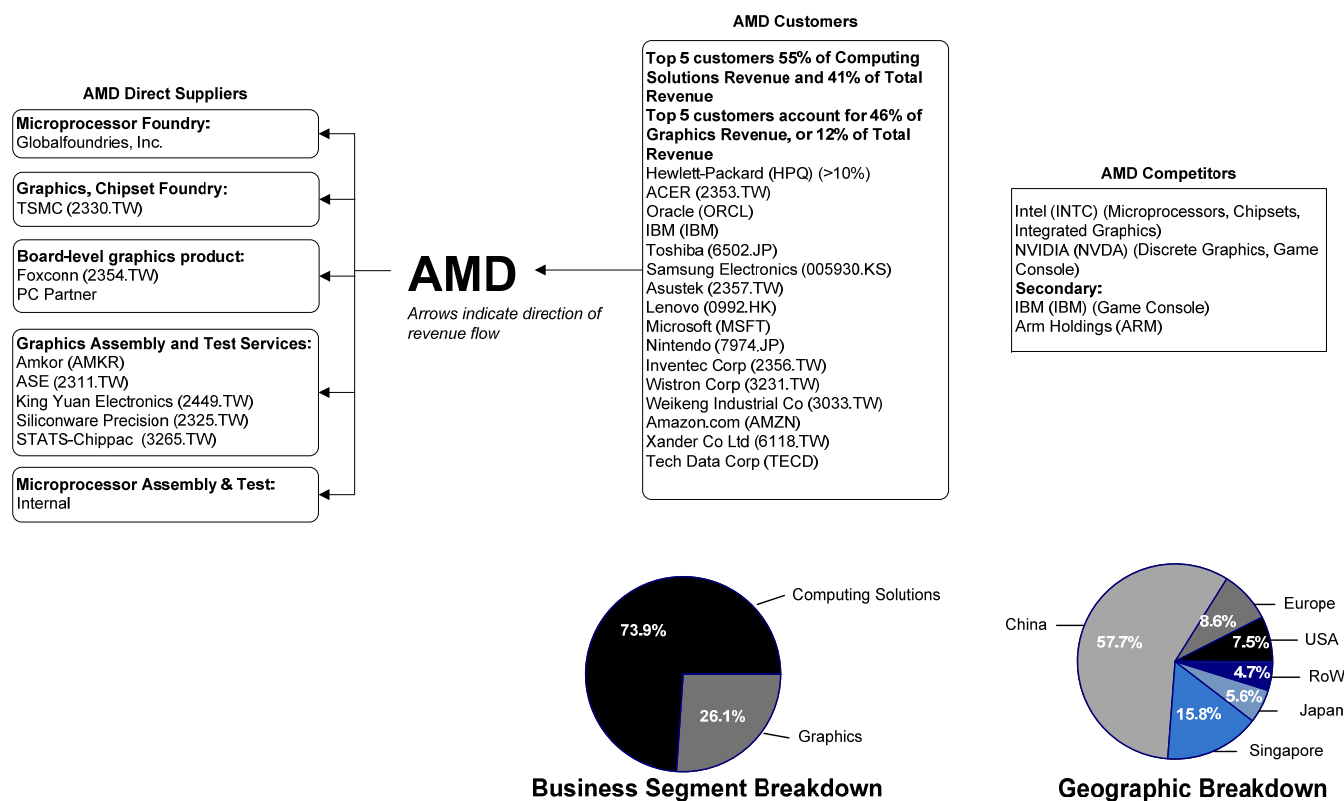
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 252. Advanced Micro Devices (AMD)

Sector: Semiconductors

Advanced Micro Devices, Inc. (AMD)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Aixtron SE

Aixtron SE is engaged in the manufacture, development and production of deposition equipment. Its products include: Compound Semiconductors, Silicon Semiconductors, Organic Semiconductors, and Nanotechnology. It also offers services such as technical phone support, inventory of key spare parts for short delivery times, specialized service and process engineers on site, regional service centers, operating cost calculations, and service and maintenance contracts. The company was founded by Heinrich Schumann, Holger Jürgensen and Meino Heyen in 1983 and is headquartered in Herzogenrath, Germany.

Figure 253. Aixtron (AIXG.DE) Results and Forecasts

	2008	2009	2010	2011	2012	Street 2013E	Street 2014E
Revenues	274.4	302.9	783.8	611.0	227.8	250.60	384.3
- <i>y/y growth</i>	27.7%	10.4%	158.8%	-22.0%	-62.7%	10.0%	53.4%
Gross Margins	40.3%	43.7%	52.1%	37.5%	-0.9%		
Operating Margins	13.6%	18.4%	36.6%	18.7%	-56.3%		
EPS	0.25	0.48	1.89	0.78	-1.44	-0.59	0.29
- <i>y/y growth</i>	31.6%	92.0%	293.8%	-58.7%	-284.6%	59.3%	149.5%
Cash	74.85	305.37	387.00	297.98	209.49		
Debt	0.00	0.00	0.00	0.00	0.00		
Net Cash/Shr	0.18	0.85	1.45	-0.06	-0.45		
Tangible Book Value/Shr	1.60	3.49	5.31	5.54	3.98		

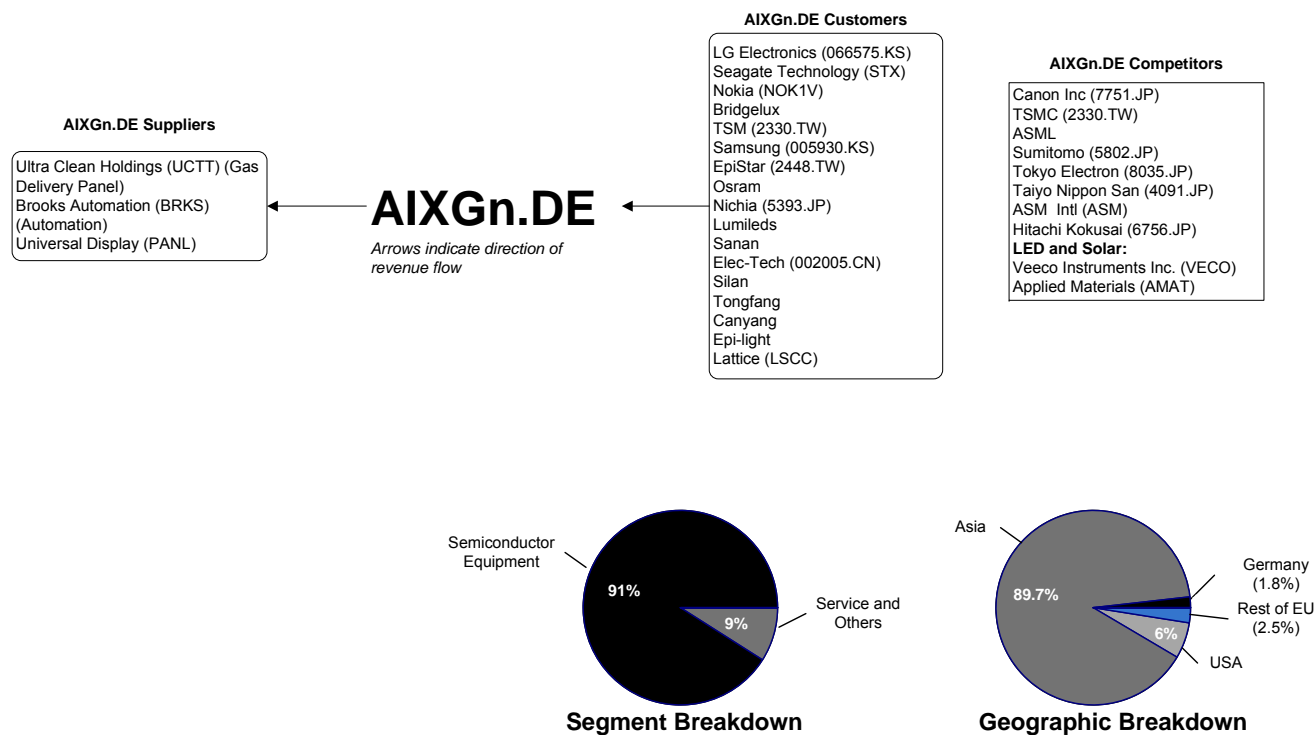
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, FactSet

Figure 254. Aixtron SE (AIXGn.DE)

Sector: Alternative Energy

Aixtron SE (AIXGn.DE)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Kevin Dennean, CFA

Alcatel-Lucent

Alcatel-Lucent is the fourth-largest provider of communications equipment globally, with €14.4 billion in CY12 revenue. The company's product portfolio is divided into three main operating segments: Networks, S3 (Software, Services & Solutions) and Enterprise. More specifically, Alcatel's Networks business comprises four main product lines: IP, Optics, Wireless and Wireline. In wireless, Alcatel-Lucent has a 10% market share globally and is the fourth-largest player globally.

Figure 255. Alcatel-Lucent (ALUA.PA)

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	16984.3	15157.0	15658.0	15327.0	14446.0	14229.1	14411.5	14624.3	14597.5
- y/y growth	-4.5%	-10.8%	3.3%	-2.1%	-5.7%	-1.5%	-0.2%	2.8%	1.3%
Gross Margins	34.1%	33.7%	33.9%	35.0%	30.1%	30.5%		31.7%	
Operating Margins	2.7%	-0.4%	1.4%	3.4%	-0.4%	1.2%		2.6%	
EPS	-0.71	-0.16	-0.03	0.36	-0.76	-0.18	-0.19	-0.01	-0.03
- y/y growth	-262.0%	77.5%	78.1%	1137.2%	-311.6%	77.0%	75.1%	94.4%	83.2%
Cash	4593.0	5570.0	5689.0	4473.0	4929.0	6671.1		6318.8	
Debt	5095.0	4755.0	5378.0	4619.0	4811.0	6694.0		6694.0	
Net Cash/Shr	0.3	0.6	0.5	0.1	0.4	0.3		0.2	
Tangible Book Value/Shr	-1.0	-1.2	-1.3	-1.0	-1.3	-1.4		-1.6	

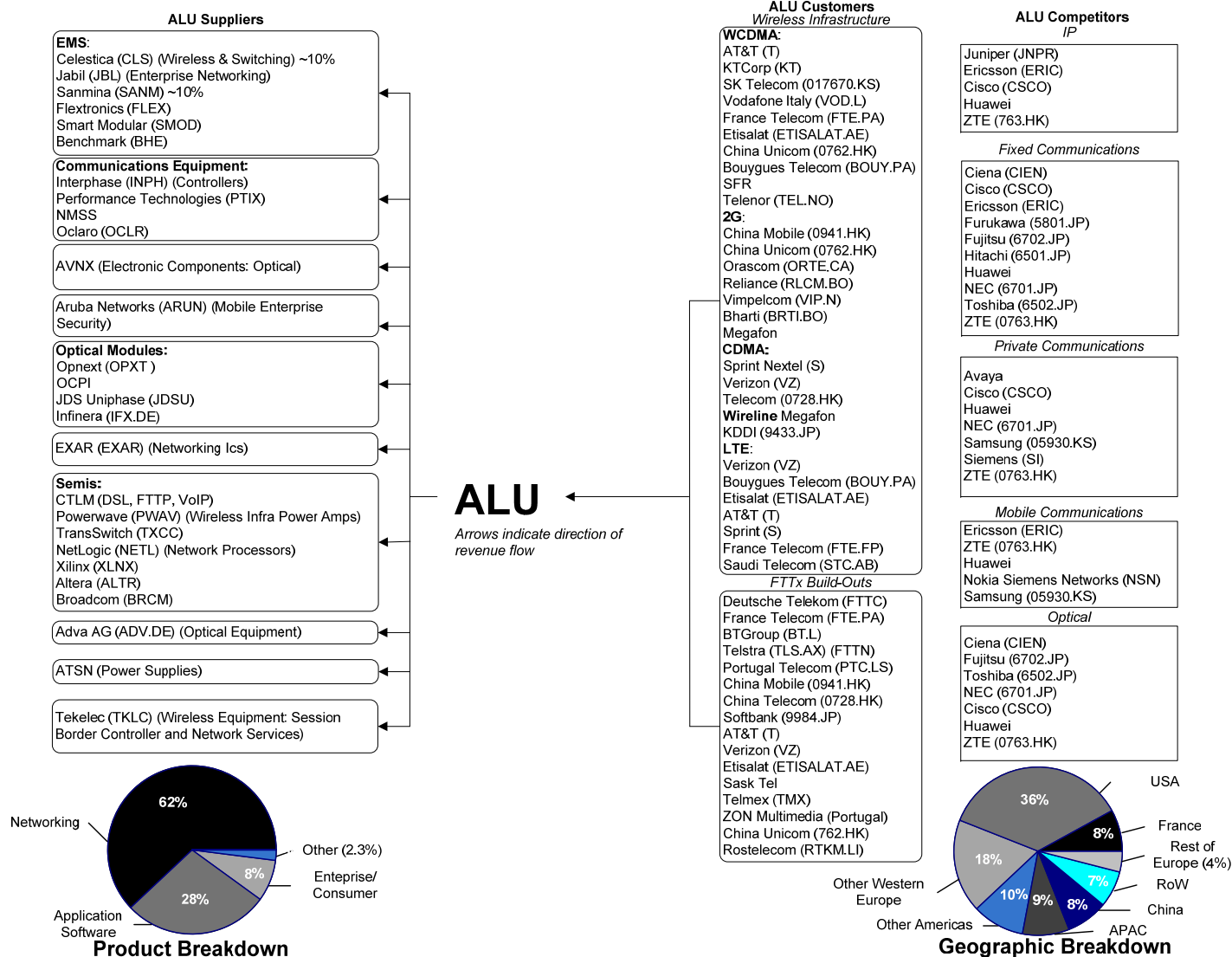
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 256. Alcatel-Lucent (ALU)

Sector: Communications Equipment

Alcatel-Lucent (ALU.PA; ALU)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Yuta Fukasawa

Alps Electric

Alps Electric Co., Ltd. engages in the manufacture and distribution of electronic components. It operates through the following segments: Electronic Components, Audio Products, Logistics, and Other. The Electronic Components segment develops electronic equipment. The Audio Products segment deals with car audio parts and, information and communication tools. The Logistics segment provides services such as transportation, storage, and forwarding. The Other segment handles system development, financing, leasing, and office services. The company was founded on November 1, 1948 and is headquartered in Tokyo, Japan.

Figure 257. Alps Electric (6770.JP) Results and Forecasts

	2009	2010	2011	2012	2013	CIR 2014E	Street 2014E	CIR 2015E	Street 2015E
Revenues	538995.0	493639.0	550668.0	526500.0	539096.0	554500.0	581395.0	571400.0	598320.0
- y/y growth	-22.2%	-8.4%	11.6%	-4.4%	2.4%	2.9%	7.8%	3.0%	2.9%
Gross Margins	10.2%	15.9%	19.8%	17.8%	16.3%	17.3%		17.9%	
Operating Margins	-4.9%	1.0%	5.2%	2.9%	1.4%	3.2%		3.6%	
EPS	-390.93	2.75	62.15	23.30	-46.53	45.75	57.13	57.46	72.35
- y/y growth	-1849.9%	100.7%	2160.4%	-62.5%	-299.7%	198.3%	222.8%	25.6%	26.6%
Cash	68372.0	89286.0	99031.0	85588.0	89837.4	91318.6		97706.6	
Debt	70727.0	102188.0	100888.0	60889.0	123968.0	123968.0		123968.0	
Net Cash/Shr	227.3	110.0	166.8	330.3	155.0	163.2		198.9	
Tangible Book Value/Shr	534.4	556.3	581.6	584.1	542.8	578.1		625.0	

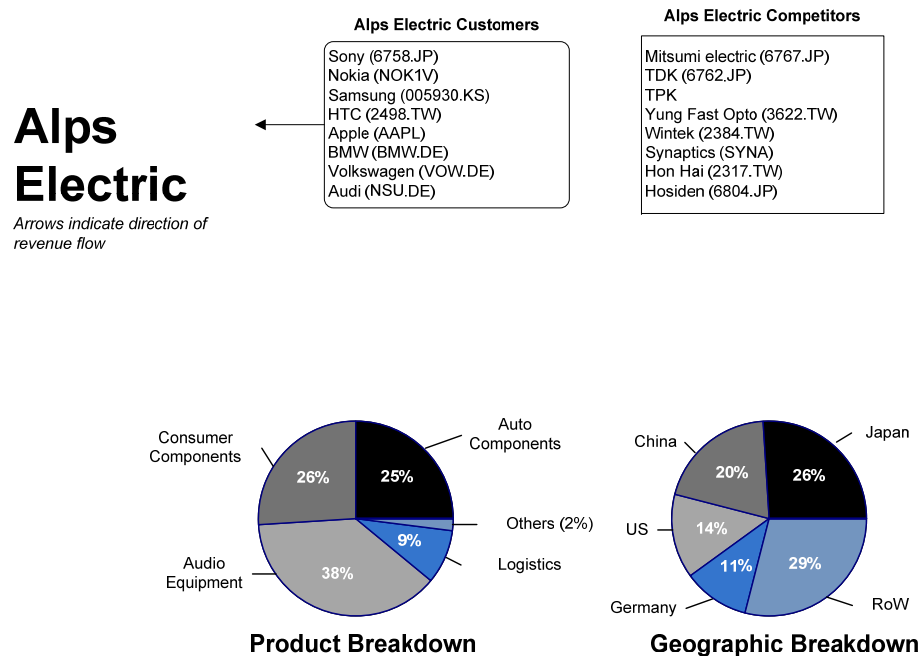
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 258. Alps Electric (6770.JP)

Sector: Electronic Components

Alps Electric (6770.JP)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Glen Yeung

Altera Corp

Altera Corporation (ALTR) designs and manufactures programmable logic devices (PLDs) and HardCopy application-specific integrated circuit (ASIC) devices, IP cores, and development tools. Altera's market share in FPGA's is has grown to over a third, with most of the company's revenues from PLD sales (FPGA and CPLD). Major product families include Stratix, Cyclone, Arria, MAX, and HardCopy. By vertical market, Telecom and Wireless accounts for a majority of sales, followed by Industrial automation, Military, and Automotive; Networking, Computer and Storage; and Other (Broadcast, Consumer, Medical, Test & Measurement).

Figure 259. Altera (ALTR) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	1367.2	1195.4	1954.4	2064.5	1783.0	1788.4	1754.5	1912.1	2012.2
- y/y growth	8.2%	-12.6%	63.5%	5.6%	-13.6%	0.3%	-1.6%	6.9%	14.7%
Gross Margins	67.2%	66.8%	71.0%	70.4%	69.6%	69.4%		69.3%	
Operating Margins	30.2%	25.5%	44.4%	41.1%	33.2%	29.2%		30.5%	
EPS	1.18	0.85	2.49	2.35	1.72	1.47	1.44	1.58	1.76
- y/y growth	42.4%	-28.4%	194.4%	-5.7%	-27.1%	-14.2%	-16.2%	7.1%	22.3%
Cash	1216.7	1546.7	2765.2	3437.2	3017.6	3453.4		3949.2	
Debt	500.0	500.0	500.0	500.0	500.0	500.0		500.0	
Net Cash/Shr	2.4	3.5	7.2	9.0	7.8	9.1		10.7	
Tangible Book Value/Shr	2.5	3.5	7.4	9.2	10.3	11.7		13.2	

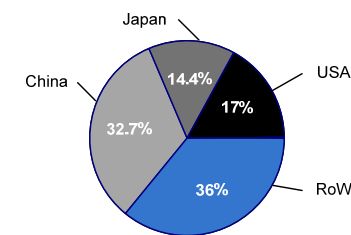
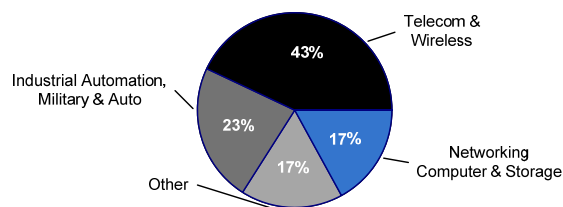
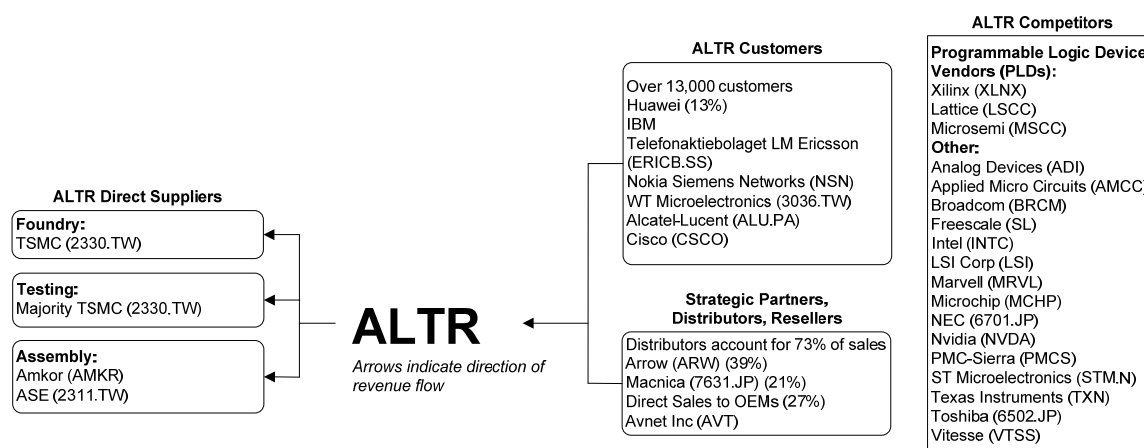
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 260. Altera (ALTR)

Sector: Semiconductors

Altera Corp. (ALTR)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

American Superconductor Corp.

American Superconductor Corp. provides megawatt-scale solutions. The company operates in two business segments: AMSC Power Systems and AMSC Superconductors. The AMSC Power Systems segment produces a broad range of products to increase electrical grid capacity and reliability; supplies electrical systems used in wind turbines; sells power electronic products that regulate wind farm voltage to enable their interconnection to the power grid; licenses proprietary wind turbine designs to manufacturers of such systems; provides consulting services to the wind industry; and offers products that enhance power quality for industrial operations. The AMSC Superconductors business segment focuses on manufacturing HTS wire and coils; designs and develops superconductor products, such as power cables, fault current limiters and motors; and manages large-scale superconductor projects. It has operations in Asia, Australia, Europe and North America. American Superconductor was founded by Yet-Ming Chiang, David A. Rudman, John B. Vander Sande and Gregory J. Yurek on April 9, 1987 and is headquartered in Devens, MA.

Figure 261. American Superconductor (AMSC) Results and Forecasts

	2007	2008	2009	2010	2011	Street 2012E	Street 2013E
Revenues	112.4	182.8	316.0	286.6	76.5	85.73	102.5
- <i>y/y growth</i>	115.4%	62.6%	72.9%	-9.3%	-73.3%	12.0%	19.6%
Gross Margins	38.4%	37.6%	35.8%	-8.6%	-9.6%		
Operating Margins	-15.5%	-3.9%	12.4%	-45.2%	-139.4%		
EPS	-0.33	-0.29	0.70	-0.28	-1.68	-0.93	-0.74
- <i>y/y growth</i>	68.0%	12.8%	341.1%	-140.0%	-500.0%	44.8%	20.1%
Cash	118.54	115.80	147.78	245.48	64.75		
Debt	0.00	0.00	0.00	0.00	0.00		
Net Cash/Shr	-0.46	-0.06	0.90	-0.48	-2.78		
Tangible Book Value/Shr	4.29	4.31	5.28	5.63	3.10		

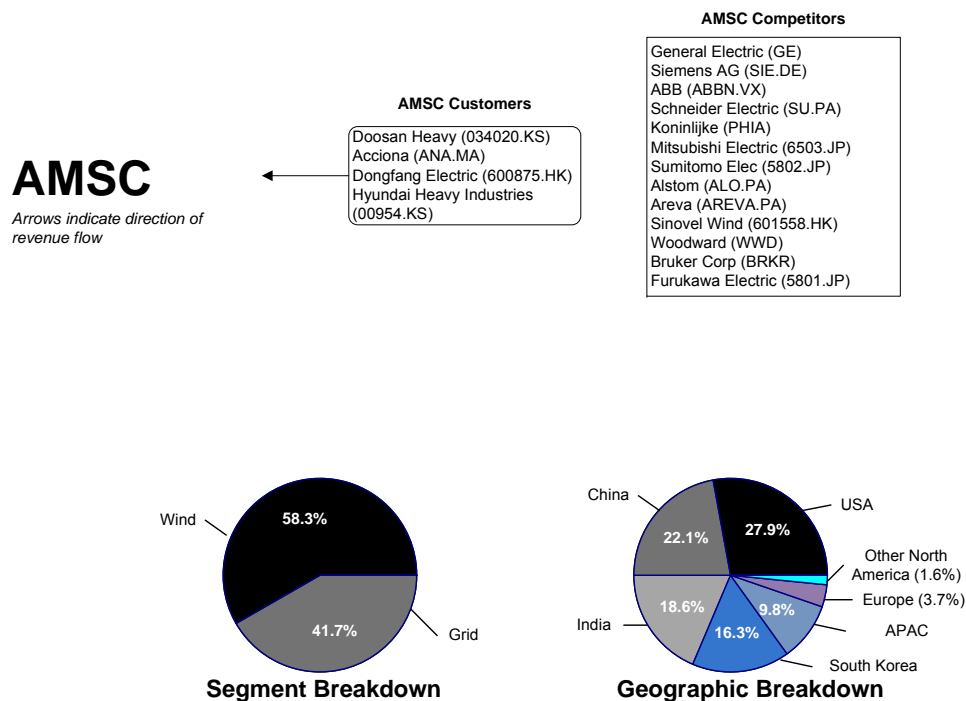
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, FactSet

Figure 262. American Semiconductor (AMSC)

Sector: Alternative Energy

American Superconductor Corporation (AMSC)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Terence Whalen

Amkor Technology Inc

Amkor was founded in 1968. It has grown into a leading provider of packaging and test services to the global semiconductor industry, with over 300 customers and 1,000 different package types/sizes, from traditional leadframe packages to advanced chip-scale (CSP), ball-grid array (BGA), and flip chip packages. The company has one of the most balanced revenue streams in terms of end-market applications and is focused on broadening its capabilities to include more test, as well as its customer base to include more fabless chipmakers and IDMs that are outsourcing more of their production. The company maintains more than 5 million square feet of manufacturing floor space in the U.S., Korea, Japan, China, Taiwan, Singapore, and the Philippines, and it has one of the broadest global test and assembly infrastructures in the world. It is headquartered in Chandler, Arizona.

Figure 263. Amkor Technology (AMKR) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	2658.6	2179.1	2939.5	2776.4	2759.8	3009.8	3015.9	3070.3	3169.3
- y/y growth	-3.0%	-18.0%	34.9%	-5.5%	-0.6%	9.1%	9.3%	2.0%	5.1%
Gross Margins	21.1%	22.0%	22.6%	17.7%	16.1%	19.1%		19.7%	
Operating Margins	9.5%	10.3%	12.7%	7.0%	6.3%	8.9%		9.6%	
EPS	-2.45	0.67	0.90	0.39	0.33	0.59	0.57	0.66	0.72
- y/y growth	-306.1%	127.4%	33.7%	-56.0%	-15.5%	76.8%	71.1%	12.4%	26.3%
Cash	429.2	398.1	422.8	437.3	415.7	313.5		178.1	
Debt	1493.4	1434.2	1364.3	1346.7	1545.0	1578.0		1578.0	
Net Cash/Shr	-5.5	-3.6	-2.8	-3.1	-5.1	-5.4		-6.0	
Tangible Book Value/Shr	1.2	2.0	3.4	4.1	4.2	4.9		5.9	

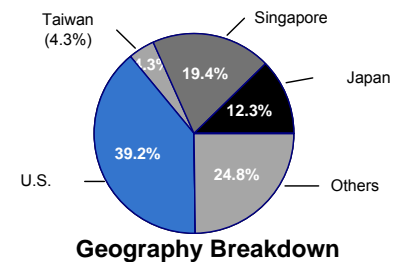
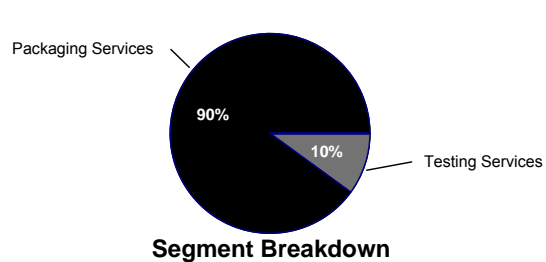
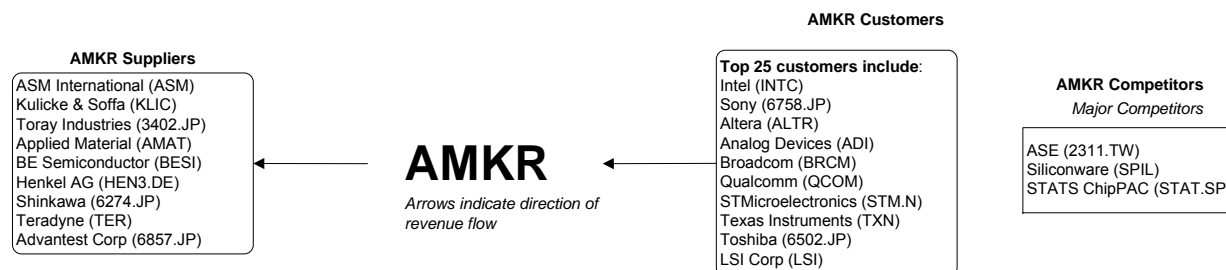
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 264. Amkor Technologies (AMKR)

Sector: Semiconductors: Assembly and Test

Amkor (AMKR)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jim Suva, CPA

Amphenol Corp

Amphenol is a leading manufacturer of electronic and electrical interconnect products and assemblies, and fiber optics. In 2011, Amphenol was the second-largest global connector company and the second-largest producer of coaxial cable for the cable TV market. Based in Wallingford, Connecticut, it has ~20,000 employees and 128 facilities worldwide with <30% of its operations in the U.S. and >70% internationally. Amphenol had \$2.8B in annual sales in 2009, \$3.6B (+26% Y/Y) in 2010, \$3.9B (+11% Y/Y) in 2011, and \$4.3b (+9% Y/Y) in 2012. It sells products to over 10,000 customer locations with no single customer accounting for more than 7% of total sales. Customers include: Samsung, Cisco, IBM, HP, Motorola, Lucent, Nortel, Maxtor, Bosch, Comcast, Verizon, Nokia, Delphi, Rockwell, Airbus, and Lockheed Martin. Sales by end market include: wireless/telecom/datacom 48%, broadband 7%, military/aerospace 19%, industrial 15% and auto 11%.

Figure 265. Amphenol (APH) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	3236.5	2820.1	3554.1	3939.8	4292.1	4647.6	4629.5	5071.4	4981.6
- y/y growth	13.5%	-12.9%	26.0%	10.9%	8.9%	8.3%	7.9%	9.1%	7.6%
Gross Margins	32.4%	31.4%	32.6%	31.6%	31.3%	31.1%		31.1%	
Operating Margins	19.5%	17.3%	19.7%	19.2%	19.3%	19.4%		19.3%	
EPS	2.34	1.85	2.71	3.05	3.47	3.85	3.84	4.29	4.27
- y/y growth	21.1%	-21.2%	46.9%	12.4%	13.7%	11.0%	10.7%	11.6%	11.3%
Cash	215.0	422.4	624.2	648.9	942.5	1028.7		1203.0	
Debt	786.5	753.4	800.0	1377.1	1706.5	1658.2		1618.2	
Net Cash/Shr	-3.2	-1.9	-1.0	-4.2	-4.0	-3.3		-2.1	
Tangible Book Value/Shr	0.7	2.3	4.7	2.6	3.2	5.1		7.3	

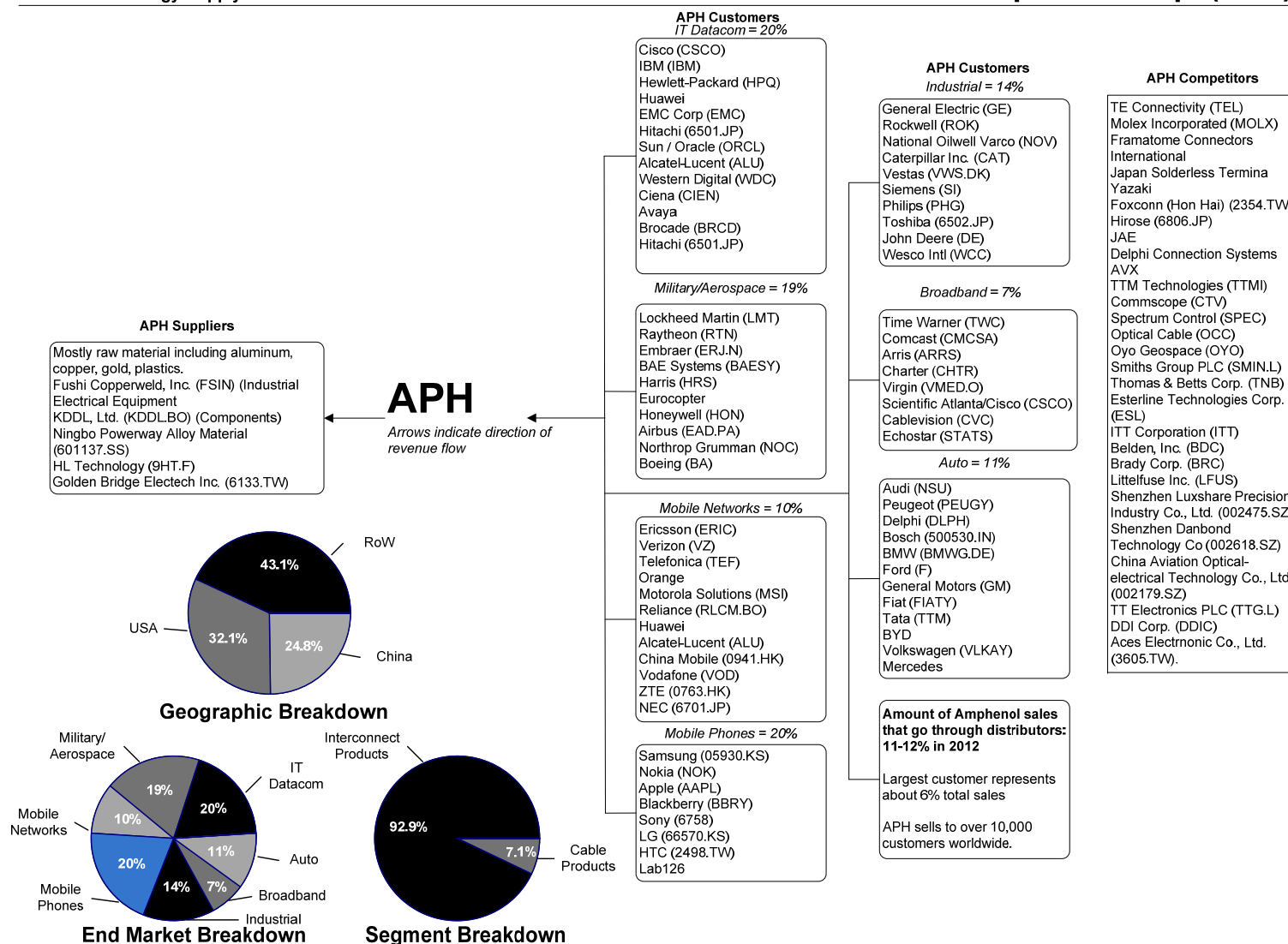
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 266. Amphenol Corp (APH)

Sector: Technology Supply Chain - Connectors

Amphenol Corp. (APH)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Terence Whalen

Analog Devices

Analog Devices (NYSE: ADI) sells data converters, signal amplifiers, and digital signal processors. ADI's converter and amplifier focus position it in markets with significant design barriers to entry, high-margin competitors, and sticky design-ins. Texas Instruments is ADI's primary converter competitor while Texas Instruments and National Semi are amplifier competitors. Other competitors are Broadcom, Cirrus Logic, Infineon, Intersil, Linear, Maxim, Microchip, National, NXP, STMicroelectronics and Silicon Labs. ADI has low customer concentration (no account >4% sales) partly because of its industrial market leverage. Application exposure conveys the horizontal nature of its business: industrial (44%), communications (20% sales), consumer (20%), and automotive (16%). ADI demonstrated strategic foresight by exiting less attractive markets of DSL, handset baseband, and PC power in 2006-2008, sidestepping what would have been punishing declines for these segments in 2008/2009. ADI has consolidated two manufacturing facilities and is in the process of realizing ~350bps of gross margin benefits. ADI operates a fab-lite manufacturing model with 55% output produced internally and 45% sourced externally mainly with TSMC. ADI derives 54% of sales from third party distributors recognizing revenue to the distributor only after the distributor sells through to its end customer. ADI's fiscal year ends in October.

Figure 267. Analog Devices (ADI) Results and Forecasts

	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	2014.9	2761.5	2993.3	2701.1	2673.9	2687.5	2920.9	2978.4
- y/y growth		37.1%	8.4%	-9.8%	-1.0%	-0.5%	9.2%	10.8%
Gross Margins	55.5%	65.2%	66.4%	64.5%	64.4%		66.5%	
Operating Margins	16.8%	33.2%	35.9%	30.8%	30.7%		34.7%	
EPS	0.97	2.36	2.71	2.14	2.16	2.18	2.65	2.67
- y/y growth		143.9%	14.5%	-20.9%	1.1%	1.7%	22.4%	22.7%
Cash	1816.0	2687.8	3592.5	3900.4	4581.5		5514.4	
Debt	379.6	400.6	886.4	821.6	774.2		774.2	
Net Cash/Shr	4.9	7.5	8.8	10.1	12.3		15.1	
Tangible Book Value/Shr	7.8	10.0	11.9	13.0	15.3		18.3	

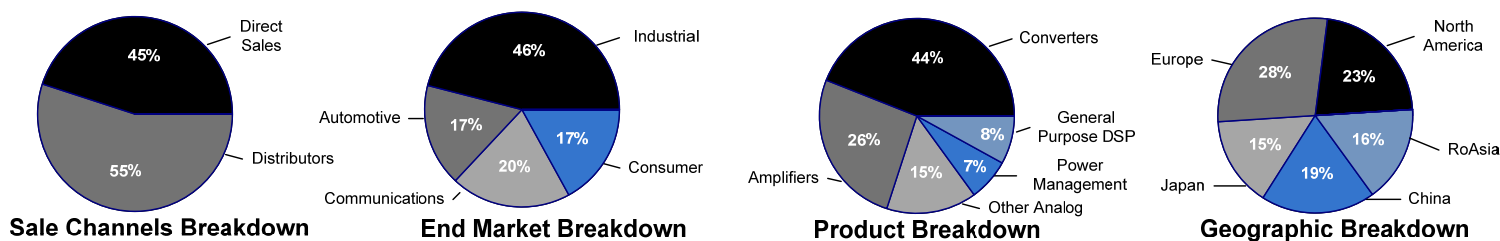
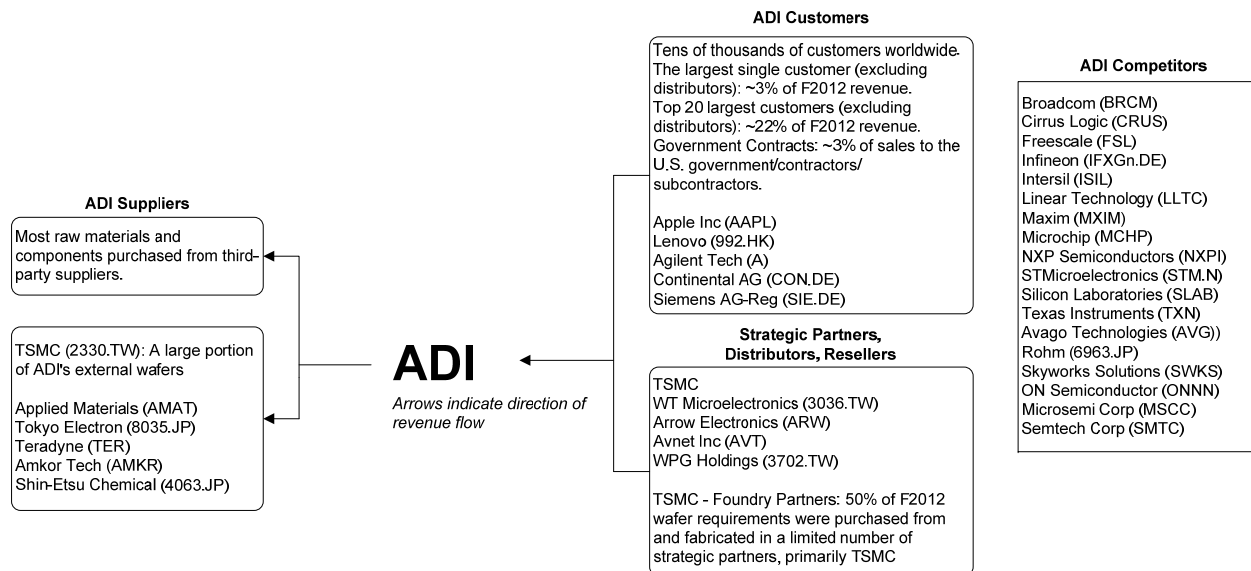
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 268. Analog Devices (ADI)

Sector: Semiconductors

Analog Devices, Inc. (ADI)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Glen Yeung, Walter
Pritchard, & Jim Suva

Apple, Inc.

Apple, Inc. (AAPL), is a leading vendor in "eco-system" based mobile hardware devices globally and the largest company in the world by market capitalization. With the iMac in 1998, iPod in 2001, iPhone in 2007, and iPad in 2010, Apple set itself apart with innovative hardware and has increasingly extended this differentiation into chip design, software (operating system) and applications throughout its entire product offering. Apple derived ~51% of its revenues from iPhone, while iPad represents ~21% and PC another 15% of total sales. iPod sales account for ~9% of revenues and the rest ~4%. The company was founded in 1976 by Steve Jobs and Steve Wozniak and is headquartered in Cupertino, CA. Apple employs approximately 72,800 on a full-time basis and has an additional 3,300 temporary employees and contractors.

Figure 269. Apple (AAPL) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	37491.0	42905.0	65225.0	108249.1	156508.0	165501.6	172038.4	169034.2	189722.8
- y/y growth	52.5%	14.4%	52.0%	66.0%	44.6%	5.7%	9.9%	2.1%	10.3%
Gross Margins	35.2%	40.1%	39.4%	40.5%	43.9%	37.4%		37.7%	
Operating Margins	22.2%	27.4%	28.2%	31.2%	35.3%	28.0%		27.3%	
EPS	6.78	9.08	15.15	27.68	44.15	37.48	39.77	39.84	44.11
- y/y growth	72.6%	33.9%	66.9%	82.6%	59.5%	-15.1%	-9.9%	6.3%	10.9%
Cash	22111.0	23464.0	25620.0	25952.0	29129.0	51442.8		73956.5	
Debt	0.0	0.0	0.0	0.0	0.0	5000.0		15000.0	
Net Cash/Shr	24.5	25.9	27.7	27.7	30.8	49.3		65.1	
Tangible Book Value/Shr	24.7	34.9	51.4	78.1	120.7	137.9		149.0	

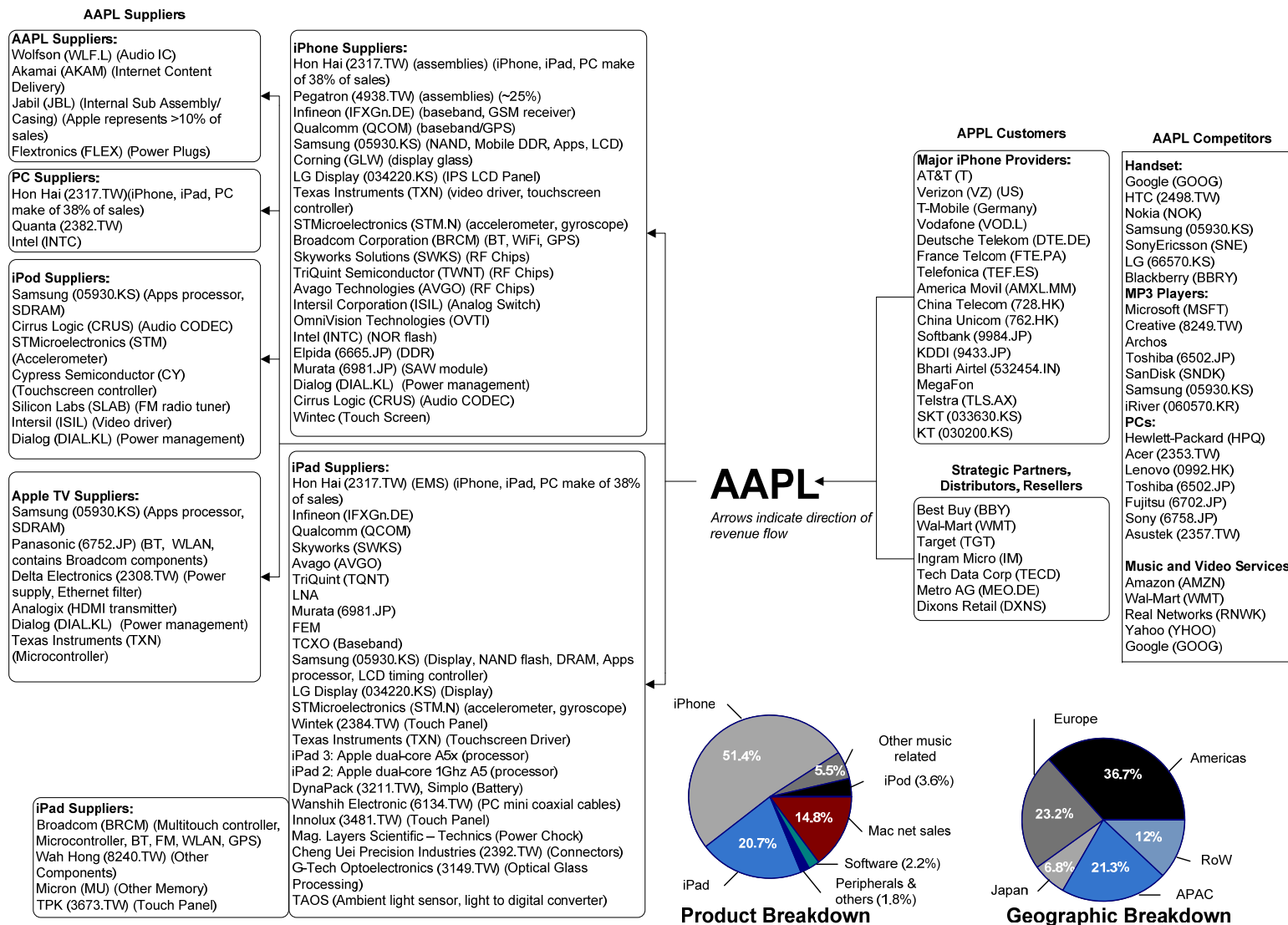
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 270. Apple (AAPL)

Sector: PC & Enterprise Hardware

Apple (AAPL)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Figure 271. Apple's Supplier List - 2012

Apple's Supplier list - 2012				
3M	Cymmetrik Shenzhen Printing	Infineon	Nichia Corp.	Shicoh
AAC Technologies	Cypress Semiconductor	Innolux	Nidec	Shimano
AcBel Polytech Inc	Dai-Ichi Seiko	Intel	Nippon Mektron	Shin Zu Shing
Advanced Micro Devices	Daikin Industries	Interflex	Nisshin Steel	Silicon Works
Advanced-Connectek Inc.	Daishinku	International Peper	Nitto Denko Corp	Simplo Tech
AKM Semiconductor	Darfon Electronic	International Rectifier Corp.	NVIDIA	Skyworks Solutions
Alcoa	Delta Electronics	Intersil	NXP Semiconductor	SMK Corp
Alps Electric	Deufol Sunman	IntraMedia	OmniVision	Solvay Specialty Polymers
Amperex Technology	Dialog Semiconductor	Inventec Appliances	Omron	Sony
Amphenol	Diodes	Jabil Circuit	ON Semiconductor	STMicroelectronics
Analog Devices	Dover	Japan Aviation Electronics	Oriental Printed Circuits	Styron
Anjie Insulating Material Co.	DSM	Japan Display	Osram Opto Semiconductors	Sumitomo Chemical
Arvato Digital	Dynacast International	Kyocera	Panasonic	Sumitomo Electric
Asahi Glass	Dynamic Electronics	Laird Technologies	Parade Technologies	Sumitomo Light Metals
Asia Vital Components	Dynapack International	Largan Precision	PCH International	SUNREX Tech
AT&S AG	E-Litecom	Lateral Solutions	Pegatron	Suyin Corp
AU Optronics	Elpida Memory	Lens One Tech	Philips Lumileds Lighting	Taiyi Precision
Audience	Emerson Electric	LG Chem	Pioneer Material Precision	Taiyo Yuden
Auras Technology	Fairchild Semiconductor	LG Display	Prent	TDK Corp
Austria Microsystems	FLEXium Interconnect	LG Innotek	Primax Electronics	TE Connectivity
Avago Technologies	Flextronics	Linear Technology	Pulse Electronics	Teikoku Printing
Avnet	Fortune Grand Enterprise	Lite-On Tech	Qualcomm	Texas Instruments
Best Ever Industries	Foster Electric	Longwell	Quanta Computer	Tian Jin Lishen Batter Join-Stock Co.
Biel Crystal Manufactory	Fujikura	Luxshare-Ict	R.R. Donnelley & Sons	Toshiba
Bluecom	Furukawa Electric	Macronix International	Radiant Opto Electronics	Toyo Rikagaku Kenkyusho
Brilliant International Group	Genius Electronic Optical	Magnachip Semiconductor	Renesas	Toyoda Gosei
Broadcom	GoerTek	Marian	RF Micro Devices	TPK Holding Co
Broadway Industrial Group	Gold Circuit Electronics	Marvell Technology	ROHM	Tripod Tech
BYD Company	Hama Naka Shoukin Industry	Maxim Integrated Products	SABIC Innovative Plastics	TriQuint
Career Technology	hanson Metal Factory	Mega Precision Tech	Salcomp	Triumph Lead Electronic
Catcher Technology	Henkel Ag & Co.	Meiko Electronics	Samsung Electro-Mechancis	TXC Corp
Cheng Loong Corporation	Heptagon Advanced Micro-Optics	Micron	Samsung Electronics	Unimicron
Cheng Uei Precision	Hi-P International	Minebea	Sandisk	Unisteel Technology
Cirrus Logic	Hirose Electric	Mitsumi Electric	SDI Corp	Universal Scientific Industrial
Coilcraft	Hitachi-LG Data Storage	Molex	Seagate	Vishay Interconnect
Compeq Manufacturing	Hon Hai Precsion	Multi Packaging Solutions	Seiko Epson	Volex
Consolidated Graphics	Hony Glass Technology	Multi-Fineline Electronix	Semtech	Western Digital
Coretronic	Hynix Semiconductor	Murata Manufacturing	Sharp	Wintek
Corning	Ibiden	Nan Ya PCB	Shenzhen Panel Lighting	Zeniya Aluminum Engineering
Cowell Optic Electronics	Infastech Fastening Systems	New Ocean Precision Component	Shenzhen Yuto Printing	Zhen Ding Technology

Source: Citi Research, Company Reports

Figure 272. Apple's Old vs. New Suppliers to the List this year

Suppliers not on the List This Year	Companies New to the List this Year		
Acument Global Technologies	3M Company	International Paper Co.	Sumitomo Electric Industries Ltd
Austria Technologies & Systemtechnik AG	Advanced-Connectek Inc	IntraMedia	Sumitomo Light Metals, Ltd.
Brady Corporation	AKM Semiconductor	Japan Display, Inc.	Suyin Corp
Cosmosupplylab Ltd.	Alcoa, Inc.	Kyocera Corp	Teikoku Printing Inks Mfg.
Cyntec Co, Ltd.	Alps Electric Co, Ltd.	Largan Precision Co, Ltd	Toyoda Gosei Co, Ltd.
ES Power Co, LTD	Arvato Digital	Luxshare-Ict Co. Ltd	Tyco Electronics
Fastening Technology Pte Ltd.	Asia Vital Components, Ltd.	Magnachip Semiconductor Corp	Zeniya Aluminum Engineering, Ltd.
Fuji Crystal Manufactory Ltd.	AT&S AG	Mega Precision Technology Ltd	Zhen Ding Technology Holding, Ltd.
Grand Upright Technology Ltd	Auras Technology Co, Ltd	Minebea Co, Ltd.	Audience, Inc.
Gruppo Dani S.p.A.	Avnet Electronics	Multi Packaging Solutions	Cirrus Logic, Inc.
Gruppo Peretti	Best Ever Industries Limited	New Ocean Precision Component (Jiangxi) Co, Ltd.	Dialog Semiconductor Plc
Jin Li Mould Manufacturing Pte Ltd.	Biel Crystal Manufactory Ltd	Nichia Corp	Parade Technologies Ltd
Kaily Packaging Pte Ltd	Bluecom Co, Ltd	Nidec Corp	
Kenseisha Sdn. Bhd.	Consolidated Graphics	Nisshin Steel Co, Ltd.	
Knowles Electronics	Coretronic Corp	Nitto Denko Corp	
Kunshan Changyun Electronic Industry	Corning Inc	OmniVision Technologies Inc.	
LSI Corp	Cowell Optic Electronics Ltd.	Omron Corp	
Luen Fung Commercial Holdings Ltd.	Dai-Ichi Seiko Co. Ltd	Osram Opto Semiconductors	
Microchip Technology Inc.	Daikin Industries	Philips Lumileds Lighting Company	
Multek Corp	Deufol Sunman	Pulse Electronics	
NEC Corp	Dover Corp	R.R. Donnelley & Sons, Co.	
Nishoku Technology Inc	DSM	Radiant Opto Electronics Corp	
Optrex Corp	Dynacast International	RF Micro Devices, Inc.	
Ri-teng Computer Accessory Co, LTD	Dynamic Electronics Co, Ltd.	SABIC Innovative Plastics Holdings Bv	
Rubycon Corp	E-Litecom Co, Ltd	Salcomp (Shenzhen) Co. Ltd.	
SANYO Electric Co, LTD	Furukawa Electric Co. Ltd	Semtech Corp	
Seiko Group	Genius Electronic Optical Co, Ltd	Shenzhen Panel Lighting Co, Ltd	
Silego Technology Inc	GoeTek Inc.	Shenzhen Yuto Printing (Holdings) Ltd	
Standard Microsystems Corp	Gold Circuit Electronics	Shicoh Co, Ltd	
Sumida Corp	Henkel Ag & Co.	Silicon Works Co Ltd	
Sizhou Panel Electronic Co	Hirose Electric Co. Ltd	SMK Corp	
Toshiba Mobile Display Co, Ltd.	Hony Glass Technology Co, Ltd	Solvay Specialty Polymers	
Yageo Corp	Infastech Fastening Systems Limited	Styron LLC	

Source: Citi Research, Company Reports

Citi Analyst: Terence Whalen

Applied Materials Inc

Applied Materials is the second largest supplier of wafer fab equipment and roughly supplied 16% equipment to the approximately \$33 billion market in 2011. Applied Materials Inc. (AMAT) also participates in non-semi display and solar equipment which comprises ~10-20% of its overall sales.

Figure 273. Applied Materials (AMAT) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	8129.2	5013.6	9548.7	10517.0	8719.0	7531.3	7838.4	8852.3	9315.9
- <i>y/y growth</i>	-16.5%	-38.3%	90.5%	10.1%	-17.1%	-13.6%	-10.1%	17.5%	18.8%
Gross Margins	42.4%	28.5%	38.9%	41.5%	38.0%	39.8%		41.2%	
Operating Margins	18.6%	-2.8%	18.1%	22.9%	14.9%	10.6%		16.6%	
EPS	0.78	-0.05	0.88	1.29	0.68	0.49	0.61	0.89	1.06
- <i>y/y growth</i>	-37.9%	-106.5%	1809.9%	47.8%	-47.8%	-28.1%	-9.1%	82.9%	72.1%
Cash	2100.7	2214.7	2584.6	6243.0	1937.0	1432.3		2485.1	
Debt	202.6	201.9	205.5	1947.0	1946.0	1946.0		1946.0	
Net Cash/Shr	1.4	1.5	1.8	3.2	0.0	-0.4		0.5	
Tangible Book Value/Shr	4.4	4.2	4.4	5.5	1.9	1.9		2.7	

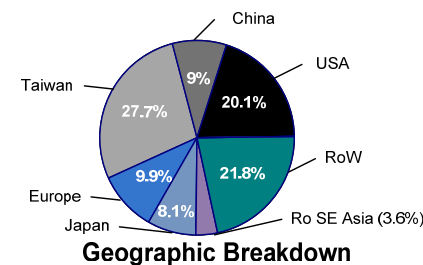
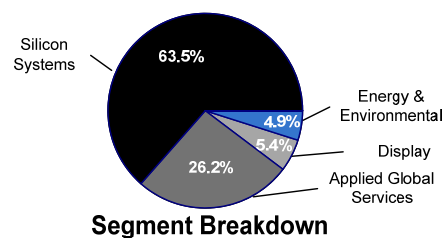
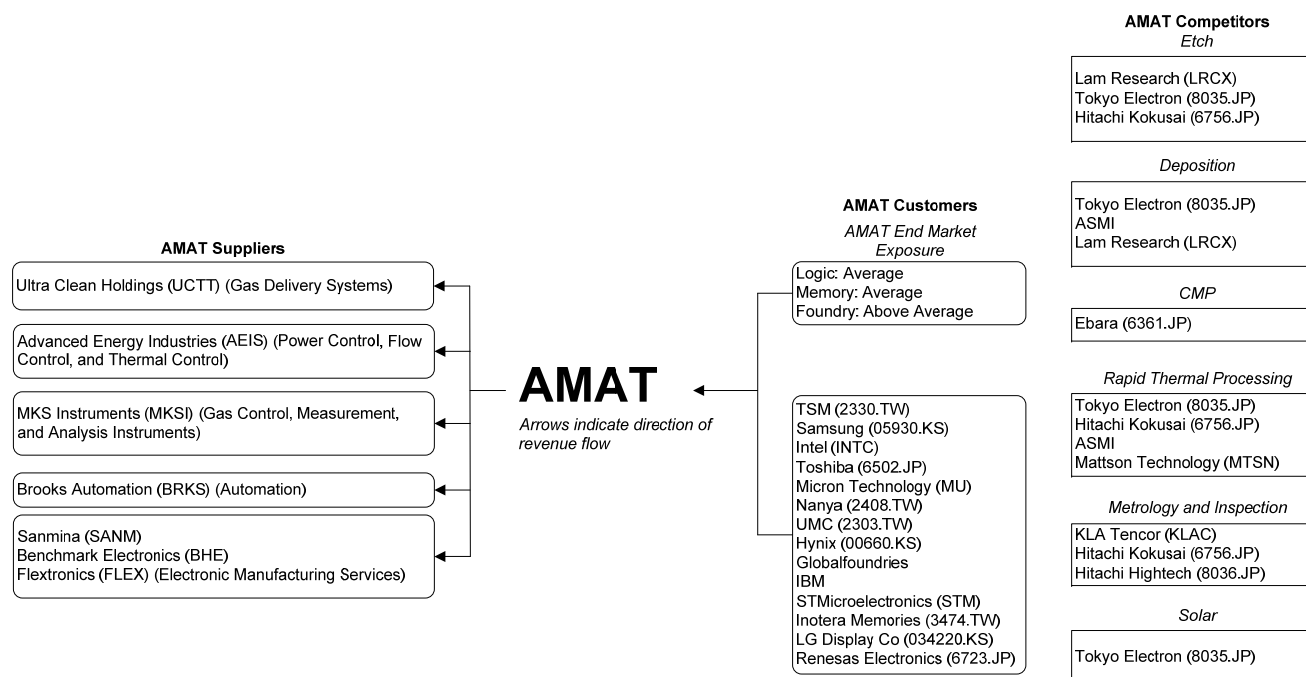
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 274. Applied Materials (AMAT)

Sector: Semiconductor Equipment: Front End

Applied Materials (AMAT)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Amit Harchandani

ARM Holdings PLC

ARM is a semiconductor intellectual property (IP) company. It designs building blocks (cores and peripherals) that aid engineers in their design and manufacture of integrated circuits (ICs). Semiconductor manufacturers license the designs and incorporate them into their own chips

Most relevant relationships: Apple and Samsung Electronics.

Figure 275. ARM Holdings (ARM.L) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	298.9	305.0	406.6	491.8	576.8	699.0	694.3	806.2	818.6
- y/y growth	15.3%	2.0%	33.3%	20.9%	17.3%	21.2%	20.4%	15.3%	17.9%
Gross Margins	89.4%	92.2%	94.3%	95.1%	94.8%	94.5%		94.6%	
Operating Margins	32.6%	31.2%	40.4%	45.1%	45.6%	50.3%		52.9%	
EPS	0.06	0.05	0.09	0.12	0.15	0.21	0.20	0.26	0.25
- y/y growth	20.6%	-4.4%	74.1%	33.0%	18.0%	43.7%	37.1%	22.5%	26.2%
Cash	78.8	141.8	290.1	429.0	529.0	733.8		963.1	
Debt	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Net Cash/Shr	0.1	0.1	0.2	0.3	0.4	0.5		0.7	
Tangible Book Value/Shr	0.1	0.2	0.3	0.4	0.5	0.7		0.9	

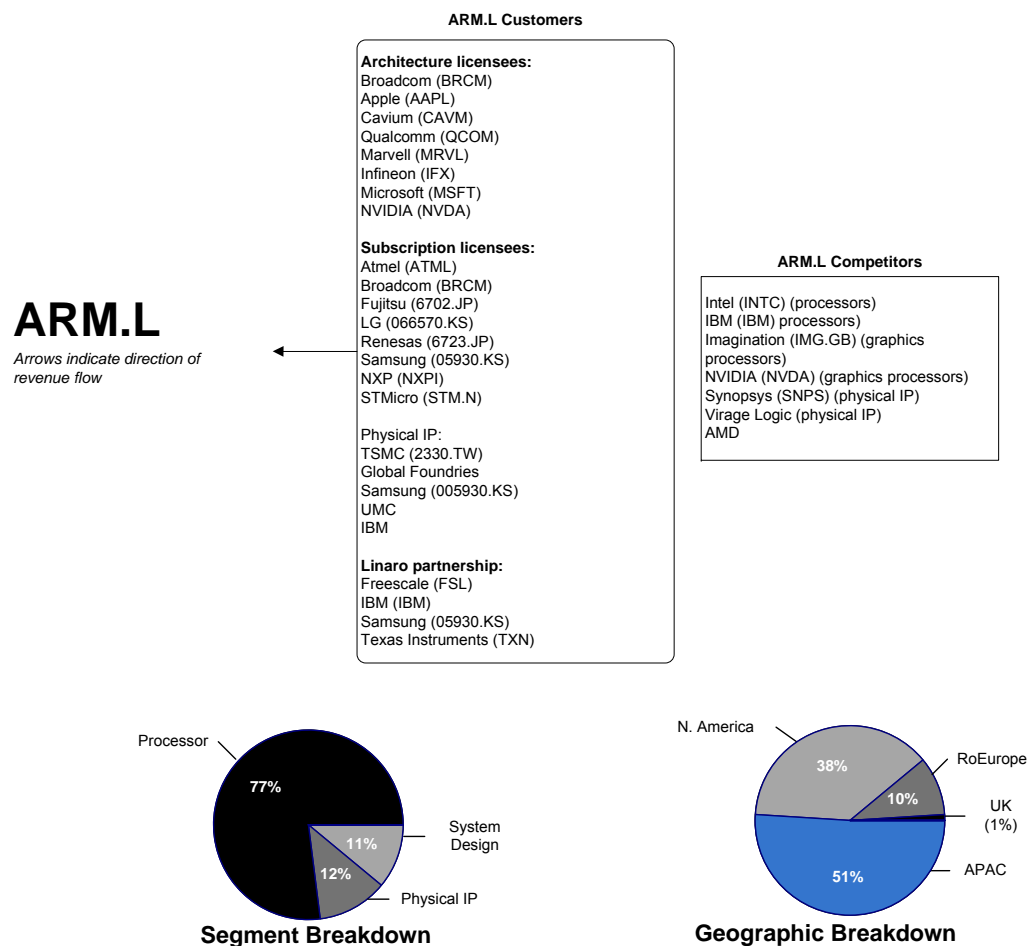
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 276. ARM Holdings PLC (ARM.L)

Sector: Semiconductor Intellectual Property

ARM Holdings PLC (ARM.L)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Kevin Dennean, CFA

ARRIS Group, Inc.

Arris, headquartered in Suwanee, Georgia, develops, manufactures and supplies telephony, video and high-speed data equipment to cable system operators. Its headend (cable modem termination systems (CMTS) which enable internet traffic to be converted for use on cable networks) and customer premise equipment (embedded multimedia terminal adapters (EMTAs) that enable analog voice conversion to Voice over IP and cable modems) allow cable operators to deliver a range of integrated voice, video and high-speed data services to their subscribers in order to compete effectively with satellite providers and telephone companies. Arris is one of the leading providers of CMTS and EMTA equipment. Domestic sales represented ~69% of sales. In 2011, Comcast was the largest customer, representing 26% of total sales, followed by Time Warner accounting for 15% of sales. Key competitors include Ambit Microsystems, Aurora Networks, Cisco Systems, Inc., Commscope, Inc, Concurrent Computer Corporation, Ericsson, Harmonic, Inc., Motorola, Inc., SeaChange, Inc., Thomson and TVC Communications, Inc.

Arris operates in three segments: Broadband Communications Systems (BCS), Access, Transport and Supplies (ATS), Media and Communications Systems (MCS). The Broadband Communication Systems segment is the largest segment, representing ~76% of annual revenues and comprises voice, video and high speed data headend products and customer premise equipment. The Access Transport and Supplies segment, representing ~18% revenues, includes transport and bandwidth management products and building and maintenance supplies for the major components of a cable network. The Media and Communications segment, representing 6% of revenues, includes application-oriented solutions designed to enable cable operators to deploy and manage on-demand entertainment and information services.

Figure 277. Arris (ARRS) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	1144.6	1107.8	1087.5	1088.7	1353.7	3790.4	3925.5	4851.7	4901.7
- y/y growth	15.4%	-3.2%	-1.8%	0.1%	24.3%	180.0%	190.0%	28.0%	24.9%
Gross Margins	34.3%	41.8%	39.0%	37.7%	34.2%	30.1%		29.7%	
Operating Margins	13.0%	18.6%	15.4%	12.5%	12.1%	10.2%		12.0%	
EPS	0.77	1.01	0.85	0.81	0.93	1.56	1.65	2.10	2.08
- y/y growth	-2.7%	31.2%	-15.6%	-4.5%	14.6%	67.5%	76.3%	34.1%	26.3%
Cash	427.3	625.6	620.1	518.8	530.1	388.7		796.5	
Debt	276.3	211.4	202.6	209.8	222.1	2150.4		2150.4	
Net Cash/Shr	1.2	3.2	3.2	2.5	4.5	-11.0		-7.6	
Tangible Book Value/Shr	3.0	4.4	4.9	5.1	6.0	-5.8		-1.7	

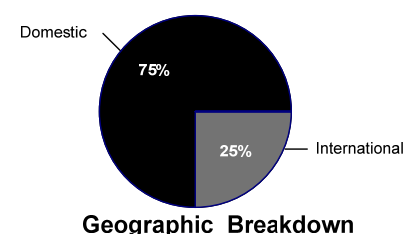
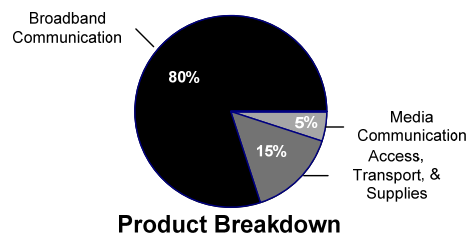
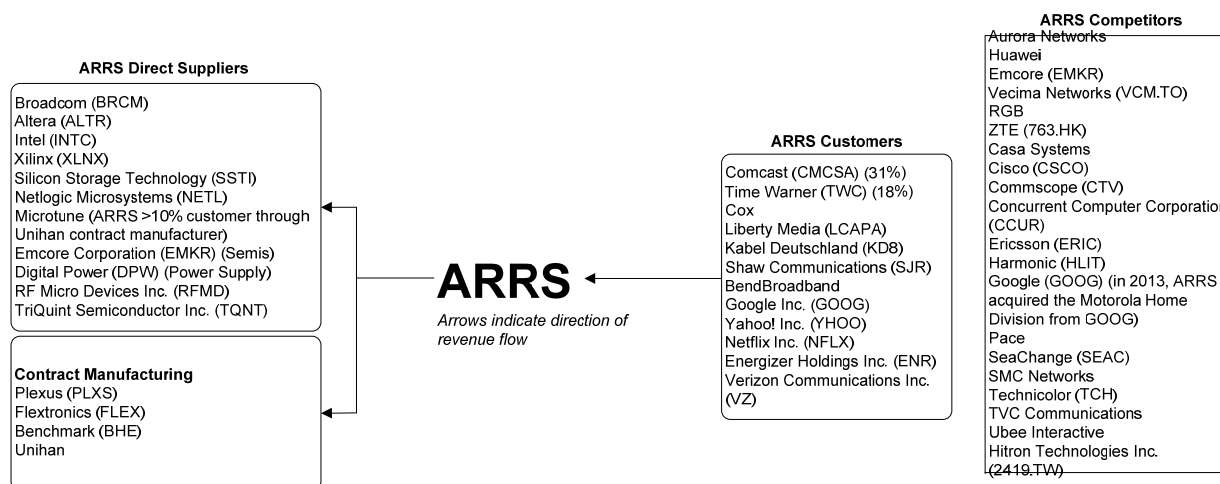
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 278. Arris (ARRS)

Sector: Communications Equipment

Arris Group, Inc. (ARRS)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jim Suva, CPA

Arrow Electronics Inc

Arrow Electronics, Inc (ARW) is a leading global distributor of electronics components and computer products and in 2011 was the second-largest global distributor of such products in terms of revenue. Arrow is headquartered in Englewood, Colorado, and has about 11,000 employees in more than 340 global locations. Arrow has about 1,200 suppliers (we believe Altera is Arrow's largest supplier at 5%–6% of total supplies) and more than 130,000 customers with no single customer representing more than 10% of sales. Sales by geography: 52% Americas, 29% Europe/EMEASA, and 19% Asia/Pacific. Arrow has two business segments: Electronics Components (EC) at 66% of sales and Computer Products (CP) at 35% of sales.

Figure 279. Arrow (ARW) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	16761.0	14684.1	18744.7	21390.3	20405.1	20480.7	20666.1	21089.7	21726.4
- y/y growth	4.9%	-12.4%	27.7%	14.1%	-4.6%	0.4%	1.3%	3.0%	5.1%
Gross Margins	13.2%	11.5%	12.5%	13.3%	12.8%	12.6%		12.7%	
Operating Margins	3.6%	2.6%	4.2%	4.5%	3.8%	3.5%		3.8%	
EPS	2.92	1.68	4.14	5.19	4.40	4.10	4.26	4.57	4.88
- y/y growth	-11.1%	-42.7%	147.2%	25.3%	-15.2%	-6.9%	-3.3%	11.4%	14.7%
Cash	451.3	1137.0	926.3	396.9	409.7	706.1		1176.2	
Debt	1276.9	1399.2	1822.4	1961.7	1951.8	2241.8		2241.8	
Net Cash/Shr	-6.5	-1.1	-7.1	-13.4	-10.9	-14.0		-9.6	
Tangible Book Value/Shr	14.8	16.6	16.1	19.7	21.4	23.6		27.6	

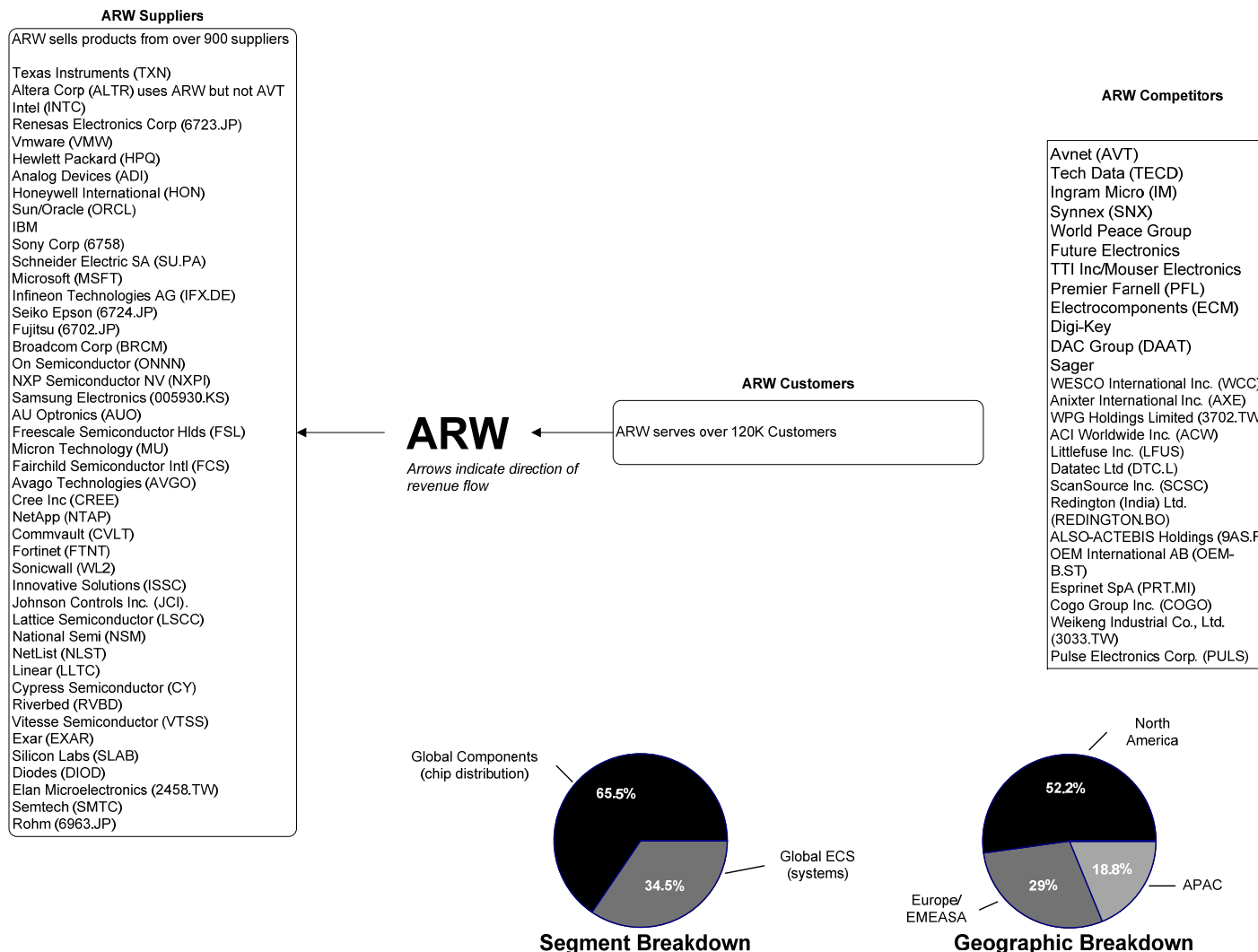
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 280. Arrow Electronics (ARW)

Sector: Technology Supply Chain - Distributors

Arrow Electronics (ARW)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

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Source: Citi Research, Company Reports

Citi Analyst: Atsushi Ikeda

Asahi Glass

Asahi Glass Co., Ltd. engages in the manufacture and sale of glass, electronics, chemicals, and ceramics. Its operations are carried out through the following segments: Glass, Electronics, Chemicals, and Other. The Glass segment includes sheet glass, mirror, polycarbonate resin sheet, tempered glass, laminated glass, and industrial glass. The Electronics segment consists of cathode ray tubes, flat panel displays, semiconductors, and optoelectronic products. The Chemicals segment provides fluorinated resins, iodine-related materials, battery components, gases, and solvents. The Other segment deals with the manufacture of ceramics. The company was founded on September 8, 1907 and is headquartered in Tokyo, Japan.

Figure 281. Asahi (5201.JP) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	1444317.0	1148198.0	1288947.0	1214672.0	1189956.0	1257400.0	1244735.0	1266500.0	1266251.0
- y/y growth	-14.1%	-20.5%	12.3%	-5.8%	-2.0%	5.7%	4.6%	0.7%	1.7%
Gross Margins	29.0%	28.0%	35.0%	32.2%	26.8%	26.0%		26.0%	
Operating Margins	10.7%	7.5%	17.8%	13.6%	7.8%	7.2%		6.6%	
EPS	33.56	17.12	105.56	82.44	37.89	39.03	41.97	39.37	43.63
- y/y growth	-43.4%	-49.0%	516.6%	-21.9%	-54.0%	3.0%	10.8%	0.9%	3.9%
Cash	83774.0	103953.0	159497.0	123789.0	120761.0	101021.0		92797.3	
Debt	553615.0	594179.0	472643.0	387420.0	512980.0	416000.0		396000.0	
Net Cash/Shr	-191.3	-363.7	-210.0	-175.4	-269.3	-217.2		-207.0	
Tangible Book Value/Shr	616.0	637.0	682.2	699.9	816.6	834.8		848.1	

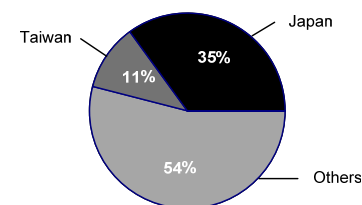
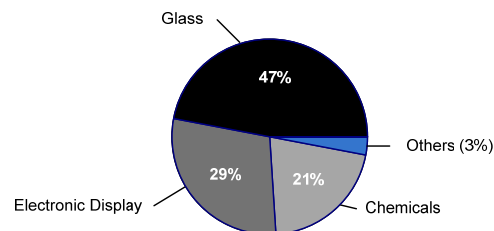
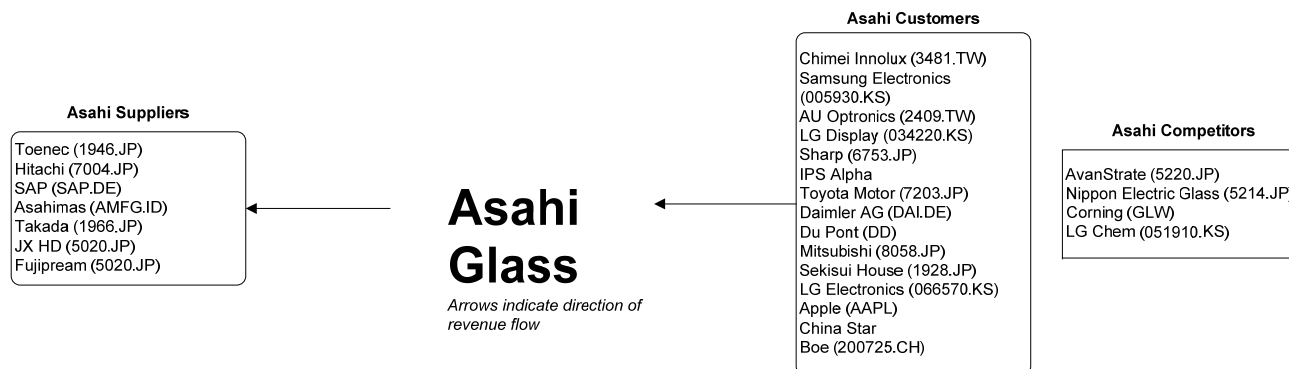
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 282. Asahi Glass (5201.JP)

Sector: Technology General

Asahi Glass (5201.JP)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Roland Shu

ASE

ASE Group is the world's largest provider of independent semiconductor manufacturing services in assembly and test. The group develops and offers a wide portfolio of technology and solutions, including IC test program design, front-end engineering test, wafer probe, wafer bump, substrate design and supply, wafer level package, flip chip, system-in-package, final test and design manufacturing services (DMS, ODM/EMS) through Universal Scientific Industrial Co, which was acquired by ASE in 2010.

Figure 283. ASE (2311.TW) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	94430.9	85775.3	188742.8	185347.2	193972.4	210986.3	208315.4	226935.8	226981.0
- y/y growth	-6.7%	-9.2%	120.0%	-1.8%	4.7%	8.8%	7.4%	7.6%	9.0%
Gross Margins	23.9%	21.2%	21.5%	18.9%	18.9%	20.0%		21.0%	
Operating Margins	12.5%	10.5%	12.8%	9.1%	9.2%	10.1%		11.1%	
EPS	0.82	0.93	2.44	1.79	1.73	2.04	2.01	2.51	2.30
- y/y growth	-49.7%	13.6%	161.2%	-26.6%	-3.6%	18.0%	16.2%	23.2%	14.5%
Cash	27406.2	27577.7	25094.6	25268.2	24435.9	32562.7		46218.5	
Debt	62703.7	63040.7	69548.0	76793.0	84690.4	83116.3		82710.5	
Net Cash/Shr	-3.2	-3.0	-3.6	-3.3	-2.7	-1.7		0.1	
Tangible Book Value/Shr	9.5	9.9	11.5	13.1	14.4	15.4		17.0	

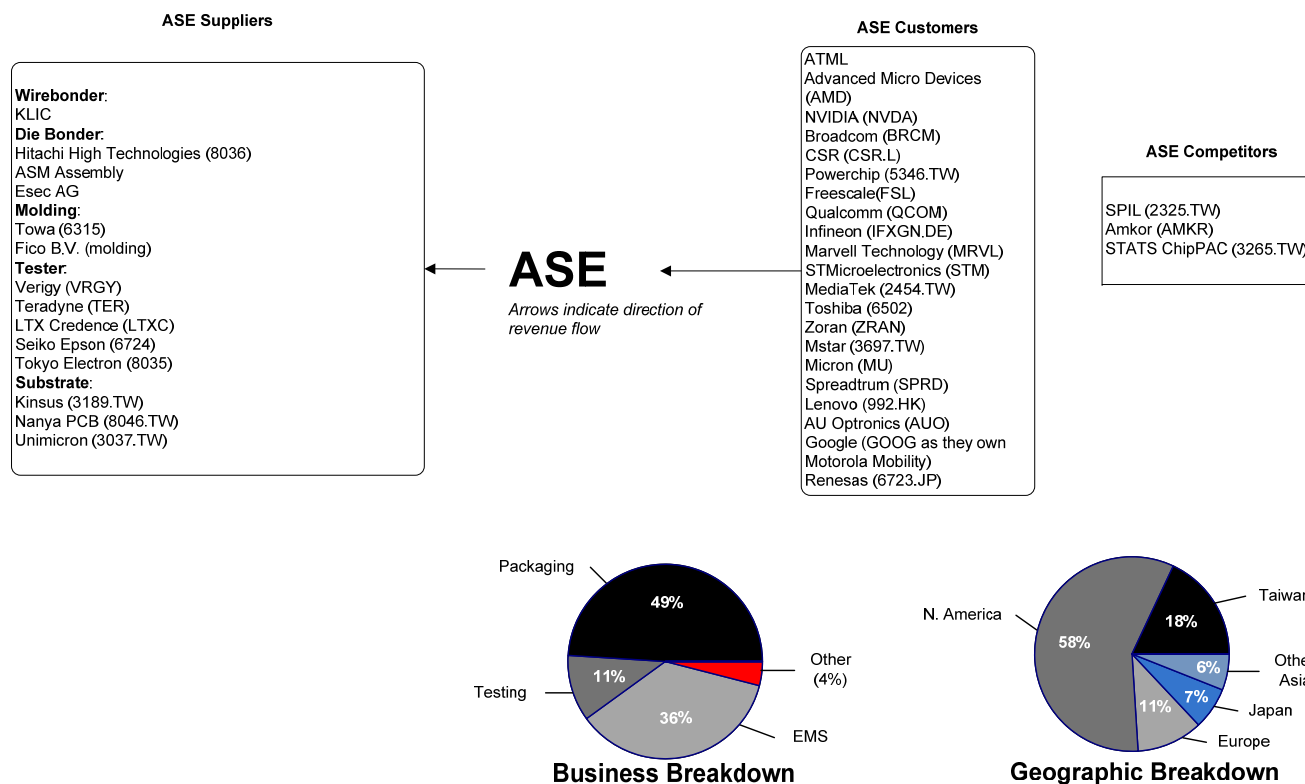
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 284. ASE (2311.TW)

Sector: Semiconductors

ASE (2311.TW)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Amit Harchandani

ASML Holding NV

ASML develops, manufactures and markets photolithography projection systems used in integrated circuit semiconductor manufacturing. Since it was founded in 1984, ASML has grown rapidly to become the world's top 3 semiconductor equipment company and the largest manufacturer of photolithography scanner systems.

Most Relevant Relationships Intel, Samsung Electronics, TSMC

Figure 285. ASML Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	2953.7	1596.1	4507.9	5651.0	4731.5	4841.1	4892.8	6492.0	6140.2
- y/y growth	-21.6%	-46.0%	182.4%	25.4%	-16.3%	2.3%	3.4%	34.1%	25.5%
Gross Margins	34.4%	28.7%	43.4%	43.3%	42.4%	41.5%		44.1%	
Operating Margins	9.7%	-10.3%	27.7%	29.0%	24.4%	21.8%		28.4%	
EPS	0.74	-0.35	2.33	3.42	2.69	2.34	2.33	4.20	3.63
- y/y growth	-49.0%	-147.0%	767.2%	46.9%	-21.3%	-13.2%	-13.3%	79.8%	55.7%
Cash	1109.2	1037.1	1949.8	2731.8	2697.6	2514.1		3063.9	
Debt	647.1	663.1	710.1	733.8	755.9	746.6		746.6	
Net Cash/Shr	1.1	0.9	2.8	4.7	4.6	4.3		5.8	
Tangible Book Value/Shr	4.2	3.8	6.0	7.7	9.2	10.9		13.7	

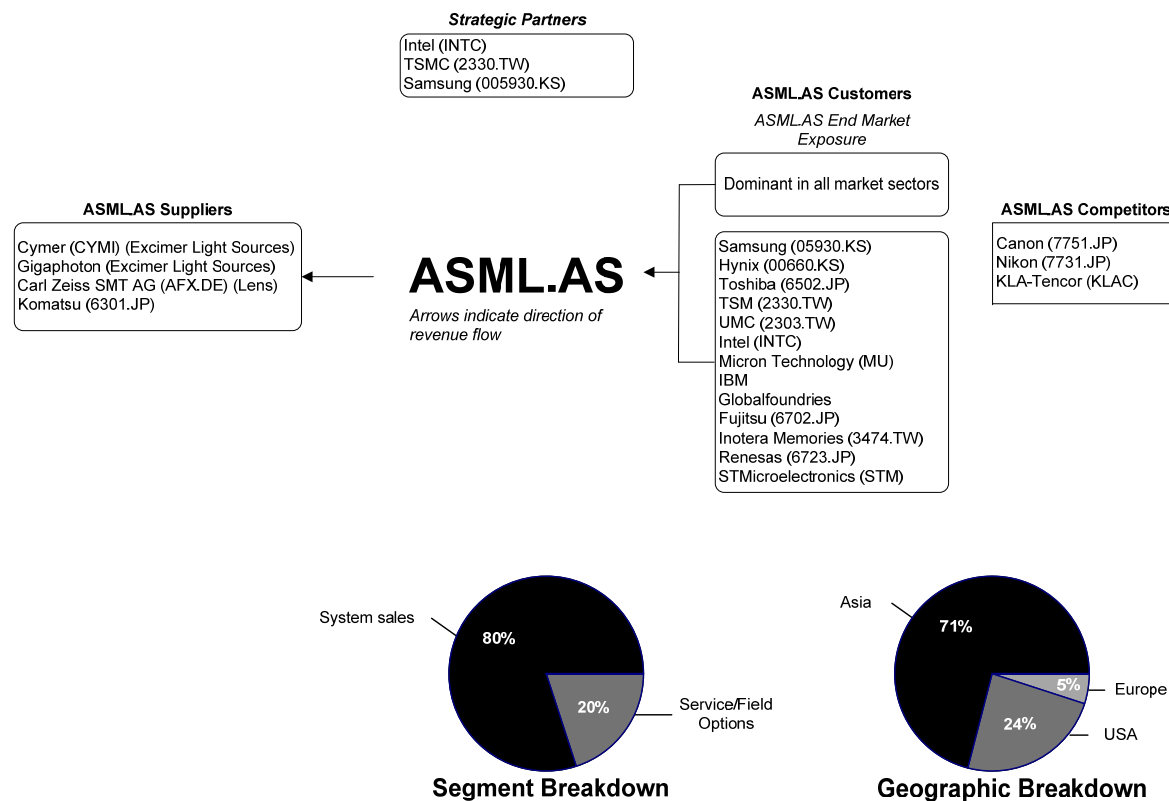
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 286. ASML (ASML)

Sector: Semiconductor Equipment

ASM Lithography (ASML.AS; ASML)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Kevin Chang

ASUSTeK Computer

Established in 1990, Asustek has built its reputation in motherboards and tapped the notebook arena in 1997. Asustek enjoys a leading position in the global motherboard market. After the spin-off of manufacturing arm Pegatron, Asustek has become a pure brand company. Besides motherboards and NB, Asustek also markets hand-held devices, graphic cards, and other consumer electronics.

Figure 287. ASUSTeK Computer (2357.TW) Results and Forecasts

	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	610120.4	429721.2	384112.3	448684.6	485689.3	483520.0	455389.9	538376.5
- y/y growth	-8.1%	-29.6%	-10.6%	16.8%	8.2%	7.8%	-6.2%	11.3%
Gross Margins	10.2%	12.1%	13.6%	13.6%	13.0%		13.1%	
Operating Margins	2.6%	4.4%	4.7%	4.9%	4.4%		4.3%	
EPS	16.04	21.55	21.93	29.79	29.71	32.67	28.05	33.99
- y/y growth	-25.9%	34.4%	1.8%	35.8%	-0.3%	9.7%	-5.6%	4.0%
Cash	90122.8	52911.3	54496.1	59339.0	61746.9		69330.7	
Debt	26436.8	8020.5	4639.3	5569.2	5569.2		5569.2	
Net Cash/Shr	103.6	67.3	71.0	77.5	80.7		90.7	
Tangible Book Value/Shr	222.5	138.6	152.1	167.5	178.2		187.0	

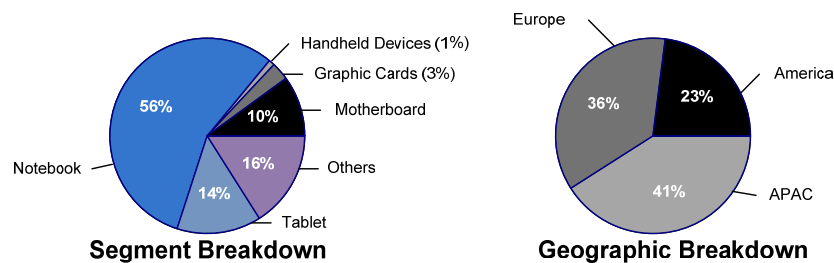
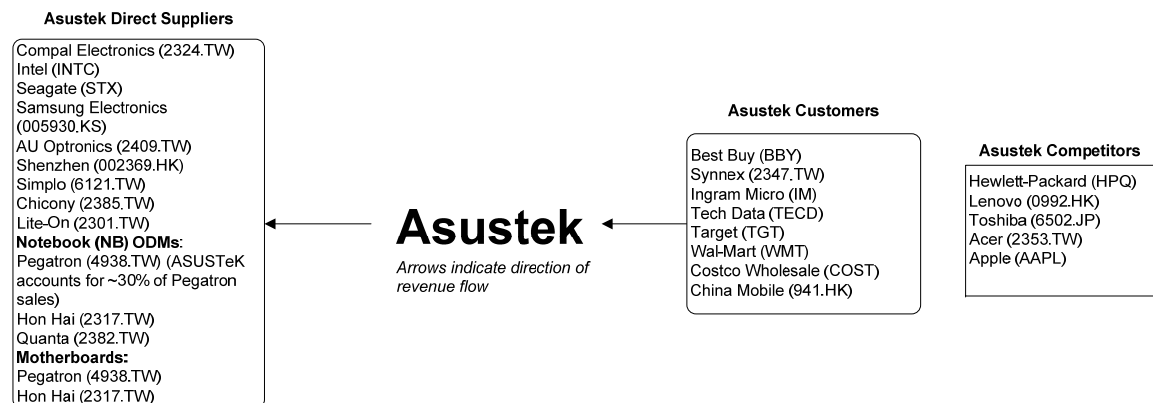
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 288. Asustek (2357.TW)

Sector: PC & Enterprise Hardware

Asustek (2357.TW)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Terence Whalen

ATMI Inc

Based in Danbury, CT, ATMI's core competency is in materials science for semiconductor manufacturing processes. Materials science refers to all the tools and processes related to the creation, introduction, and abatement of the materials used in semiconductor manufacture. ATMI does not manufacture the process chamber itself, but produces the chemical precursors, packaging methods, and delivery systems necessary for those tools to produce wafers.

Figure 289. ATMI Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	339.1	254.7	367.3	390.1	407.4	435.8	433.6	446.9	466.7
- y/y growth	-6.9%	-24.9%	44.2%	6.2%	4.4%	7.0%	6.4%	2.6%	7.6%
Gross Margins	49.1%	40.1%	47.9%	47.2%	49.3%	49.0%		49.8%	
Operating Margins	11.8%	0.5%	11.4%	13.2%	15.0%	14.9%		16.1%	
EPS	0.94	0.19	1.24	1.11	1.34	1.43	1.45	1.54	1.62
- y/y growth	-19.0%	-80.1%	565.9%	-10.5%	20.7%	6.6%	8.4%	7.8%	11.9%
Cash	92.4	97.4	127.1	110.2	156.4	161.8		238.2	
Debt	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Net Cash/Shr	2.9	3.1	4.0	3.4	4.8	4.9		7.3	
Tangible Book Value/Shr	11.1	11.3	12.2	11.4	12.8	15.1		17.7	

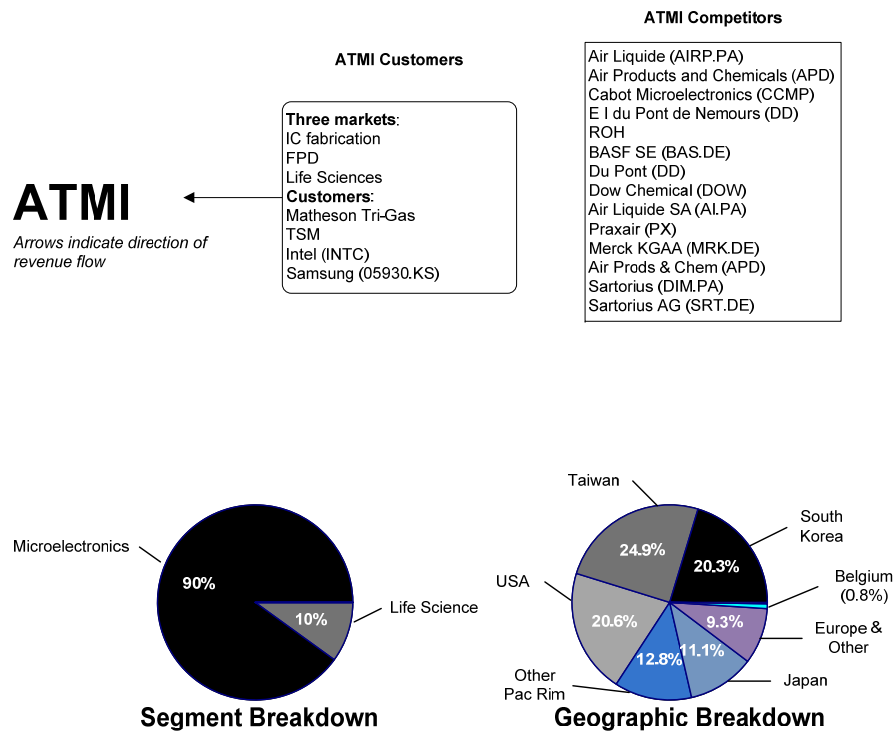
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 290. ATMI (ATMI)

Sector: Semiconductor Equipment

ATMI (ATMI)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Arthur Lai

AU Optronics

AUO was established in 1996 (named Acer Display Technology before it merged with Unipac Optronics in 2001) and it successfully shrank the capacity gap with Korean panel makers after its acquisition of Quanta Display (QDI) in 2006. With a global market share of 16% in terms of shipments in 2011, AUO now ranks as the fourth-largest display panel company after Samsung Electronics, LG Display, and Chimei Innolux.

Figure 291. AU Optronics (2409.TW) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	423928.2	359331.3	467158.0	379711.9	378470.9	435098.5	425918.9	452203.4	439522.0
- y/y growth	-11.7%	-15.2%	30.0%	-18.7%	-0.3%	15.0%	12.5%	3.9%	3.2%
Gross Margins	13.1%	2.0%	7.8%	-7.4%	-2.3%	8.6%		8.5%	
Operating Margins	7.2%	-4.2%	2.2%	-15.2%	-10.0%	2.3%		2.1%	
EPS	2.46	-3.05	0.76	-6.94	-6.19	0.41	0.52	0.54	1.09
- y/y growth	-63.3%	-223.7%	124.9%	-1015.4%	10.9%	106.7%	108.3%	30.6%	111.8%
Cash	84972.5	85831.4	89925.8	90922.3	77449.3	81931.3		103820.0	
Debt	162784.1	183480.5	183515.9	232711.5	224208.7	197223.0		171105.8	
Net Cash/Shr	-3.4	-5.6	-6.4	-9.9	-10.5	-7.4		-2.8	
Tangible Book Value/Shr	33.1	29.7	30.4	23.3	16.9	17.3		17.7	

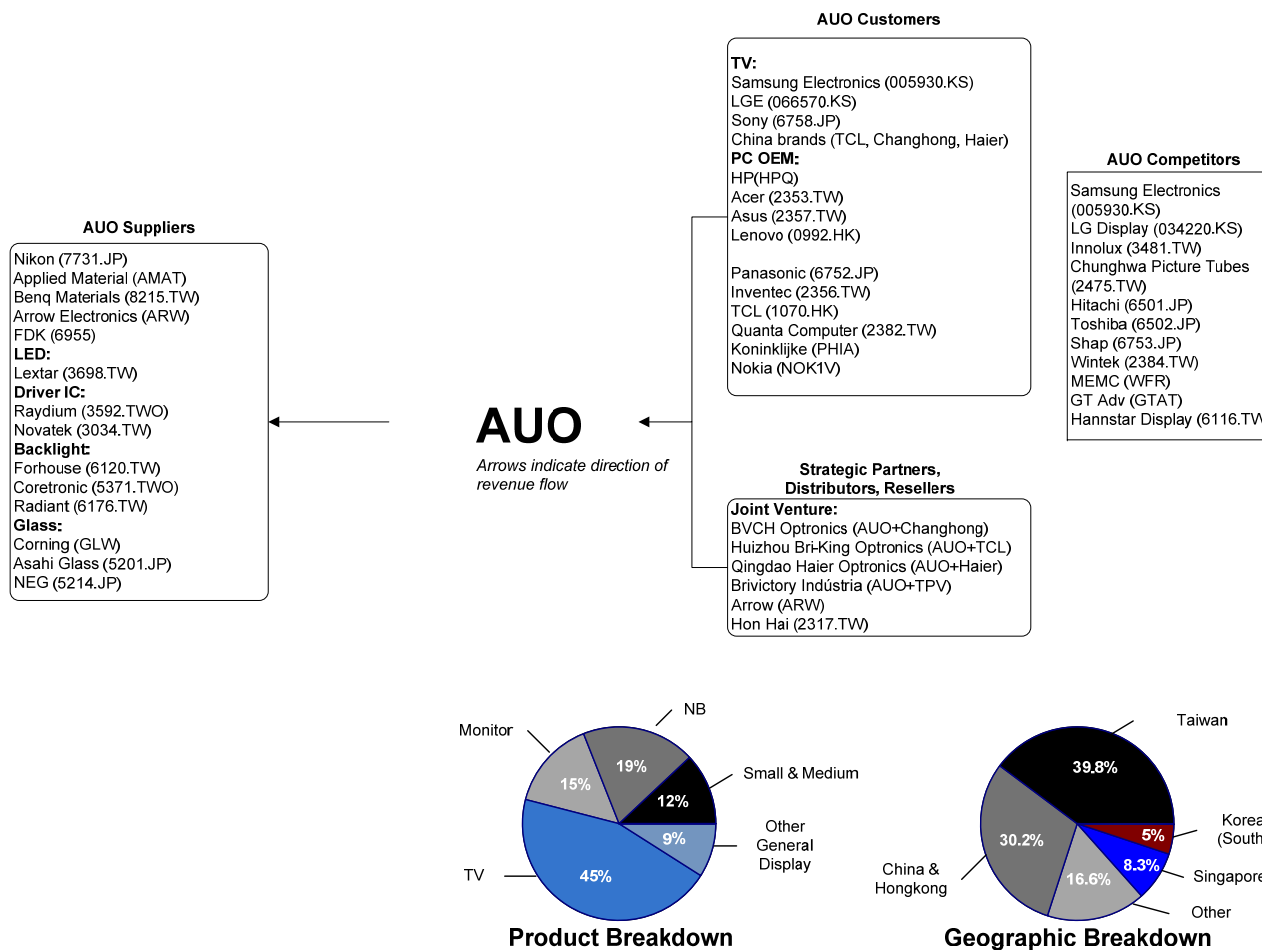
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 292. AU Optronics (2409.TW)

Sector: Semiconductors and Components

AU Optronics (2409.TW; AUO)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Terence Whalen

Avago Technologies

Avago Technologies is a semiconductor vendor that focuses on III-V compound semiconductor devices. III-V chips enable high-speed low-power performance so are particularly well suited for optoelectronic and radio frequency applications. C11 sales included 40% wireless, 28% wired, 26% industrial and automotive, and 5% consumer and computing. By application, Avago sells into handsets, wireline networking and telecom equipment and basestations. Avago has no single customer that accounts for more than 10% of sales. Avago originated as a division of Hewlett Packard and evolved into Agilent Technologies' semiconductor components division. In 2005, private equity firms KKR and Silver Lake Partners purchased Avago. Avago is headquartered in Singapore and employs 3,400 people with ~60% based in Asia. The company has R&D facilities in the U.S., Europe and Asia and manufacturing facilities in Asia and the U.S including 3 internal fabs and 20 packaging facilities. Avago outsources majority of its front-end manufacturing to TSMC and other foundry partners and outsources significantly majority of back-end assembly and test requirements to third party manufacturers including Amertron, SAE (HK) and Hana Micro. Avago's fiscal year ends in October.

Figure 293. Avago (AVGO) Results and Forecasts

	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	1484.0	2093.0	2336.0	2364.0	2469.6	2383.6	2818.0	2639.9
- y/y growth		41.0%	11.6%	1.2%	4.5%	0.8%	14.1%	10.8%
Gross Margins	37.7%	46.2%	49.1%	48.3%	48.9%		49.5%	
Operating Margins	16.4%	26.2%	28.5%	28.2%	26.5%		27.9%	
EPS	0.71	1.99	2.55	2.57	2.50	2.45	2.94	2.78
- y/y growth		179.0%	28.4%	0.5%	-2.5%	-4.7%	17.5%	13.7%
Cash	472.0	561.0	829.0	1084.0	1409.0		2002.8	
Debt	599.0	236.0	6.0	3.0	3.0		3.0	
Net Cash/Shr	1.1	2.2	3.2	4.3	5.5		7.8	
Tangible Book Value/Shr	1.0	3.1	5.4	7.3	9.4		11.8	

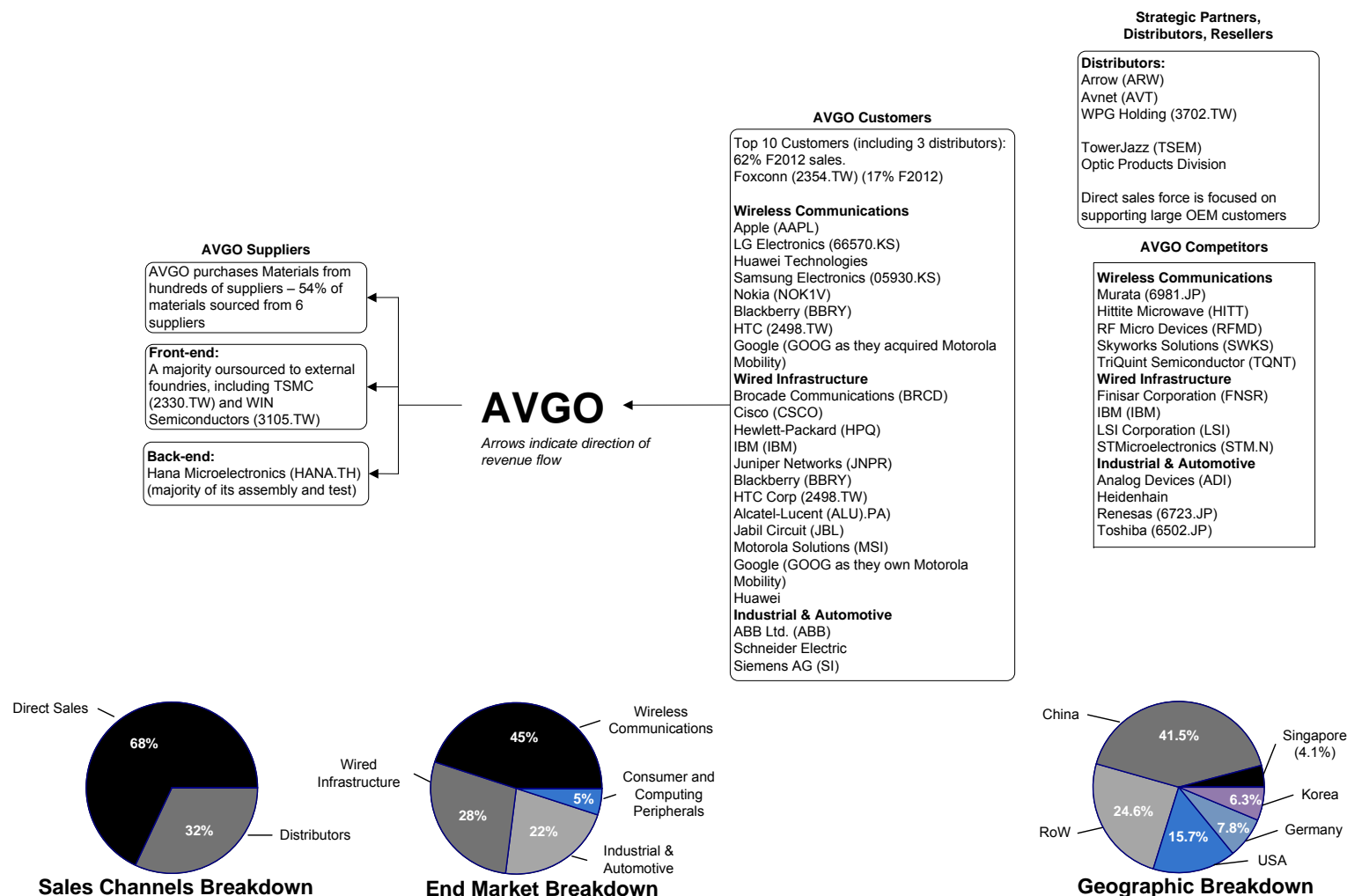
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 294. Avago (AVGO)

Sector: Semiconductors

Avago Technologies (AVGO)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jim Suva, CPA

Avnet Inc

Avnet Inc (AVT) is a leading global distributor of electronics components and computer products, and in 2011 it was the largest global distributor of such products in terms of revenue. Avnet is headquartered in Phoenix, AZ and has ~10,900 employees in over 275 global locations. Avnet has ~300 and >100,000 customers. Sales by geography: ~45% Americas, 29% Europe/EMEASA, and 26% Asia/Pacific. Avnet has two business segments: Electronics Marketing (EM) representing 58% of total sales and Technology Solutions (TS) representing 42% of total sales over the last twelve months.

Figure 295. Avnet (AVT) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	17952.5	16229.9	19160.1	26534.4	25707.5	25292.5	25345.6	26010.5	26540.5
- y/y growth	14.5%	-9.6%	18.1%	38.5%	-3.1%	-1.6%	-1.4%	2.8%	4.7%
Gross Margins	12.9%	12.5%	11.9%	11.7%	11.9%	11.8%		11.8%	
Operating Margins	4.2%	3.0%	3.4%	3.8%	3.7%	3.0%		3.1%	
EPS	3.18	1.91	2.77	4.32	4.06	3.47	3.39	3.75	4.11
- y/y growth	11.9%	-39.8%	44.9%	55.8%	-5.9%	-14.6%	-16.6%	8.1%	21.2%
Cash	640.4	943.9	1092.1	675.3	1006.9	959.9		1358.2	
Debt	1225.3	969.9	1280.2	1516.6	2144.4	2079.6		2079.6	
Net Cash/Shr	-3.5	0.0	-1.0	-3.9	-1.8	-3.9		-1.0	
Tangible Book Value/Shr	16.0	14.7	16.1	20.8	19.0	21.5		25.1	

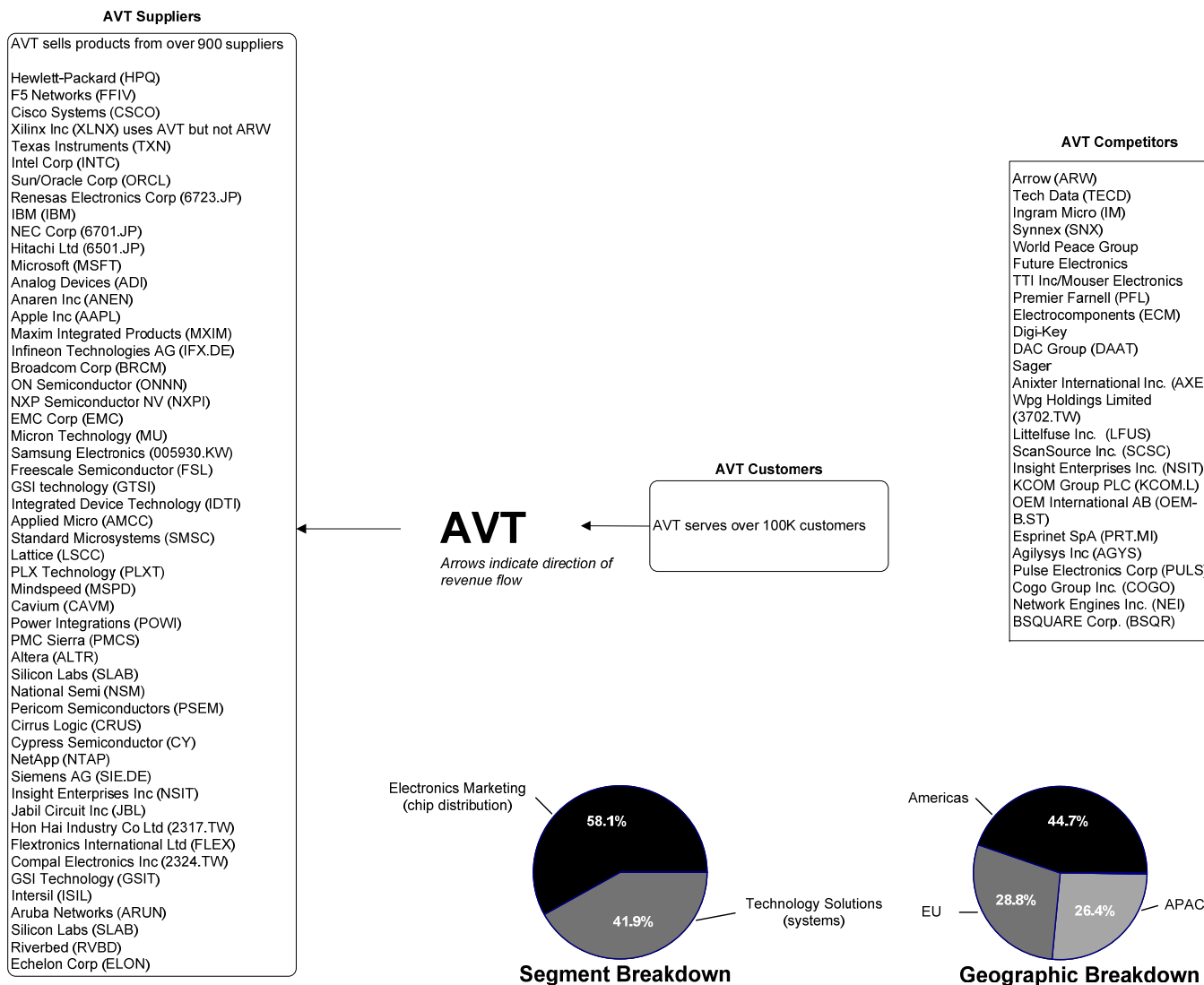
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 296. Avnet (AVT)

Sector: Technology Supply Chain - Distributors

Avnet (AVT)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jim Suva, CPA

AVX Corp

AVX Corp. manufactures and sells passive electronic components around the world with products that include ceramic and tantalum capacitors, film and power capacitors, and resistors. The company is controlled by Kyocera (Japanese electronic conglomerate of electronic components and electronic goods) that owns 70% of the company. AVX also distributes some of Kyocera's products as well as small amount connectors both of which help the company with a broader offering of products. AVX sales are approximately: 60% AVX Passive Components, 25% Kyocera Electronic Devices Resale, and 15% AVX Connectors. Headquartered South Carolina, AVX was founded in 1972, joined the Kyocera group in 1990, and became a publicly traded company in 1995. It has 20 manufacturing facilities in 12 countries. Its end markets are computers 13%, consumer 9%, wireless 16%, telecom 14%, industrial 13%, auto 20%, military 4%, medical 7%, and other 4%.

Figure 297. AVX Results and Forecasts

	2009	2010	2011	2012	2013	CIR 2014E	Street 2014E	CIR 2015E	Street 2015E
Revenues	1389.6	1305.0	1653.1	1545.3	1414.4	1524.5	1507.4	1679.3	1600.5
- y/y growth	-14.2%	-6.1%	26.7%	-6.5%	-8.5%	7.8%	6.6%	10.2%	6.2%
Gross Margins	16.7%	21.3%	27.7%	25.4%	18.6%	17.9%		18.4%	
Operating Margins	7.9%	12.9%	20.0%	17.8%	10.4%	10.0%		11.1%	
EPS	0.62	0.84	1.46	1.20	0.60	0.65	0.65	0.78	0.80
- y/y growth	-30.1%	36.3%	74.2%	-18.1%	-49.6%	7.4%	6.9%	20.2%	24.0%
Cash	546.7	688.5	781.0	813.4	1047.1	877.8		738.9	
Debt	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Net Cash/Shr	3.2	4.0	4.6	4.8	6.2	5.2		4.4	
Tangible Book Value/Shr	8.3	9.1	10.6	11.4	10.0	9.6		9.2	

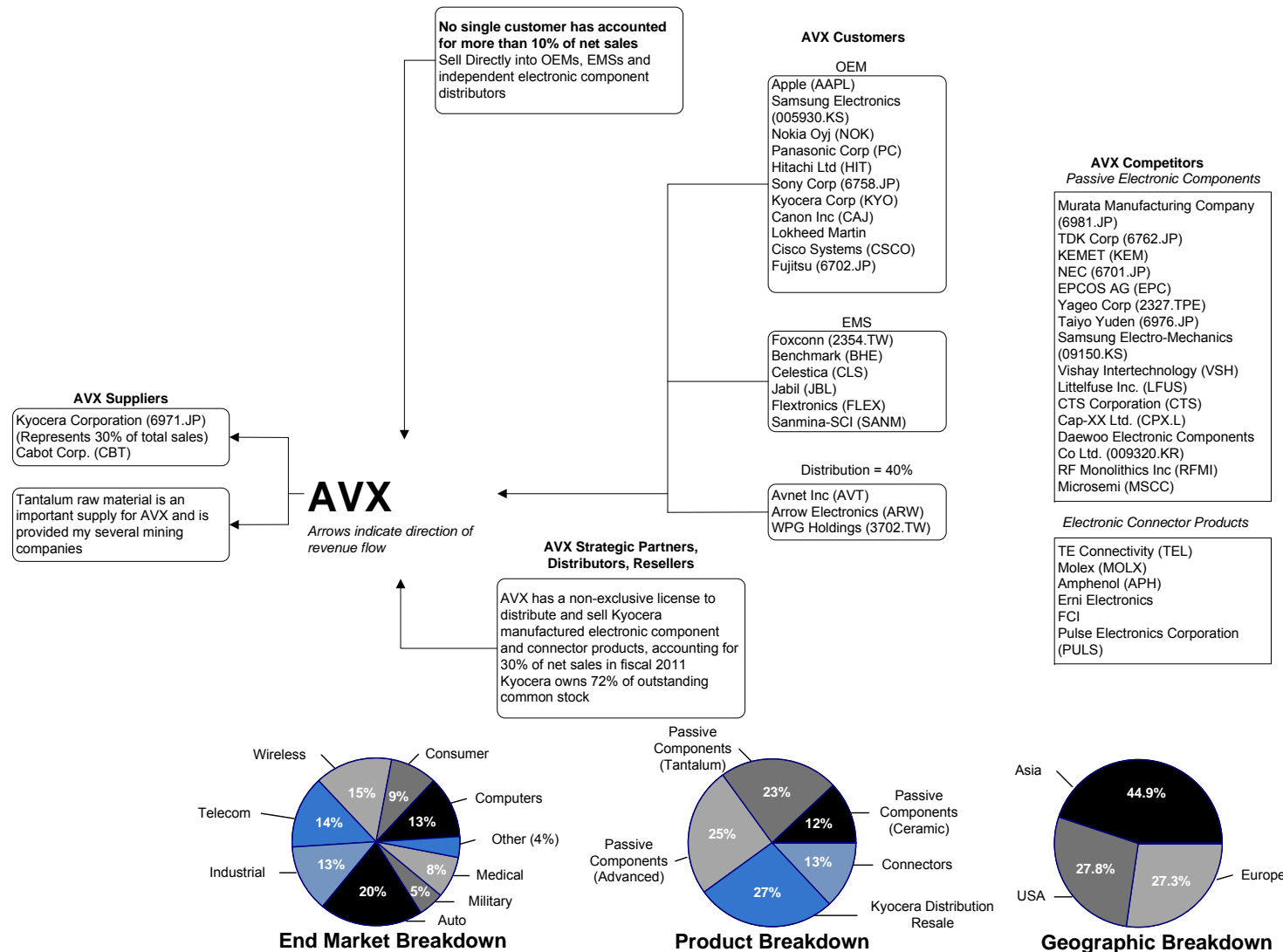
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 298. AVX Corporation (AVX)

Sector: Technology Supply Chain - Passives

AVX Corporation (AVX)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Belden Inc

Belden, Inc. designs, manufactures and markets cable, connectivity and networking products in markets, including industrial automation, enterprise, education, healthcare, entertainment, broadcast, sound and security, transportation, infrastructure, consumer electronics and other industries. It adds value through design, engineering, manufacturing excellence, product quality, and customer service. The company operates its business through three segments: Americas, Europe, Middle East and Africa and Asia Pacific. Belden was founded by Joseph C. Belden in 1902 and is headquartered in St. Louis, MO.

Figure 299. Belden (BDC) Results and Forecasts

	2008	2009	2010	2011	2012	Street 2013E	Street 2014E
Revenues	2005.9	1415.3	1617.1	1982.0	1840.7	2109.91	2225.1
- <i>y/y growth</i>	-1.3%	-29.4%	14.3%	22.6%	-7.1%	14.6%	5.5%
Gross Margins	27.4%	28.1%	28.2%	28.2%	29.9%		
Operating Margins	6.9%	3.3%	8.3%	8.9%	8.4%		
EPS	2.68	1.16	1.77	2.40	2.80	3.63	4.10
- <i>y/y growth</i>	-6.6%	-56.7%	52.6%	35.6%	16.7%	29.7%	12.8%
Cash	227.41	308.88	358.65	382.72	395.10		
Debt	590.00	590.21	551.16	550.93	1151.21		
Net Cash/Shr	3.89	3.26	2.33	3.84	3.03		
Tangible Book Value/Shr	2.01	2.04	3.66	4.25	-8.95		

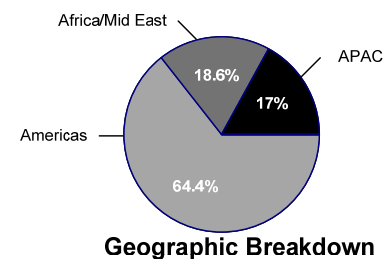
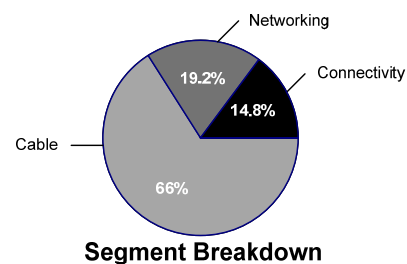
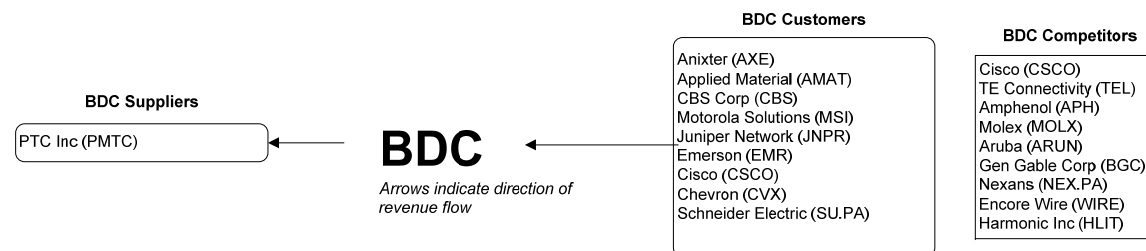
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, FactSet

Figure 300. Belden, Inc. (BDC)

Sector: Technology Supply Chain - Connectors

Belden Inc. (BDC)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jim Suva, CPA

Benchmark Electronics Inc

Benchmark Electronics is a leading provider of electronics manufacturing services to the enterprise computer, telecommunications, medical device, industrial control, and testing and instrumentation markets. Benchmark is a global manufacturer with facilities located in North America, South America, Europe, and Asia. Benchmark's customers rely on Benchmark to manufacture technologically complex products, including telecommunications equipment, high-capacity computer storage devices, and fault-tolerant computer servers. The company's largest customers are IBM (>10% of sales), EMC (~8-9%), Medtronic and AMAT. Sales by end markets include: 31% high-end computing, 10% medical, 27% industrial, 26% telecom, and 7% test and instrumentation.

Figure 301. Benchmark (BHE) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	2590.2	2089.3	2402.1	2253.0	2468.2	2309.4	2318.2	2372.3	2427.9
- y/y growth	-11.2%	-19.3%	15.0%	-6.2%	9.5%	-6.4%	-6.1%	2.7%	4.7%
Gross Margins	6.8%	7.0%	7.9%	6.2%	7.2%	7.2%		7.5%	
Operating Margins	3.3%	2.9%	4.0%	2.2%	3.5%	3.2%		3.6%	
EPS	1.26	0.91	1.38	1.01	1.21	1.11	1.11	1.29	1.31
- y/y growth	-6.0%	-27.4%	51.4%	-27.1%	19.8%	-8.3%	-8.5%	16.2%	18.1%
Cash	359.7	421.2	346.3	283.9	384.6	397.3		437.2	
Debt	11.9	11.7	11.4	11.0	10.6	10.5		10.5	
Net Cash/Shr	5.2	6.3	5.4	4.6	6.6	7.1		8.0	
Tangible Book Value/Shr	15.2	16.4	17.1	18.2	19.5	21.0		22.4	

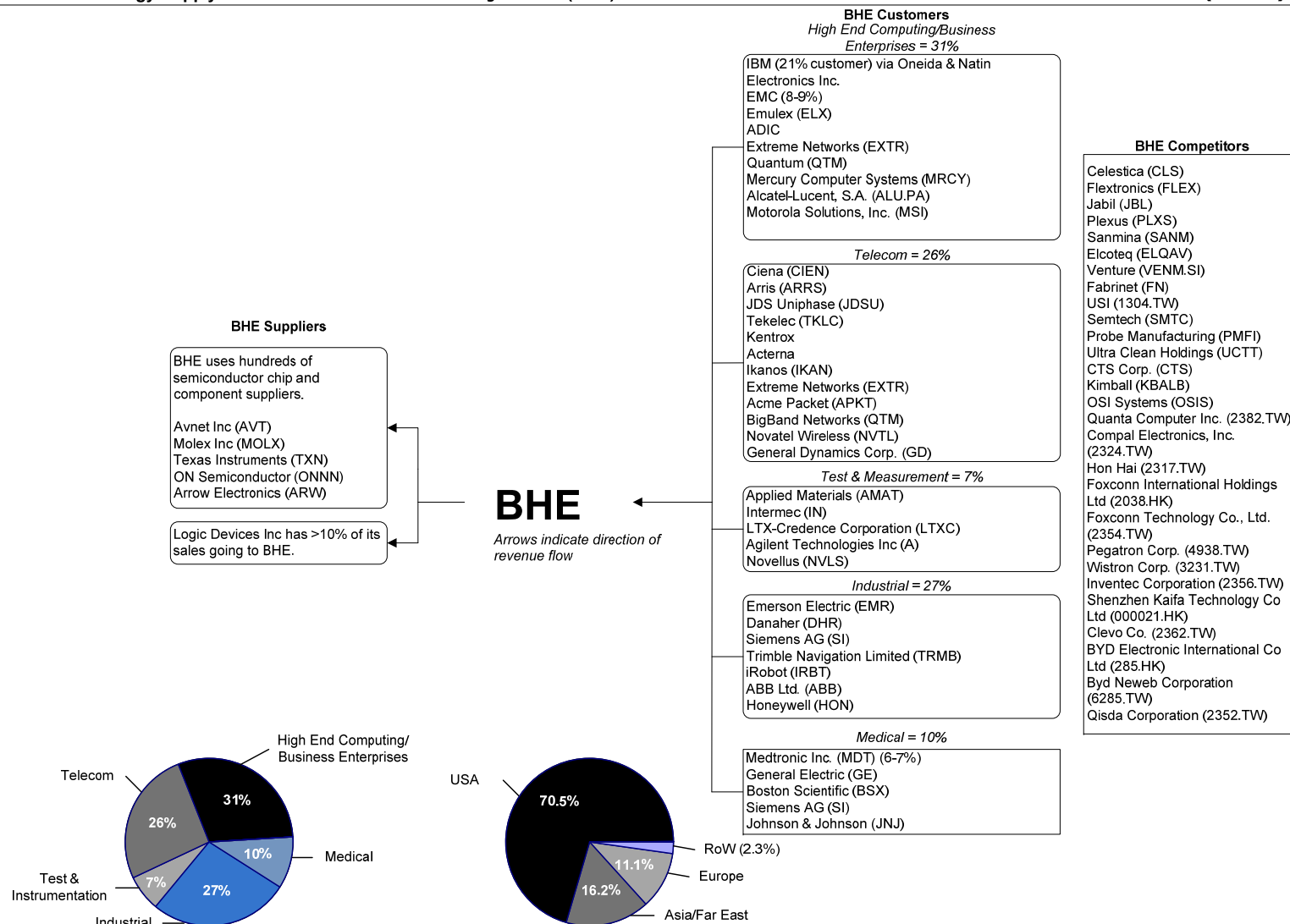
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 302. Benchmark Electronics (BHE)

Sector: Technology Supply Chain – Electronic Manufacturing Service (EMS)

Benchmark Electronics (BHE)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jim Suva, CPA

BlackBerry

BlackBerry develops hardware and software solutions for mobile communications. Through the development of integrated hardware, software, and services, which support multiple wireless network standards, the company provides platforms and solutions. These solutions provide access to information, including e-mail, voice, instant messaging, short message services, the Internet, and intranet-based applications and browsing. The company's technology also enables third party developers and manufacturers to enhance their products and services through software development kits, wireless connectivity to data, and other support programs. The company was founded by Mike Lazaridis, Douglas Fregin, and Jim Balsillie on March 7, 1984 and is headquartered in Waterloo, Canada.

BBRY has seen its market share erode in recent quarters as a result of heightened competition from Apple and Android devices. As of C2012, its market share of smartphones stood at 5%, down from 11% a year ago.

Figure 303. Blackberry (BBRY) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	6009.4	11065.2	14953.2	19907.0	18435.0	11093.0	12851.0	14164.9	13476.2
- y/y growth	97.9%	84.1%	35.1%	33.1%	-7.4%	-39.8%	-30.3%	27.7%	4.9%
Gross Margins	49.5%	44.3%	42.0%	42.1%	36.7%	25.3%		30.7%	
Operating Margins	28.8%	24.6%	23.4%	23.3%	14.8%	-6.2%		0.6%	
EPS	2.26	3.44	4.37	6.34	4.20	-0.64	0.12	0.14	0.34
- y/y growth	104.4%	52.2%	27.2%	44.9%	-33.8%	-115.3%	-97.1%	121.3%	184.2%
Cash	1605.1	1518.2	1911.5	2121.0	1774.0	2654.0		2252.4	
Debt	7.6	0.0	0.0	0.0	0.0	0.0		0.0	
Net Cash/Shr	2.8	2.6	3.4	3.9	3.4	5.1		4.3	
Tangible Book Value/Shr	6.0	8.3	10.9	12.7	12.4	11.5		9.8	

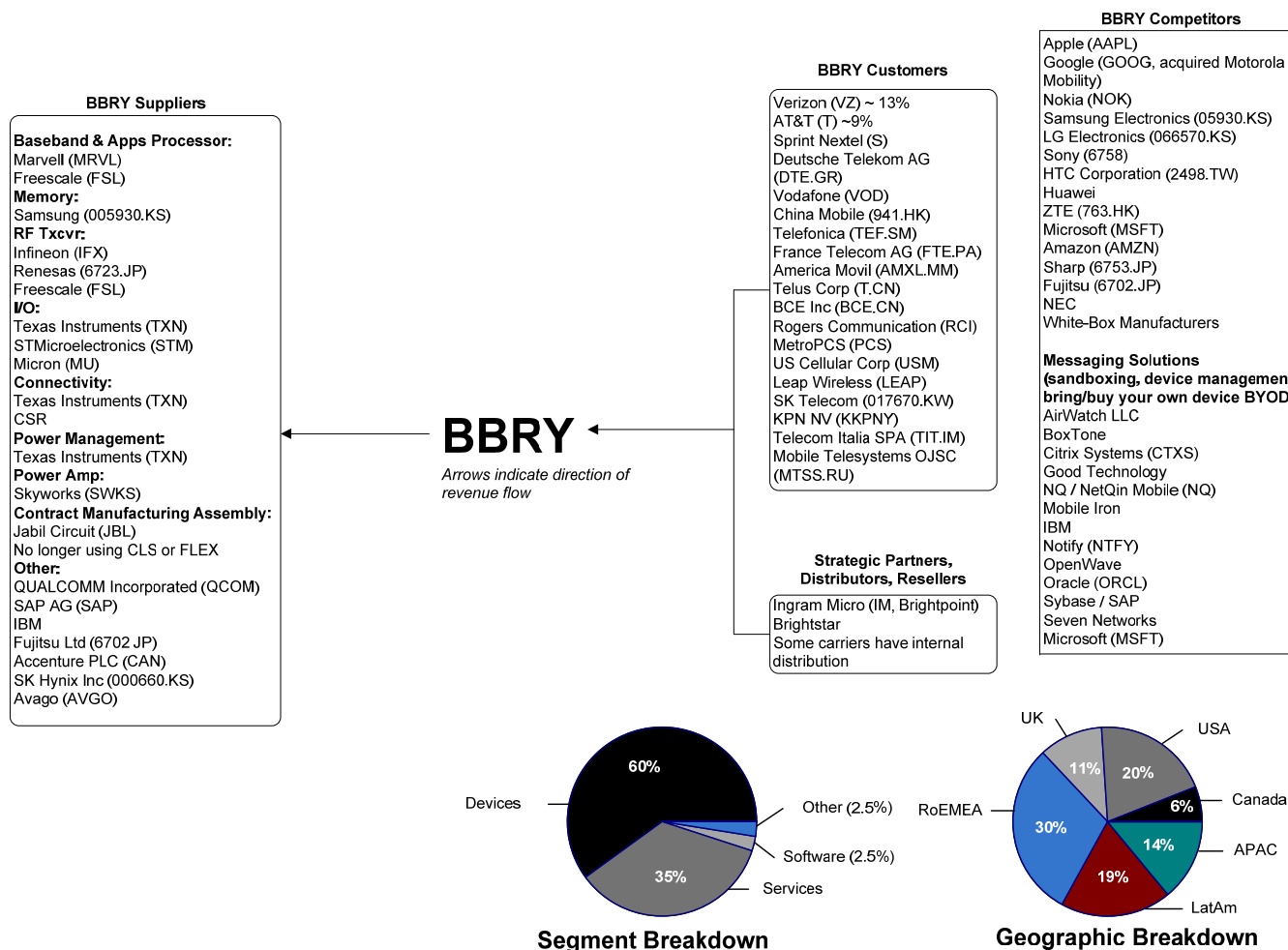
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 304. Blackberry (BBRY)

Sector: Handheld Devices

Blackberry (BBRY)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Glen Yeung

Broadcom Corporation

Broadcom is a fabless semiconductor company that designs and develops semiconductors for wired and wireless communications. Broadcom provides a broad portfolio of system-on-chip (SoC) solutions for manufacturers of broadband access, computing and networking equipment, mobile devices, and consumer electronics. Applications for Broadcom's SoC solutions include digital cable, satellite and IP set-top boxes, HDTV, cable and DSL modems, residential gateways, transmission and switching for networking, server solutions, broadband network and security processors, handsets, GPS, VoIP gateway and telephony systems. However, in the fast-growing fabless semiconductor market, Broadcom is the 2nd largest behind Qualcomm.

Figure 305. Broadcom (BRCM) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	4658.1	4490.3	6818.3	7389.0	8006.0	8582.6	8631.1	8945.5	9456.3
- y/y growth	23.3%	-3.6%	51.8%	8.4%	8.4%	7.2%	7.8%	4.2%	9.6%
Gross Margins	52.5%	50.8%	51.8%	50.9%	49.7%	50.0%		50.3%	
Operating Margins	3.7%	1.2%	15.9%	12.9%	8.4%	11.7%		13.3%	
EPS	0.41	0.13	1.99	1.65	1.25	1.64	2.89	1.87	3.15
- y/y growth	11.2%	-68.9%	1455.8%	-17.1%	-24.2%	31.4%	131.5%	13.8%	8.9%
Cash	1898.1	1929.4	2657.7	4529.0	2374.0	3323.2		4592.4	
Debt	0.0	0.0	697.0	1196.0	1693.0	1694.0		1694.0	
Net Cash/Shr	3.6	3.8	3.6	5.9	1.7	3.3		5.3	
Tangible Book Value/Shr	4.5	4.9	7.6	8.7	4.7	7.1		9.7	

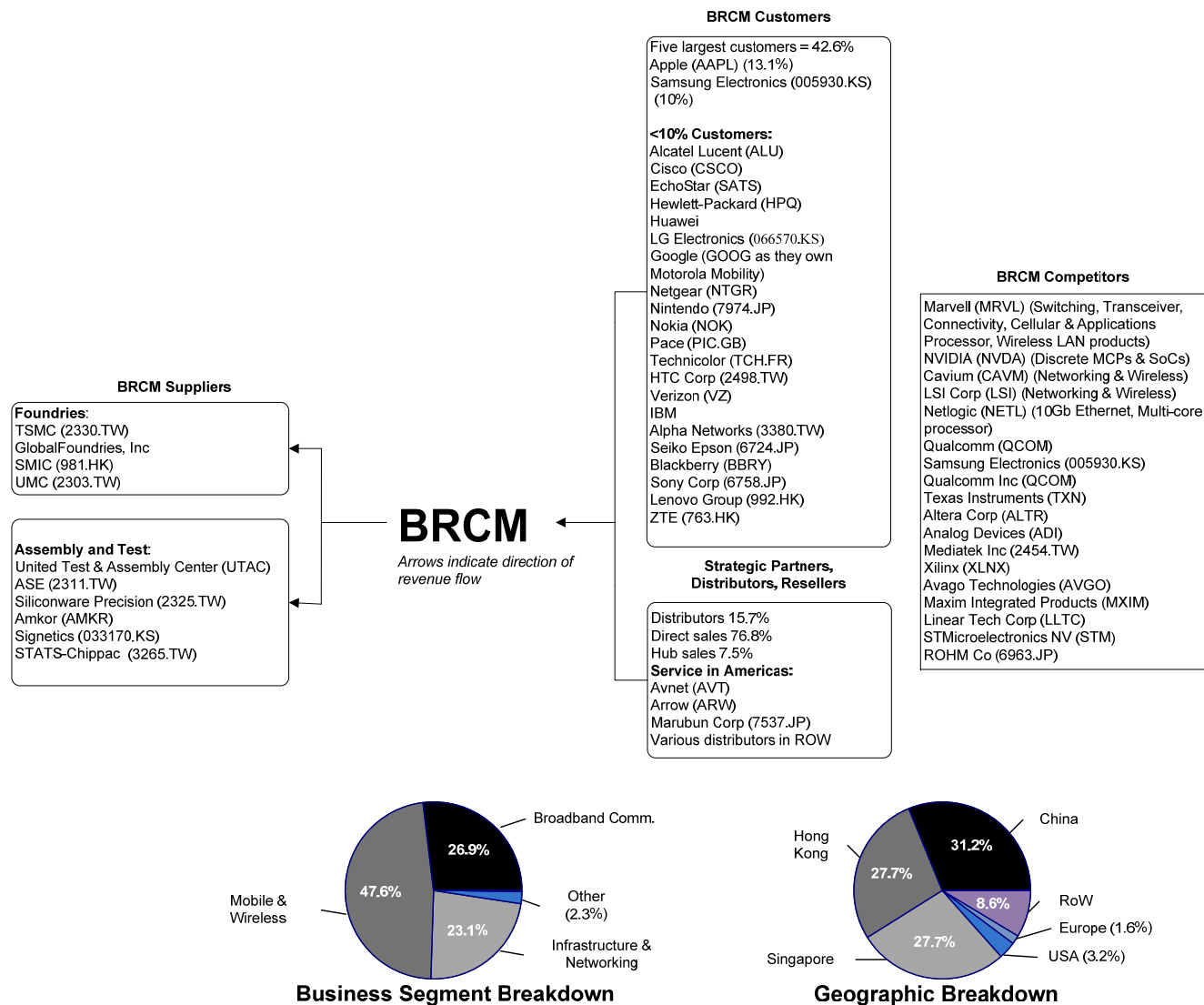
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 306. Broadcom (BRCM)

Sector: Semiconductors

Broadcom (BRCM)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Brocade Communications

Brocade Communications Systems, Inc. is a supplier of networking equipment, including Storage Area Networking ("SAN") solutions and Internet Protocol ("IP") networking solutions for businesses and organizations of many types and sizes, including global enterprises and service providers such as telecommunication firms, cable operators and mobile carriers. It offers a comprehensive line of high-performance networking hardware and software products as well as services that enable businesses and organizations to make their networks and data centers more efficient, reliable and adaptable to the changing demands of new network traffic patterns and volume. The company's products, services and solutions simplify information technology ("IT") infrastructure, increase resource utilization, ensure availability of mission critical applications, and support key IT services, including Internet connectivity and enterprise and end user mobile computing device connectivity, as well as emerging networking requirements such as virtualization, software-defined networking ("SDN"), and cloud computing. It operates through four business segments of which two are individually reportable segments: SAN Products and Global Services. The other two operating segments, Ethernet Switching & IP Routing and ADP, combine to form a third reportable segment: IP Networking Products. The SAN Products segment includes infrastructure products and solutions that assist customers in the development and delivery of storage and server consolidation, disaster recovery and data security, and in meeting compliance issues regarding data management. These products are used to build storage area networks and are generally used in conjunction with servers and storage subsystems, SAN interconnection components such as host bus adapters ("HBAs"), and server and storage management software applications and tools. The Global Services segment includes break/fix maintenance, installation, consulting, network management and software maintenance and customer support revenue. The IP Networking Products segment include Open Systems Interconnection Reference Model ("OSI") Layer 2 and Layer 3 switches and routers that are designed to connect users in an enterprise network, enabling network connectivity such as access to the Internet, network-based communications, and collaboration through unified messaging applications and mobility. Brocade also offers converged network products, and a portfolio of platforms designed for service provider environments as well as carrier Ethernet products. Brocade Communications Systems was founded by Paul R. Bonderson, Jr., Kumar Malavalli and Seth D. Nieman on August 24, 1995 and is headquartered in San Jose, CA.

Figure 307. Brocade (BRCD) Results and Forecasts

	2008	2009	2010	2011	2012	Street 2013E	Street 2014E
Revenues	1466.9	1952.9	2094.4	2147.4	2237.8	2284.59	2341.1
- y/y growth	18.6%	33.1%	7.2%	2.5%	4.2%	2.1%	2.5%
Gross Margins	56.5%	49.4%	55.8%	56.9%	59.2%		
Operating Margins	2.2%	7.2%	10.1%	8.5%	12.8%		
EPS	0.61	0.53	0.59	0.50	0.66	0.68	0.68
- y/y growth	29.3%	-12.5%	11.3%	-15.3%	32.0%	3.0%	-0.4%
Cash	606.63	351.37	335.98	414.98	713.23		
Debt	1224.67	1084.81	929.81	789.44	601.18		
Net Cash/Shr	1.11	0.29	0.62	0.90	1.25		
Tangible Book Value/Shr	2.13	-0.82	0.12	0.38	1.10		

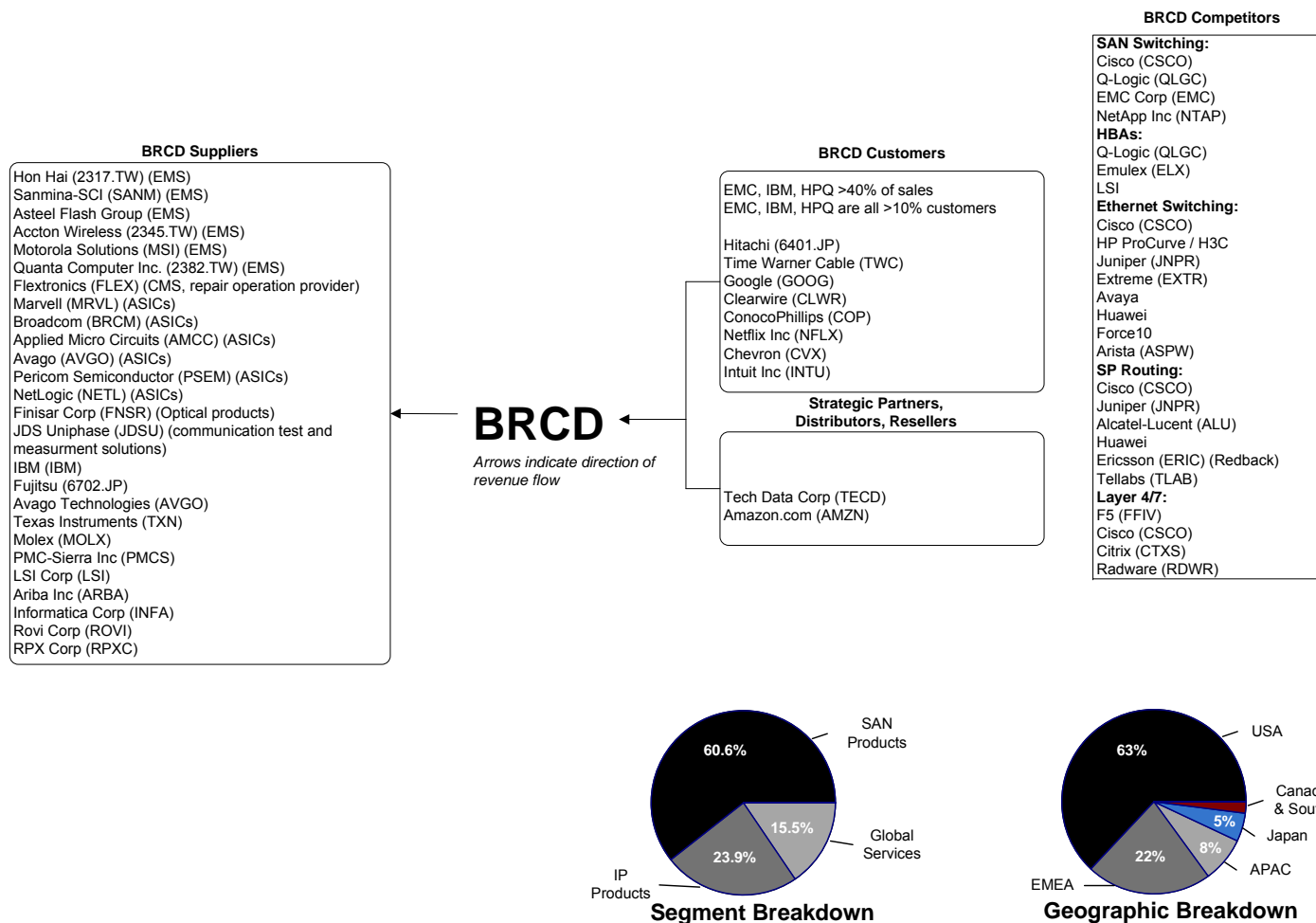
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, FactSet

Figure 308. Brocade (BRCD)

Sector: Storage

Brocade Communications (BRCD)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Terence Whalen

Brooks Automation Inc

Brooks Automation is a leading supplier of automation solutions to the global semiconductor industry and other related industries, including flat panel display manufacturing and data storage. The company was founded in 1978 and became publicly traded in 1995. Partly through acquisitions such as PRI-Automation in May 2002, BRKS has transformed itself from a niche player in the tool automation market to the largest automation player in the semiconductor industry. BRKS serves the semiconductor automation market, being the share leader in tool hardware and #3 in factory hardware. BRKS includes nearly every major chipmaker and equipment OEM in its customer list. The company continues to be well leveraged to the industry transition to 300mm, and after a series of substantial cost reductions, the company is finally starting to see some meaningful operating leverage.

Figure 309. Brooks Automation (BRKS) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	526.4	218.7	593.0	688.1	519.5	490.1	467.0	550.5	538.6
- y/y growth	-29.2%	-58.5%	171.1%	16.0%	-24.5%	-5.7%	-10.1%	12.3%	15.3%
Gross Margins	24.1%	-2.7%	28.0%	32.4%	33.4%	33.8%		35.1%	
Operating Margins	-1.8%	-42.5%	7.7%	12.7%	5.0%	3.4%		6.2%	
EPS	-0.08	-1.47	0.84	1.39	0.48	0.26	0.17	0.51	0.64
- y/y growth	-108.6%	-1636.1%	157.2%	65.3%	-65.9%	-45.2%	-64.3%	96.1%	275.3%
Cash	143.3	88.0	108.8	125.8	141.0	129.6		156.0	
Debt	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Net Cash/Shr	2.2	1.4	1.7	1.9	2.1	2.0		2.4	
Tangible Book Value/Shr	5.6	4.1	5.2	6.0	8.0	8.3		8.7	

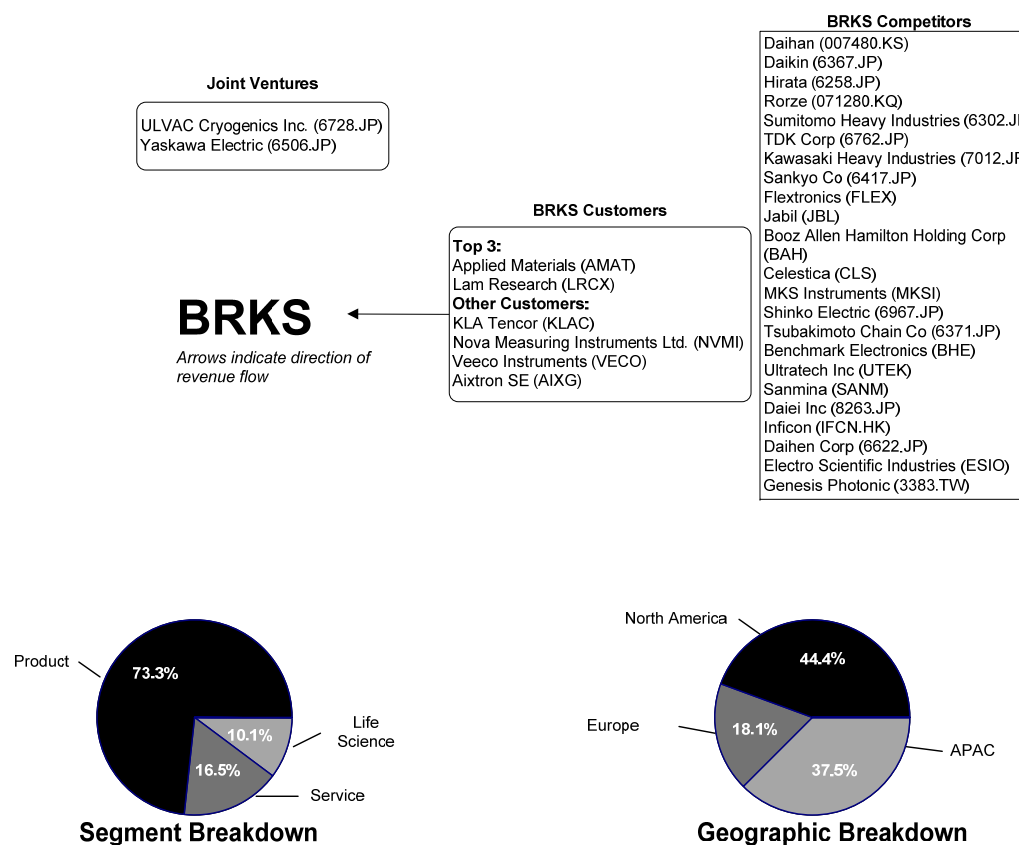
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 310. Brooks Automation (BRKS)

Sector: Semiconductor Equipment

Brooks Automation (BRKS)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Masahiro Shibano

Canon

Canon, Inc. engages in the manufacture and sale of office, consumer, and industrial equipment. It operates through the following segments: Office, Consumer, and Industrial Equipment and Others. The Office segment provides office network digital multi-functional products (MFD), color network digital MFD, personal-use network digital MFD, office copying machines, full-color copying machines, personal-use copying machines, laser printers, large format inkjet printers, and digital production printers. The Consumer segment provides digital single-lens reflex cameras, compact digital cameras, interchangeable lenses, digital video camcorders, inkjet multifunction peripherals, single-function inkjet printers, image scanners, and broadcast lenses. The Industrial Equipment and Others segment provides semiconductor lithography equipment, liquid crystal displays (LCDs), medical image recording equipment, ophthalmic products, magnetic heads, micro motors, computers, handy terminals, document scanners, and calculators. The company was founded on August 10, 1937 and is headquartered in Tokyo, Japan.

Figure 311. Canon (7751.JP) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	4094161.0	3209201.0	3706901.0	3557433.0	3479788.0	3749830.4	3889821.0	3882345.2	4002659.0
- y/y growth	-8.6%	-21.6%	15.5%	-4.0%	-2.2%	7.8%	11.8%	3.5%	2.9%
Gross Margins	47.3%	44.5%	48.1%	48.8%	47.4%	49.3%		50.5%	
Operating Margins	12.1%	6.8%	10.5%	10.6%	9.3%	12.5%		13.7%	
EPS	247.75	106.64	200.25	204.63	190.77	273.09	261.55	306.92	294.04
- y/y growth	-34.3%	-57.0%	87.8%	2.2%	-6.8%	43.2%	37.1%	12.4%	12.4%
Cash	679196.0	795034.0	840579.0	773227.0	666678.0	767553.0		936453.0	
Debt	13963.0	9781.0	11331.0	11711.0	3983.0	4366.0		4366.0	
Net Cash/Shr	537.6	640.0	679.2	633.6	564.5	663.7		810.2	
Tangible Book Value/Shr	1994.2	2015.4	1983.7	1912.7	2253.7	2397.1		2563.7	

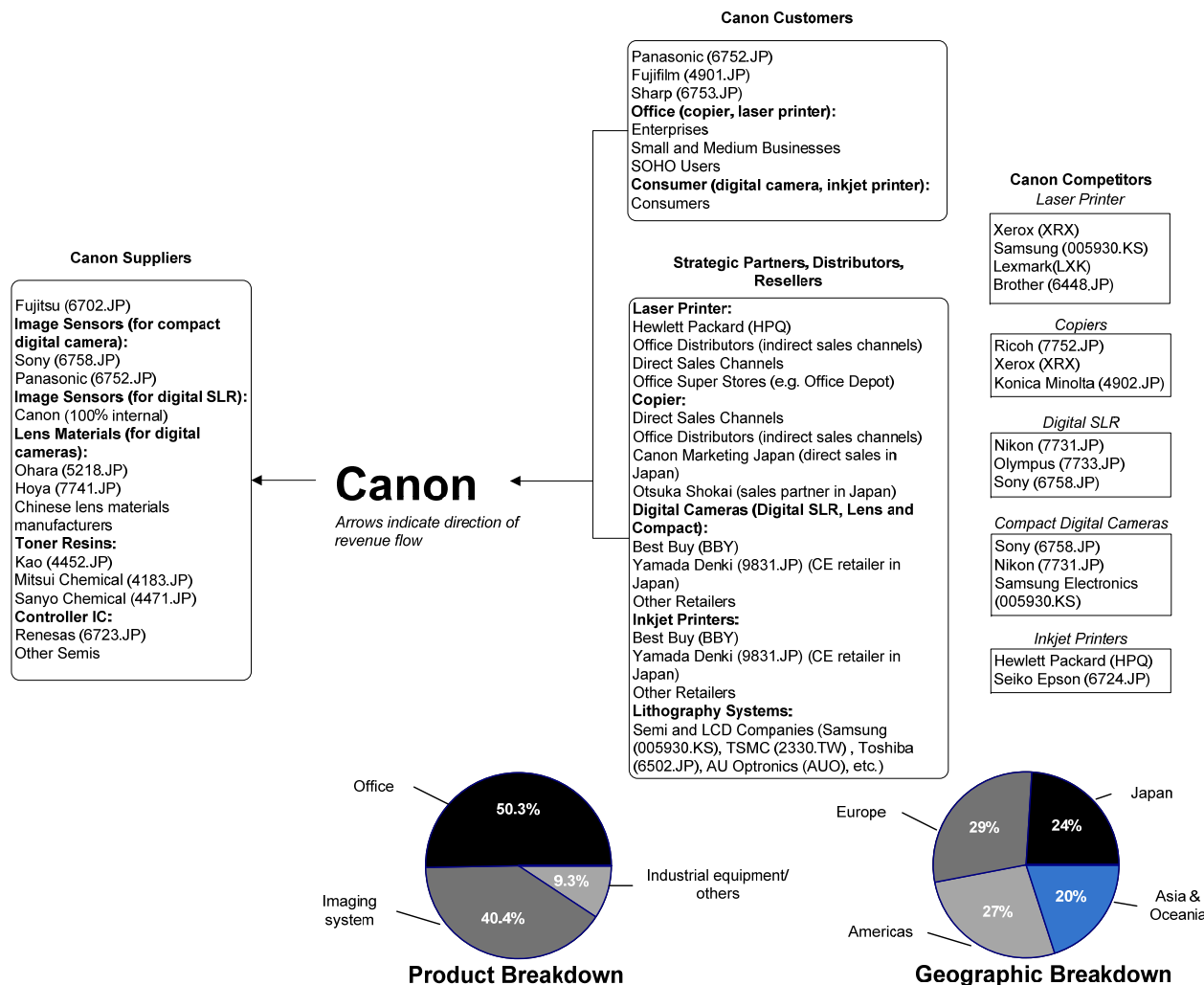
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 312. Canon (7751.JP)

Sector: Imaging

Canon (7751.JP)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Wei Chen

Catcher Technology

Catcher Technology is one of the largest manufacturers of light metal casing (aluminum alloy and magnesium alloy) in the world. Product segments include casings for notebook, smartphone and MP3. Catcher's major customers include Apple, and HTC. NB has accounted for 50-60% of total revenue in 2012 and smartphone for 30%. We expect higher adoption of Unibody casing in NBs.

Figure 313. Catcher (2474.TW) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	19048.5	16988.0	21844.6	35913.8	37028.8	40783.7	43344.2	42920.6	47246.4
- y/y growth	5.3%	-10.8%	28.6%	64.4%	3.1%	10.1%	17.1%	5.2%	9.0%
Gross Margins	40.2%	35.3%	35.5%	47.0%	43.3%	43.5%		42.8%	
Operating Margins	26.2%	21.0%	23.3%	36.8%	32.8%	33.3%		32.7%	
EPS	6.63	5.00	6.21	14.44	14.18	15.56	15.87	14.45	15.79
- y/y growth	-39.9%	-24.6%	24.2%	132.5%	-1.8%	9.7%	11.9%	-7.1%	-0.5%
Cash	7357.9	13723.7	17247.1	40197.8	45725.6	42848.4		43675.1	
Debt	10869.6	18135.8	19580.2	25406.0	31630.0	31387.1		31387.1	
Net Cash/Shr	5.0	8.3	15.7	44.3	55.8	52.5		53.5	
Tangible Book Value/Shr	44.6	48.1	49.1	74.4	81.3	93.9		102.3	

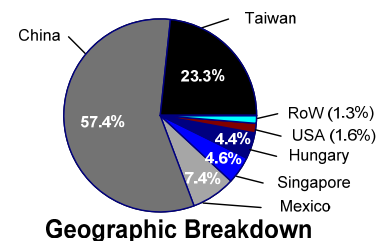
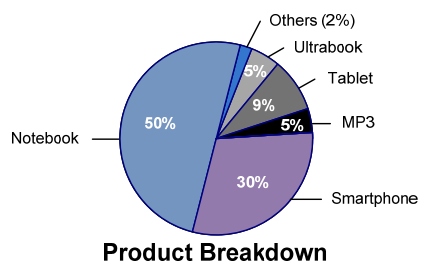
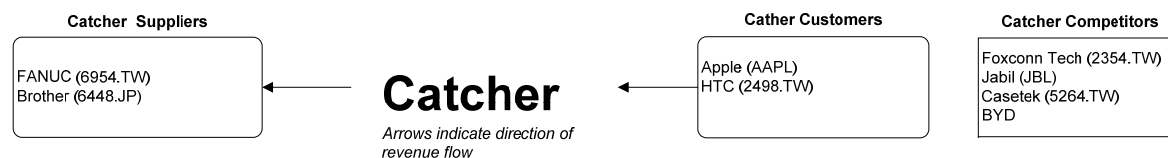
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 314. Catcher (2474.TW)

Sector: PC & Enterprise Hardware

Catcher Technology Co. Ltd. (2474.TW)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jim Suva, CPA

Celestica Inc

Celestica is the fourth-largest EMS company in the world in terms of calendar 2012 revenue. It provides OEMs with complex printed circuit board assembly, full system assembly and integration, test, material management, logistics, and distribution. It also provides advanced design, engineering and supply chain management services, and it manufactures memory and power products. Celestica has been winding down its Research In Motion business which in 2011 was a 20% customer and currently has minimal impact to sales. Other top customers include CSCO, IBM, HPQ, ALU, Oracle and Juniper. Sales by end-market: 35% communications, 17% Consumer, 21% Diversified, 16% Servers and 12% Storage. Originally an IBM manufacturing unit, Celestica was carved out in October 1996 and purchased by an investor group that included Celestica's management. It went public in June 1998 and grew rapidly, but it was slow to begin restructuring after the tech boom.

Figure 315. Celestica (CLS) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	7677.9	6092.2	6526.0	7213.0	6507.2	5748.5	5894.7	6054.5	6265.4
- y/y growth	-4.9%	-20.7%	7.1%	10.5%	-9.8%	-11.7%	-9.4%	5.3%	6.3%
Gross Margins	6.9%	7.3%	7.0%	7.0%	6.8%	6.8%		7.1%	
Operating Margins	3.0%	3.5%	3.4%	3.6%	3.3%	2.7%		3.1%	
EPS	0.74	0.64	0.86	1.05	0.98	0.73	0.77	0.89	0.94
- y/y growth	176.8%	-13.7%	34.4%	22.3%	-7.3%	-25.6%	-20.7%	22.4%	22.0%
Cash	1201.0	937.7	632.8	658.9	550.5	542.1		631.3	
Debt	733.1	222.8	0.0	0.0	55.0	20.0		20.0	
Net Cash/Shr	2.0	4.1	2.7	3.0	2.6	2.9		3.4	
Tangible Book Value/Shr	5.9	6.3	6.0	6.4	5.8	7.1		7.8	

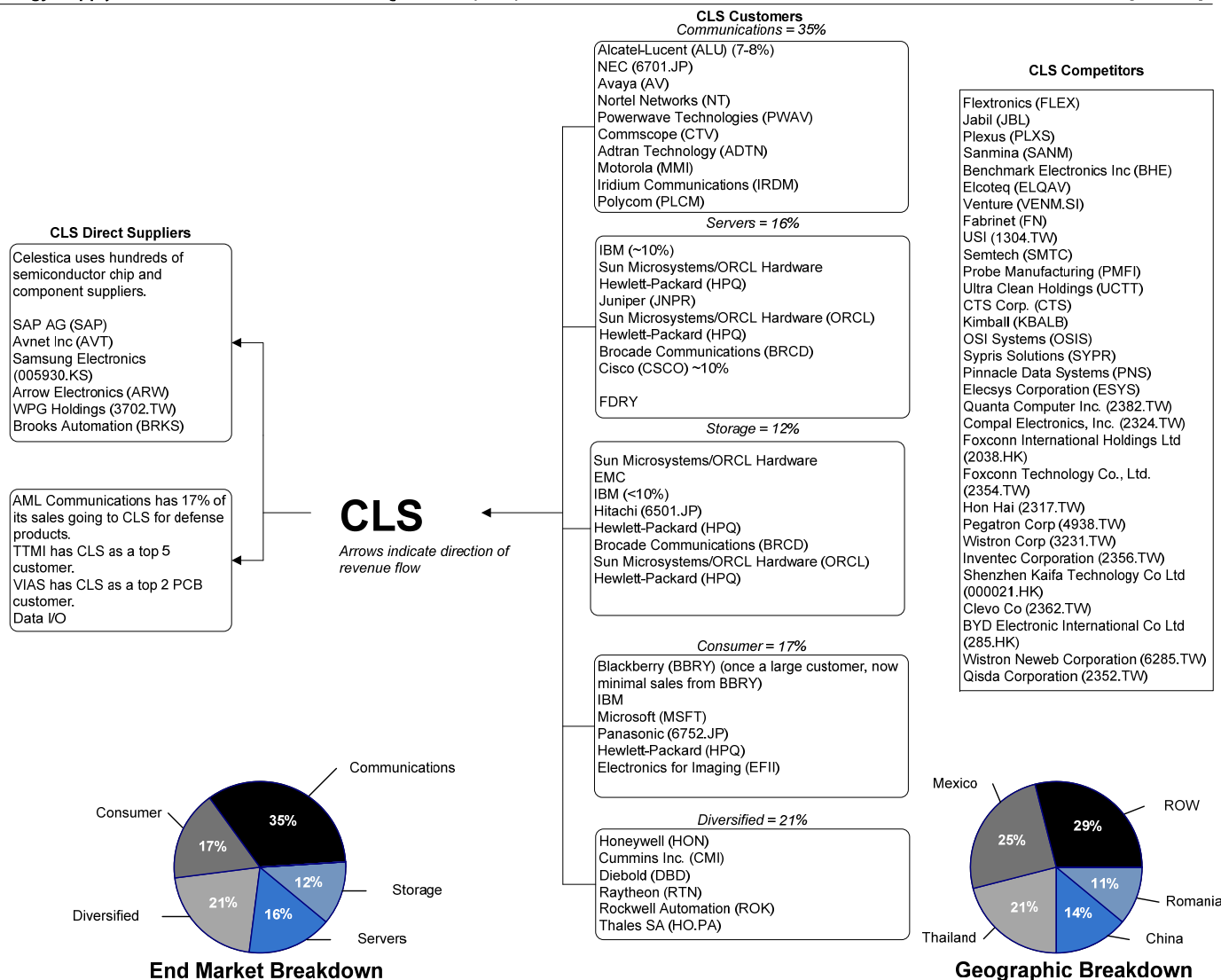
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 316. Celestica (CLS)

Sector: Technology Supply Chain – Electronic Manufacturing Service (EMS)

Celestica (CLS)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jason Channell

Centrotherm Photovoltaics

Centrotherm Photovoltaics AG provides technology and equipment for the photovoltaics sector. Its product portfolio includes the production of silicon, planning and development of silicon plants as well as engineering and key equipment for the manufacturing of polysilicon, ingots, and wafers. The company also provides consulting and engineering services. It was founded by Rolf Hans Hartung, Robert Michael Hartung, and Hans Autenrieth on December 28, 2005 and is headquartered in Blaubeuren, Germany

Figure 317. Centrotherm Photovoltaics (CTN.DE) Results and Forecasts

	2008	2009	2010	2011	2012
Revenues	374.7	509.1	624.2	698.5	N/A
<i>- y/y growth</i>	125.4%	35.9%	22.6%	11.9%	N/A
Gross Margins	18.3%	20.4%	31.5%	18.1%	N/A
Operating Margins	10.2%	7.5%	12.8%	-3.8%	N/A
EPS	2.06	1.35	2.42	-0.75	N/A
<i>- y/y growth</i>	65.2%	-34.5%	79.3%	-131.0%	N/A
Cash	180.90	168.17	191.42	137.63	N/A
Debt	0.00	0.00	30.23	131.41	N/A
Net Cash/Shr	3.87	2.35	3.28	-3.22	N/A
Tangible Book Value/Shr	4.28	5.44	7.74	7.38	N/A

(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, FactSet

Figure 318. Centrotherm Photovoltaics (CTN.DE)

Sector: Alternative Energy

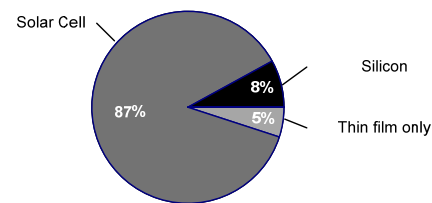
Centrotherm Photovoltaics (CTN.DE)

CTN.DE

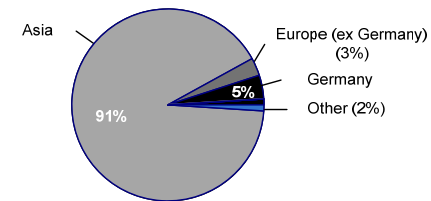
Arrows indicate direction of
revenue flow

Centrotherm Competitors

Applied Materials (AMAT)
GT Solar
Manz (M5Z.DE)
Meyer Burger (MBT.DE)
Roth & Rau



Segment Breakdown



Geographic Breakdown

Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Henry Kim, CFA

Cheil Industries

Cheil manufactures men's and women's apparel, along with chemical products such as acrylonitrile butadiene styrene (ABS), polystyrene (PS), and expanded polystyrene (EPS) resins. Cheil produces textiles as well as materials used in electronic products, such as epoxy molding compound (EMC).

Figure 319. Cheil (001300.KS) Results and Forecasts

	2008	2009	2010	2011	2012	Street 2013E	Street 2014E
Revenues	3849033.1	4405486.6	5121300.7	5580979.5	6009889.6	6700195.00	7536648.0
- <i>y/y growth</i>	21.9%	14.5%	16.2%	9.0%	7.7%	11.5%	12.5%
Gross Margins	28.9%	22.8%	29.2%	27.4%	29.9%		
Operating Margins	6.0%	5.7%	6.5%	3.5%	5.4%		
EPS	3149.66	2540.00	5174.00	5079.00	3981.00	5793.81	7233.53
- <i>y/y growth</i>	4.1%	-19.4%	103.7%	-1.8%	-21.6%	45.5%	24.8%
Cash	34378.20	96910.84	40429.28	96615.29	146459.36		
Debt	721582.56	523767.44	327405.95	852706.06	1269453.42		
Net Cash/Shr	1862.19	9637.66	9012.19	3955.37	2212.70		
Tangible Book Value/Shr	30474.56	37896.33	56871.55	55055.11	55164.57		

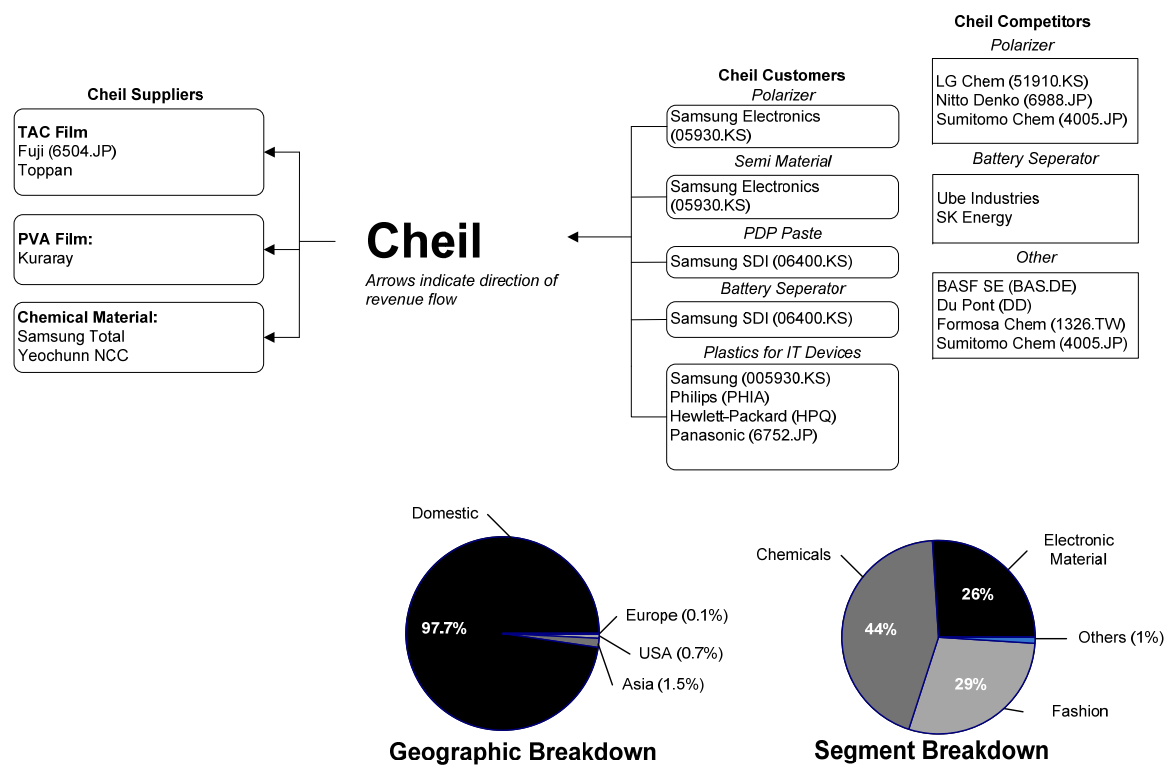
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 320. Cheil Industries (001300.KS)

Sector: Diversified

Cheil Industries (001300.KS)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Wei Chen

Chicony Electronics

Founded in 1983, Chicony is one of the world's largest PC peripheral makers with a leading market share in keyboards, PC webcams, NB camera modules, and NB adapters. With manufacturing sites in DongGuan and Suzhou, China, alongside an extensive global logistics network, the company cooperates closely with PC OEM/ODMs such as HP, Acer, and Toshiba, retailers such as Carrefour, and peripheral brand names such as Microsoft.

Figure 321. Chicony (2385.TW) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	48406.0	53947.9	60437.3	60686.0	67509.7	76664.0	76396.2	82564.1	83920.8
- y/y growth	18.1%	11.4%	12.0%	0.4%	11.2%	13.6%	13.2%	7.7%	9.8%
Gross Margins	17.9%	18.2%	14.7%	14.8%	15.8%	16.2%		16.7%	
Operating Margins	7.6%	7.5%	5.2%	3.5%	6.0%	6.3%		6.8%	
EPS	4.41	5.01	5.45	6.23	5.69	6.62	6.70	7.50	7.25
- y/y growth	87.1%	13.5%	8.7%	14.4%	-8.7%	16.4%	17.7%	13.3%	8.2%
Cash	2945.2	3747.1	4811.1	6272.2	5418.8	6321.1		6689.9	
Debt	9331.8	5593.2	7030.5	8616.8	6548.2	6548.2		6548.2	
Net Cash/Shr	3.0	0.2	1.1	6.2	0.9	2.2		2.7	
Tangible Book Value/Shr	12.4	17.8	20.5	24.7	24.5	27.2		29.8	

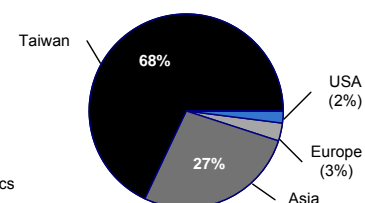
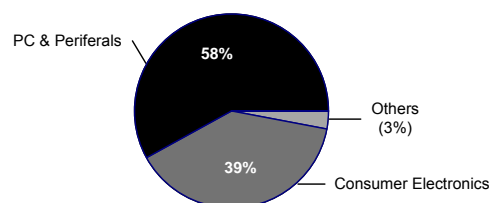
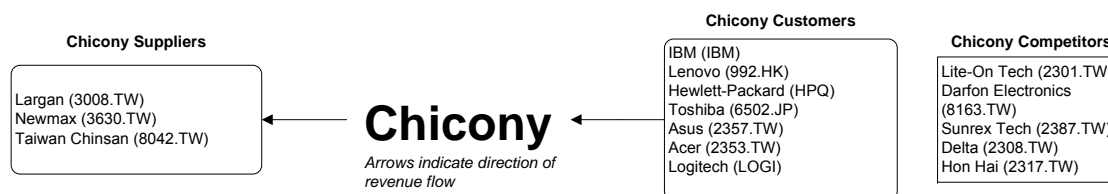
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 322. Chicony Electronics (2385.TW)

Sector: PC & Enterprise Hardware

Chicony Electronics Co. Ltd. (2385.TW)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Roland Shu

Chipbond Technology

Chipbond was established in 1997 to provide turnkey services for back-end assembly processing of LCD driver ICs from wafer bumping to packaging. The acquisition of International Semiconductor Technology (IST) in 2010 has made Chipbond the largest LCD driver IC back-end supplier.

Figure 323. Chipbond (6147.TW) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	5263.7	5210.9	12595.7	13226.0	15012.8	17352.3	17089.0	19210.0	19528.1
- <i>y/y growth</i>	-10.1%	-1.0%	141.7%	5.0%	13.5%	15.6%	13.8%	10.7%	14.3%
Gross Margins	13.1%	15.5%	28.6%	23.4%	28.6%	29.2%		31.5%	
Operating Margins	6.2%	7.9%	23.2%	16.7%	21.5%	22.2%		23.8%	
EPS	0.24	1.11	4.56	2.99	4.31	5.42	5.52	6.03	6.51
- <i>y/y growth</i>	-93.1%	355.8%	309.9%	-34.5%	44.2%	25.8%	28.1%	11.3%	17.8%
Cash	1671.8	2204.9	2767.0	6565.4	4931.2	7887.5		9939.4	
Debt	4687.9	4174.7	5355.6	8131.9	6110.0	5796.6		5706.1	
Net Cash/Shr	-5.8	-1.1	-1.3	3.2	3.1	8.5		12.0	
Tangible Book Value/Shr	17.1	19.2	26.7	27.3	29.6	32.5		35.3	

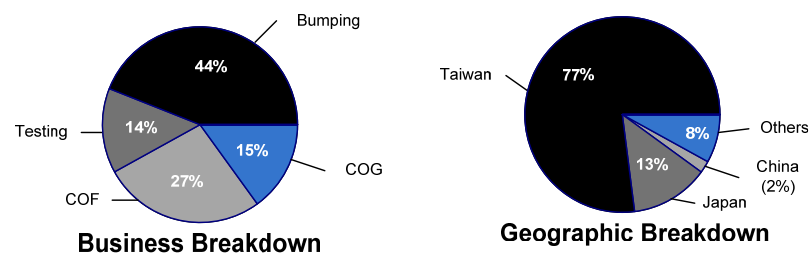
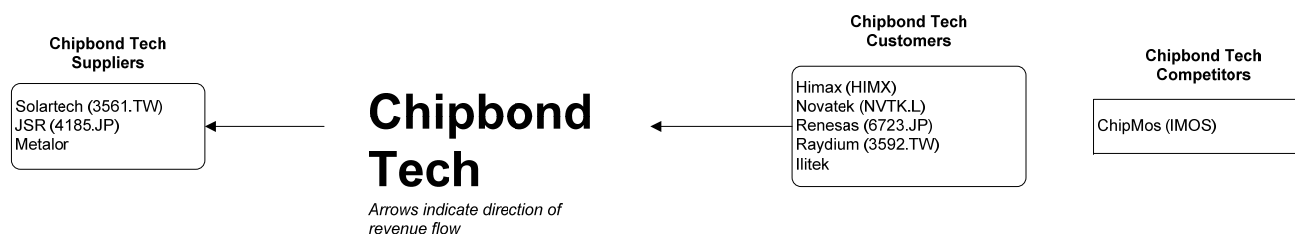
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 324. Chipbond (6147.TW)

Sector: Semiconductors

Chipbond Technology (6147.TWO)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Kevin Dennean, CFA

Ciena Corp

Ciena is a provider of networking equipment used primarily in optical telecom networks worldwide. The company is focusing its efforts on developing a product portfolio to target the transition of multiple legacy communications networks to a converged, next-generation architecture. Ciena offers a full suite of transport and switching products from core to access, with an increasing emphasis on Ethernet, complemented by a professional support and consulting services.

Founded in 1992, Ciena is headquartered in Linthicum, MD and has 4,201 employees globally. Ciena generated approximately 40% of FY2010 sales internationally.

Figure 325. Ciena (CIEN) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	902.4	652.6	1236.6	1742.0	1833.9	2024.3	1981.0	2303.2	2174.6
- y/y growth	15.7%	-27.7%	89.5%	40.9%	5.3%	10.4%	8.0%	13.8%	9.8%
Gross Margins	51.2%	44.6%	45.7%	42.6%	40.9%	43.2%		44.2%	
Operating Margins	11.2%	-7.6%	-2.3%	1.0%	1.9%	5.9%		9.5%	
EPS	1.16	-0.51	-0.52	-0.25	-0.24	0.67	0.43	1.39	0.88
- y/y growth	-17.2%	-144.0%	-1.8%	52.4%	4.5%	383.9%	283.9%	107.8%	102.8%
Cash	917.0	1048.9	688.7	541.9	692.5	499.9		694.5	
Debt	798.0	798.0	1442.7	1442.4	1442.0	1208.7		1208.7	
Net Cash/Shr	1.1	2.8	-8.1	-9.2	-5.3	-5.8		-3.3	
Tangible Book Value/Shr	5.0	4.3	-2.8	-3.3	-3.4	-2.5		-0.8	

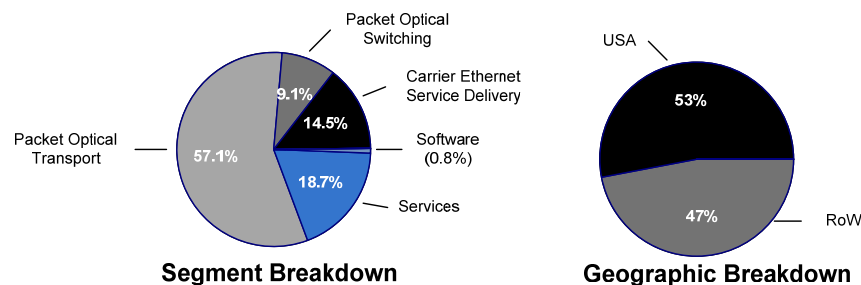
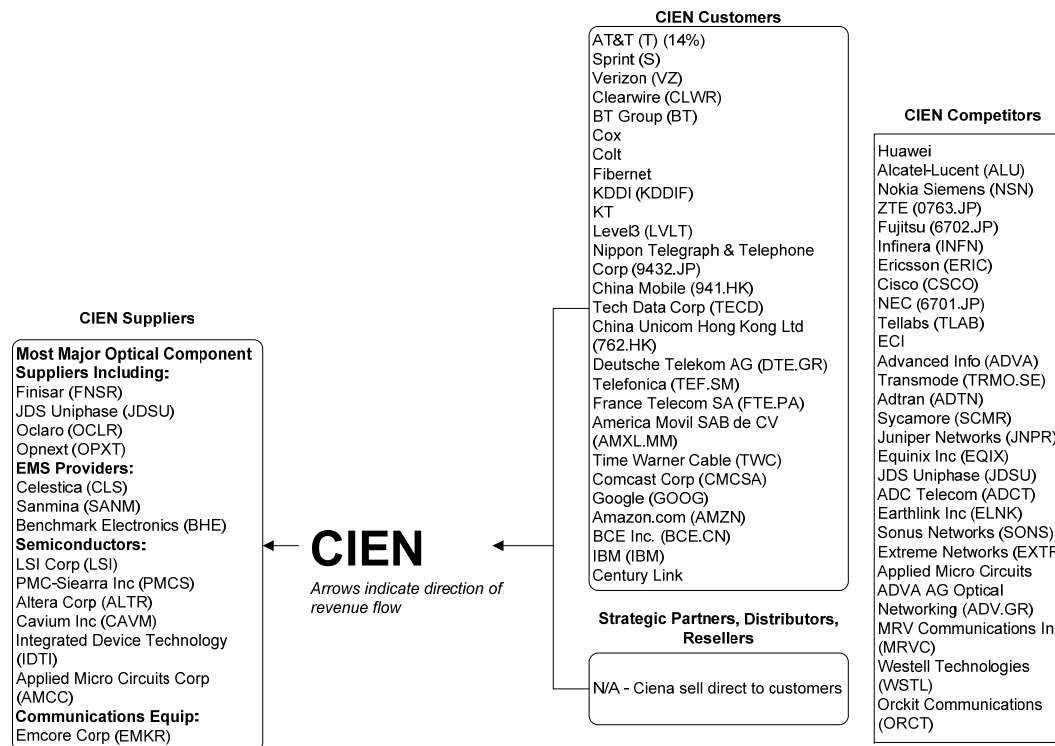
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 326. Ciena (CIEN)

Sector: Communications Equipment

Ciena Corp. (CIEN)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Kevin Dennean, CFA

Cisco Systems Inc.

Cisco Systems, Inc. is the world's largest provider of communications equipment. It has a dominant share in switches and routers across both enterprises and service providers; these products account for 33% and 19%, respectively of the company's \$43 billion of FY11 (October 2011) revenues. Through its Service Provider Video segment (8% of FY11 revenues), Cisco is a leading provider of IP set-top boxes, cable modems, residential gateways, and infrastructure used in homes and businesses by carriers to deliver video content. The Collaboration segment (9% of FY11 revenues) consists primarily of the WebEx online meeting and communication service and the Telepresence video conferencing solution. The Wireless segment (3% of FY11 revenues) provides wireless access points and associated equipment for enterprises. The Security segment (3% of FY11 revenue) provides firewall, intrusion prevention, remote access, VPNs, unified client, web and email security and network security to enterprises and service providers. Data Center (2% of FY11 revenue) consists of the Unified Computing System server platform, WAN optimization, and application delivery products. Other products (3% of FY11 revenue) consists of consumer home networking (Linksys) and other emerging technologies. Cisco's services segment (20% of FY11 revenues) provides technical support services (warranty, maintenance, software) and advanced services (consulting and planning) services.

Founded in 1984, Cisco is headquartered in San Jose, CA and had 72 thousand employees globally.

Figure 327. Cisco (CSCO) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	39540.0	36117.0	40040.0	43218.0	46061.0	48277.5	48691.1	51558.0	51376.9
- y/y growth	13.2%	-8.7%	10.9%	7.9%	6.6%	4.8%	5.7%	6.8%	5.5%
Gross Margins	65.4%	65.0%	65.2%	63.3%	62.4%	62.0%		61.7%	
Operating Margins	29.5%	27.1%	29.2%	26.2%	27.7%	27.4%		27.5%	
EPS	1.53	1.35	1.61	1.62	1.85	1.95	1.99	2.10	2.10
- y/y growth	14.4%	-12.0%	19.6%	0.4%	14.4%	5.2%	7.4%	7.6%	5.4%
Cash	26235.0	35001.0	39861.0	44585.0	48716.0	49637.0		58528.7	
Debt	6393.0	10295.0	15284.0	16822.0	16328.0	16291.0		16291.0	
Net Cash/Shr	3.2	4.2	4.7	5.1	6.0	6.2		7.9	
Tangible Book Value/Shr	3.4	4.2	4.3	5.1	6.1	6.6		8.4	

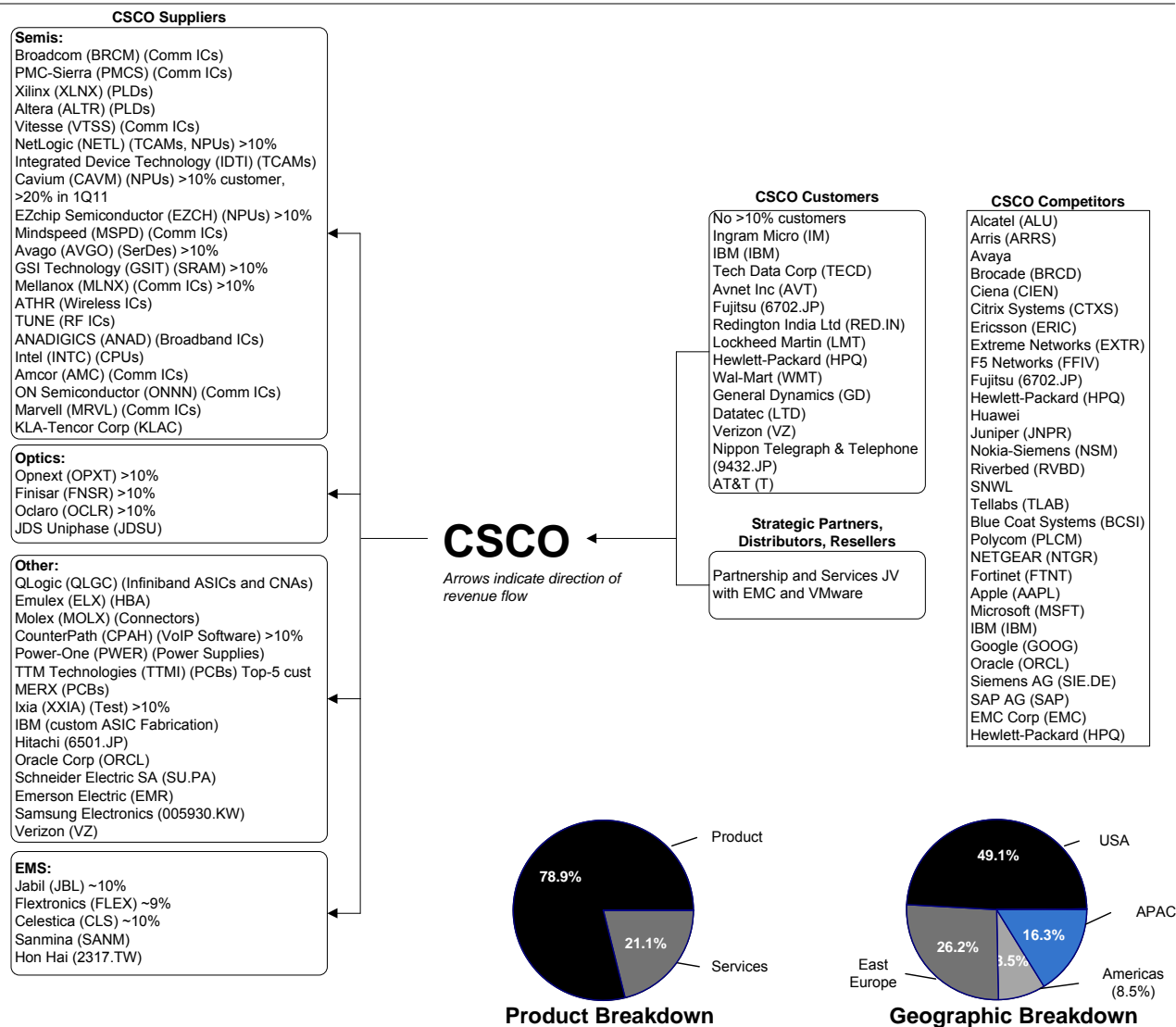
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 328. Cisco Systems (CSCO)

Sector: Telecom Equipment

Cisco (CSCO)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Compal Communications

Compal Communications Inc (CCI) is a handset ODM vendor in Taiwan. Its parent company, Compal Electronics, owns an approximately 50% stake. Since 2004, CCI has designed and manufactured low-end Android and Windows mobile smartphones for global handset OEMs. Among those OEMs, Nokia and Motorola are the largest customers.

Figure 329. Compal Communications (8078.TW) Results and Forecasts

	2008	2009	2010	2011	2012	Street 2013E	Street 2014E
Revenues	36183.1	24851.4	14423.8	18325.3	45471.3	40721.65	55316.1
- y/y growth	-25.7%	-31.3%	-42.0%	27.0%	148.1%	-10.4%	35.8%
Gross Margins	9.5%	11.3%	9.4%	9.1%	8.4%		
Operating Margins	2.0%	1.6%	-5.2%	-2.6%	2.4%		
EPS	2.19	1.31	-0.56	-0.27	1.92	1.51	2.64
- y/y growth	-67.1%	-40.2%	-142.8%	51.8%	811.1%	-21.2%	74.5%
Cash	8044.17	10767.20	8887.13	4581.25	9525.23		
Debt	0.00	0.00	14.64	272.48	1422.96		
Net Cash/Shr	0.87	5.80	-1.75	-6.28	7.56		
Tangible Book Value/Shr	18.46	18.60	16.39	15.75	17.64		

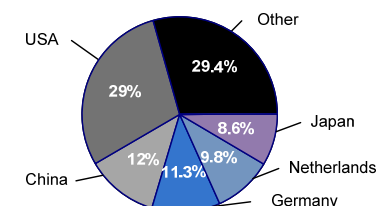
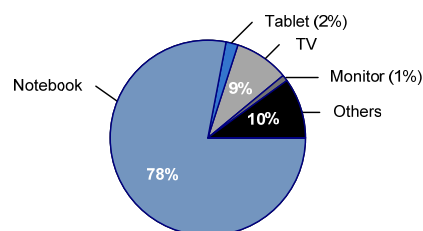
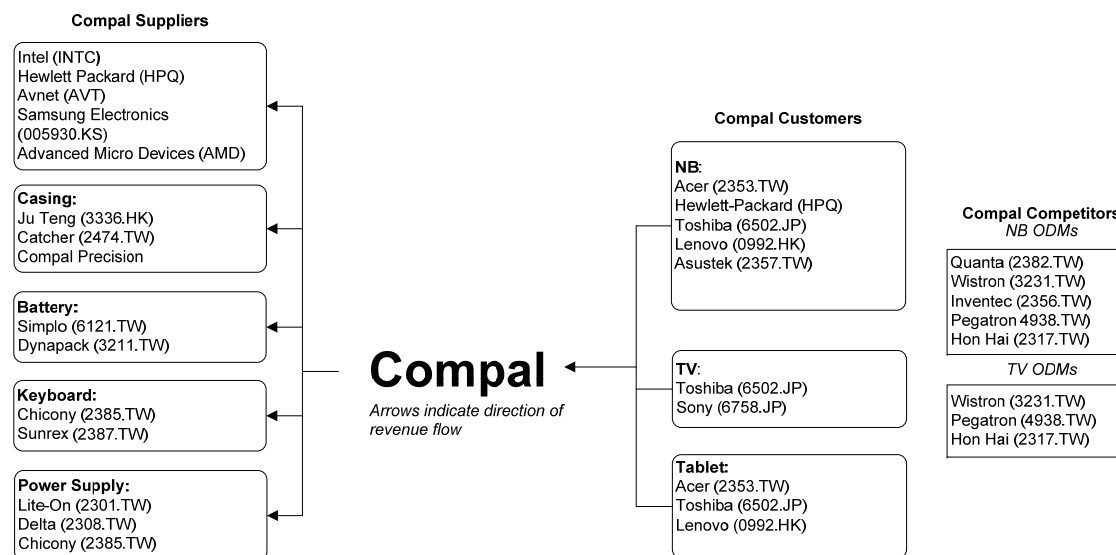
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, FactSet

Figure 330. Compal Communications (8078.TW)

Sector: PC & Enterprise Hardware

Compal Electronics (2324.TW)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Wei Chen

Compal Electronics

Established in 1984, Compal Electronics is a Taiwanese original design manufacturer (ODM) of notebook (NB) PCs for various NB brands including Acer, Toshiba, HPQ, and Lenovo. It is the world's second-largest NB ODM in terms of shipments in 1H12, next to Quanta Computer.

Figure 331. Compal Electronics (2324.TW) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	478748.1	675305.2	887004.1	693126.6	682891.4	725836.4	731993.8	750228.3	776275.9
- y/y growth	-3.9%	41.1%	31.3%	-21.9%	-1.5%	6.3%	7.2%	3.4%	6.0%
Gross Margins	7.0%	6.1%	5.1%	4.8%	4.4%	4.3%		4.3%	
Operating Margins	3.6%	3.3%	2.7%	1.9%	1.5%	1.4%		1.5%	
EPS	3.25	4.66	5.26	2.49	1.45	1.62	2.02	1.94	2.13
- y/y growth	-8.1%	43.1%	12.8%	-52.6%	-41.6%	11.3%	39.0%	20.0%	5.4%
Cash	46585.7	47672.9	63870.1	52630.9	44345.8	56632.8		62999.8	
Debt	15895.7	31651.2	39176.9	15014.4	37131.8	30550.6		30550.6	
Net Cash/Shr	9.4	11.5	14.4	11.9	9.9	12.7		14.2	
Tangible Book Value/Shr	20.0	23.7	25.6	24.1	24.2	26.0		27.2	

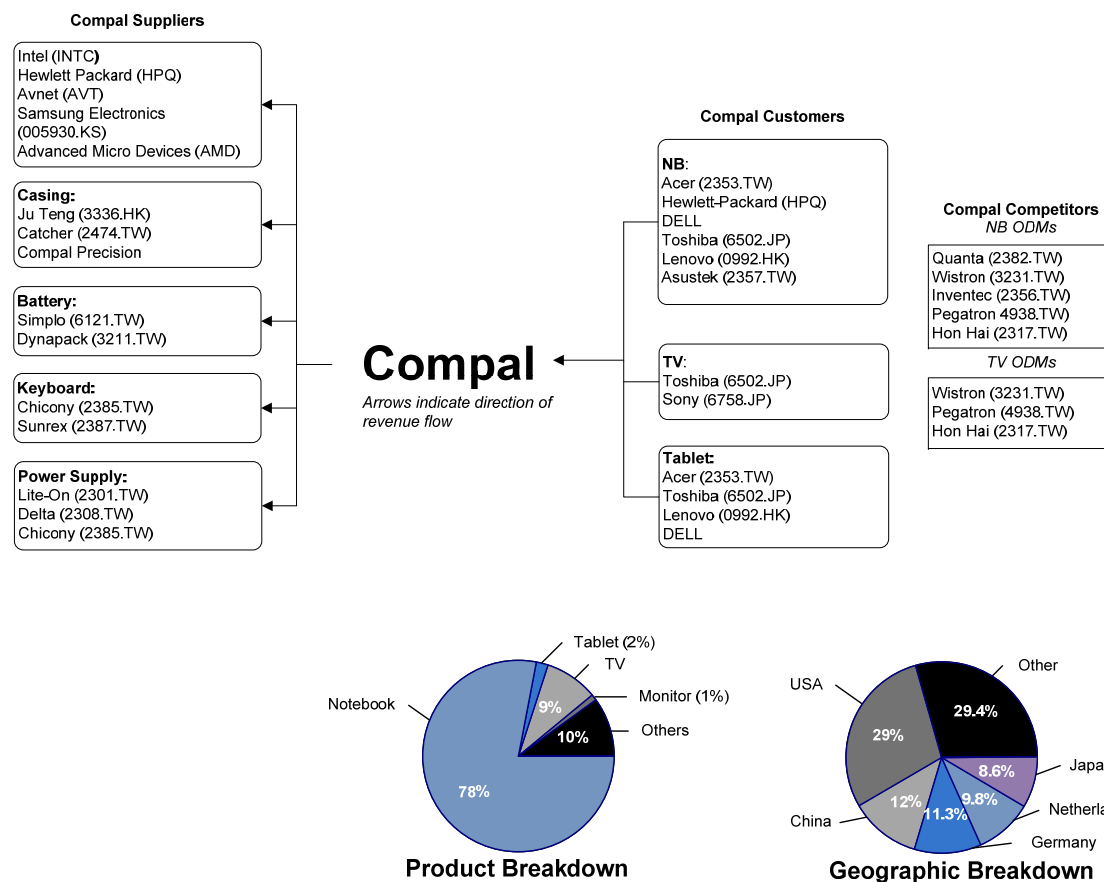
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 332. Compal Electronics (2324.TW)

Sector: PC & Enterprise Hardware

Compal Electronics (2324.TW)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jim Suva, CPA

Corning Incorporated

Founded in 1851, Corning, Inc. develops and manufactures specialty glass and ceramics. The company provides high-performance glass for notebook computers, flat panel desktop monitors, LCD televisions, and other information display applications; optical fiber and cable and hardware and equipment products for the telecommunications industry; ceramic substrates for gasoline and diesel engines in automotive and heavy duty vehicle markets; laboratory products for the scientific community and specialized polymer products for biotechnology applications; advanced optical materials for the semiconductor industry and the scientific community; and other technologies. It operates through five segments: Display Technologies, Telecommunications, Environmental Technologies, Specialty Materials and Life Sciences. The Display Technologies segment manufactures glass substrates for active matrix liquid crystal displays, which are used primarily in notebook computers, flat panel desktop monitors and LCD televisions. The Telecommunications segment produces optical fiber and cable, and hardware and equipment products for the worldwide telecommunications industry. The Environmental Technologies segment manufactures ceramic substrates and filter products for emissions control in mobile and stationary applications around the world. The Specialty Materials segment manufactures products, which provides more material formulations for glass, glass ceramics and fluoride crystals to meet demand for unique customer needs. The Life Sciences segment manufactures glass and plastic labware, equipment, media and reagents to provide workflow solutions for scientific applications. Corning is based in Corning, New York, and has more than 28,000 employees worldwide.

Figure 333. Corning (GLW) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	5948.2	5395.1	6632.0	7890.1	8011.5	8153.3	8075.4	8520.5	8641.7
- y/y growth	1.5%	-9.3%	22.9%	19.0%	1.5%	1.8%	0.8%	4.5%	7.0%
Gross Margins	46.0%	38.8%	46.0%	45.2%	42.4%	43.1%		43.2%	
Operating Margins	20.4%	11.8%	22.2%	23.1%	18.3%	19.2%		19.2%	
EPS	1.53	1.35	2.07	1.76	1.29	1.29	1.28	1.40	1.39
- y/y growth	8.3%	-11.9%	53.7%	-14.8%	-27.0%	0.6%	-0.5%	8.5%	8.5%
Cash	2816.0	3583.0	6350.0	5825.0	6144.0	5838.5		5275.3	
Debt	1605.0	2004.0	2319.0	2391.0	3458.0	2929.0		2929.0	
Net Cash/Shr	0.8	1.1	2.6	2.2	1.8	2.1		1.8	
Tangible Book Value/Shr	8.4	9.6	12.0	12.9	13.4	13.6		14.2	

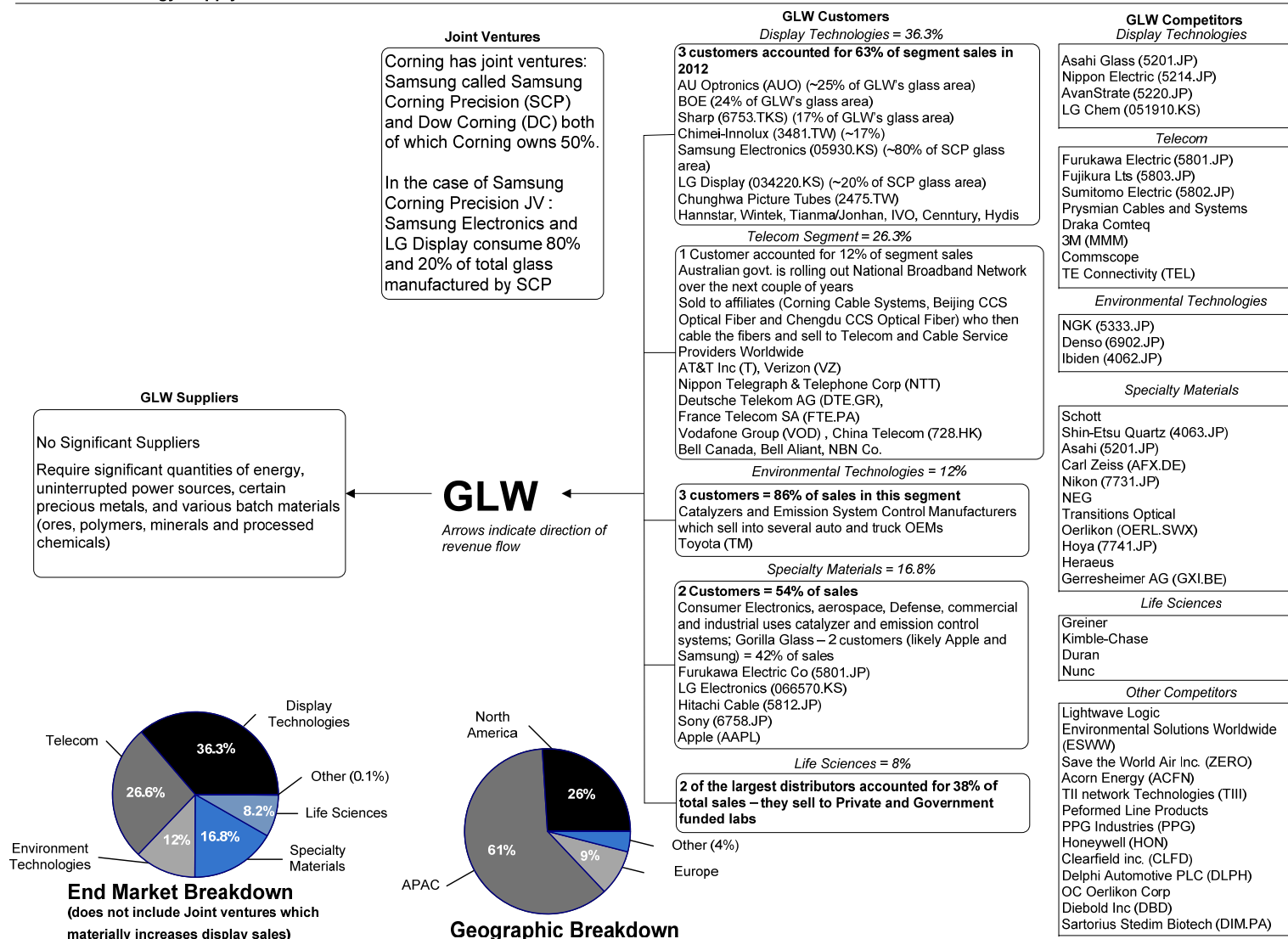
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 334. Corning Incorporated (GLW)

Sector: Technology Supply Chain

Corning Incorporated (GLW)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Amit Harchandani

CSR Plc

CSR plc is a provider of Bluetooth, location, FM, Wi-Fi, audio, video, and camera technologies. It was formed in 1999 and floated on the London Stock Exchange in 2004. It is headquartered in Cambridge, UK, and has more than 3,000 employees working in over 35 offices worldwide. CSR operates a fabless business model.

Figure 335. CSR Plc (CSR.L)

	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	385.2	518.3	527.2	647.1	606.9	605.5	558.1	567.8
- y/y growth		34.5%	1.7%	22.7%	-6.2%	-6.4%	-8.0%	-6.2%
Gross Margins	44.6%	47.7%	49.8%	50.8%	53.3%		58.1%	
Operating Margins	2.4%	9.9%	5.8%	7.2%	10.4%		10.8%	
EPS	0.13	0.27	0.13	0.17	0.30	0.29	0.30	0.31
- y/y growth		119.4%	-51.2%	28.5%	73.5%	70.2%	-0.3%	5.8%
Cash	255.2	282.1	178.8	205.0	208.5		225.1	
Debt	0.2	0.0	0.0	0.0	0.0		0.0	
Net Cash/Shr	1.6	1.6	1.0	1.0	1.3		1.4	
Tangible Book Value/Shr	2.0	1.8	1.6	1.2	1.6		1.8	

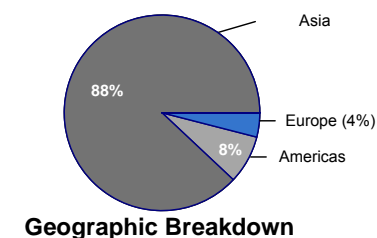
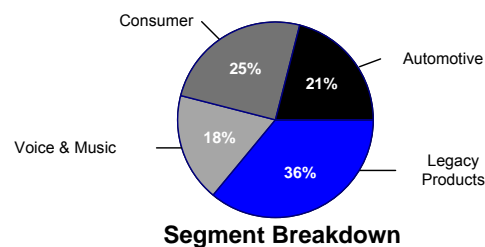
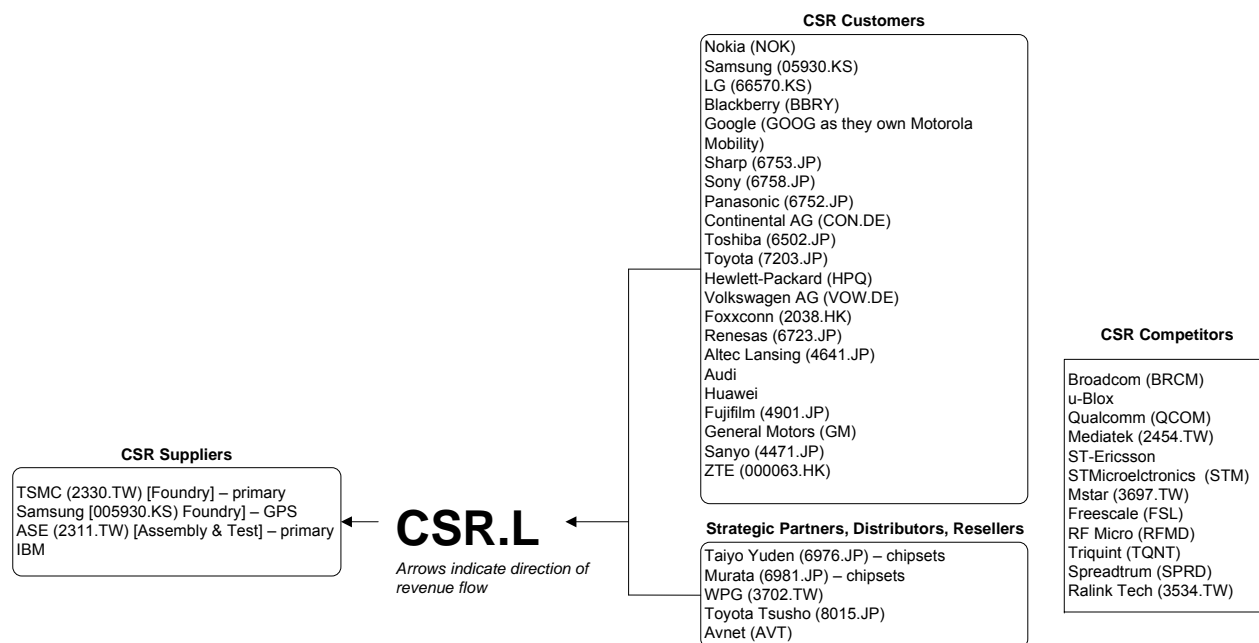
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 336. CSR PLC (CSR.L)

Sector: Semiconductors

CSR Plc (CSR.L)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Glen Yeung

Cypress Semiconductor Corp

Cypress Semiconductor, founded in 1982, designs and manufactures a range of semiconductor solutions, including its proprietary programmable system-on-a-chip (PSoC) platform (which has been successful in touchscreen controllers), static random access memory (SRAM), and data communication devices (USB & West Bridge controllers). The company has aligned its businesses along the following end-markets: 1) Computation and Consumer; 2) Memory Products Division; and 3) Data Communications Division. Cypress has 3,500 employees, is headquartered in San Jose, California, and operates a "fab-lite" strategy with a fab in Minnesota that manufactures ~50% of Cypress's output.

Figure 337. Cypress (CY) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	1800.2	667.8	877.5	995.2	769.7	738.5	765.7	837.2	843.5
- y/y growth	12.7%	-62.9%	31.4%	13.4%	-22.7%	-4.1%	-0.5%	13.4%	10.2%
Gross Margins	36.3%	47.1%	58.4%	57.3%	55.4%	51.2%		52.1%	
Operating Margins	11.7%	1.9%	21.8%	23.7%	12.6%	7.9%		12.9%	
EPS	0.72	0.07	0.95	1.25	0.56	0.31	0.43	0.60	0.77
- y/y growth	-23.0%	-90.0%	1213.5%	32.1%	-54.9%	-45.2%	-24.2%	95.3%	79.2%
Cash	237.8	299.6	434.3	166.3	117.2	163.8		201.6	
Debt	28.0	0.0	0.0	0.0	232.0	232.0		232.0	
Net Cash/Shr	1.6	2.1	2.2	0.9	-0.7	-0.4		-0.2	
Tangible Book Value/Shr	3.9	4.0	4.1	2.2	0.5	0.3		0.6	

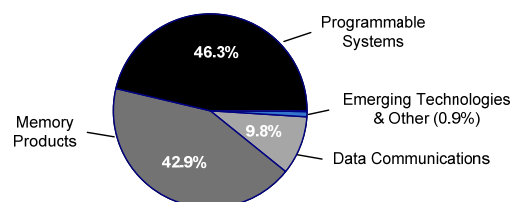
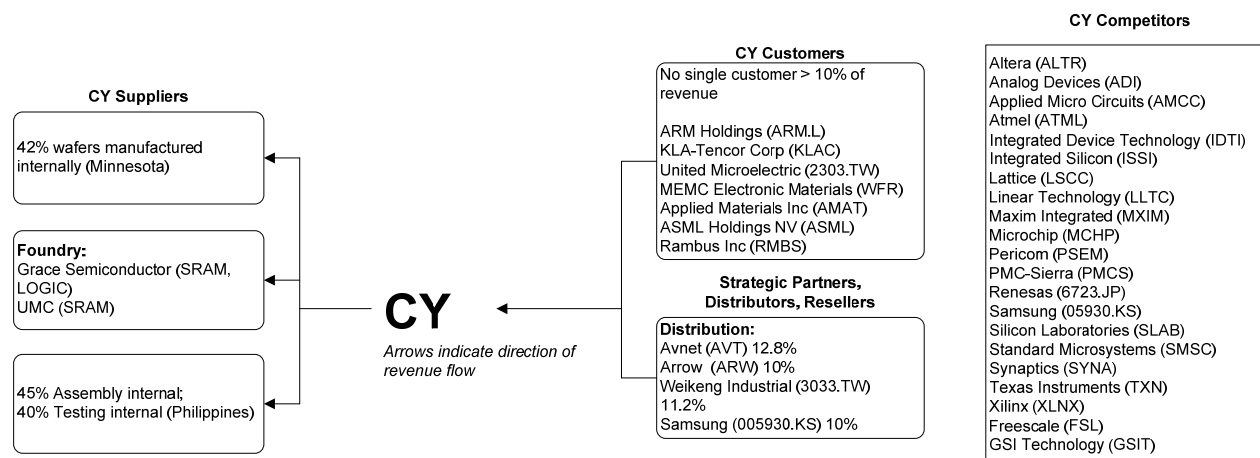
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

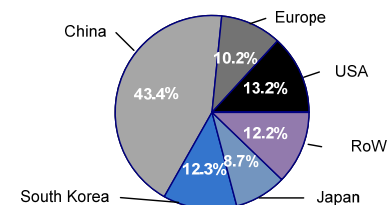
Figure 338. Cypress (CY)

Sector: Semiconductors

Cypress Semiconductor Corp. (CY)



Business Segment Breakdown



Geographic Breakdown

Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Masahiro Shibano

Dainippon Screen Mfg

Dainippon Screen Mfg. Co., Ltd. engages in the manufacture and sale of semiconductors and printing equipment. It operates through the following segments: Semiconductor Equipment (SE), Flat Panel Display Equipment (FE), Media and Precision Technology (MP), and Other. The SE segment provides single wafer and batch-type cleaning tools; spin scrubbers; coaters and developers; and annealing, wafer surface inspection and measurement systems. The FE segment offers coaters and developers, wet etchers, resist strippers, and exposure and measurement systems for thin film devices. The MP segment handles systems for pattern inspection, automatic optical inspection, plotters, exposure, and pattern measurement. The Other segment administers the development of product software, and planning and production of printed materials. The company was founded on October 11, 1943 and is headquartered in Kyoto, Japan.

Figure 339. Dainippon Screen (7735.JP) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	279816.0	219049.0	164128.0	254952.0	250089.0	189000.0	189567.0	204500.0	207785.0
- y/y growth	#VALUE!	-21.7%	-25.1%	55.3%	-1.9%	-24.4%	-24.2%	8.2%	9.6%
Gross Margins	25.6%	22.7%	16.0%	28.2%	25.1%	20.9%		23.5%	
Operating Margins	5.2%	-2.1%	-8.6%	10.5%	5.4%	-4.0%		2.9%	
EPS	18.97	-160.84	-33.71	108.21	19.53	-29.10	-56.26	14.77	13.28
- y/y growth	#VALUE!	-948.0%	79.0%	421.0%	-81.9%	-249.0%	-388.0%	150.7%	123.6%
Cash	26247.0	25899.0	31253.0	39985.0	37662.0	41991.0		29291.0	
Debt	56924.0	94883.0	67966.0	48693.0	42686.0	70000.0		60000.0	
Net Cash/Shr	-59.6	-29.8	-71.4	123.6	49.2	69.2		16.9	
Tangible Book Value/Shr	501.7	284.8	266.4	362.0	370.4	337.0		352.8	

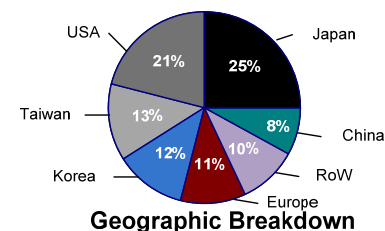
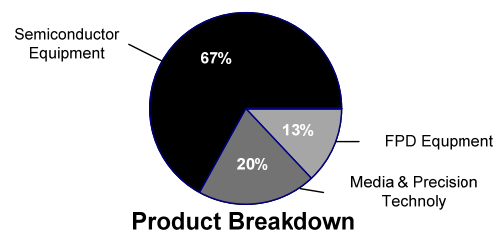
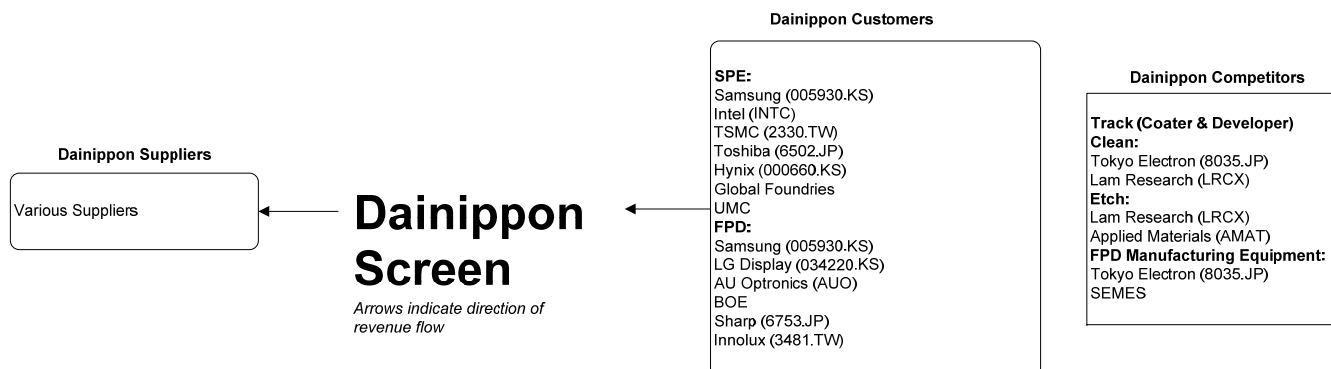
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 340. Dainippon Screen (7735.JP)

Sector: Semiconductor Equipment

Dainippon Screen (7735.JP)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Wei Chen

Delta Electronics

Delta was established in 1975 and is the world's leading computer switching power supply manufacturer. Its business is divided into 1) Power Electronics (62% of 2012 revenue), including switching power supply, components, fan and thermal; 2) Energy Management (17% of revenue), including solar, wind power, telecom power, UPS, Industrial Automation, Auto Electronics; and 3) Smart Green Life (18% of revenue), including display, LED, E-paper, voice, cloud computing, and networking.

Figure 341. Delta Electronics (2308.TW) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	142644.9	125510.8	171302.5	172056.3	175823.6	177790.3	178004.0	201196.3	193761.4
- y/y growth	9.2%	-12.0%	36.5%	0.4%	2.2%	1.1%	1.2%	13.2%	8.9%
Gross Margins	18.0%	21.0%	21.4%	19.1%	23.5%	24.9%		24.9%	
Operating Margins	7.8%	9.4%	10.1%	6.0%	9.1%	10.5%		10.3%	
EPS	4.75	5.22	6.70	4.58	6.69	6.76	7.74	7.62	8.79
- y/y growth	-33.2%	9.8%	28.4%	-31.6%	46.1%	1.1%	15.7%	12.7%	13.5%
Cash	44608.9	58453.2	61408.3	68423.6	63120.4	64960.8		70590.1	
Debt	7158.7	14747.2	19528.5	43319.6	37323.7	37323.7		37323.7	
Net Cash/Shr	20.6	24.8	22.0	18.1	18.0	18.7		21.0	
Tangible Book Value/Shr	26.7	28.0	31.7	32.4	35.2	37.4		40.3	

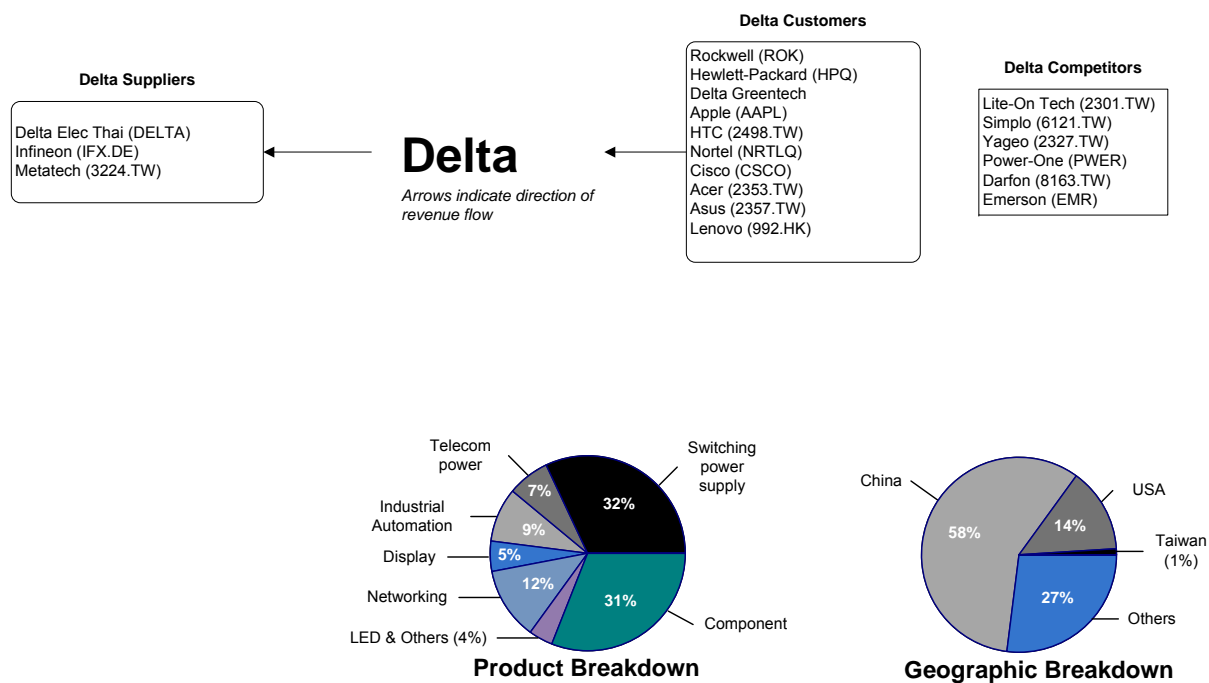
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 342. Delta Electronics (2308.TW)

Sector: PC & Enterprise Hardware

Delta Electronics (2308.TW)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Arthur Lai

E Ink Holdings

E Ink (formerly Prime View) was established in 1994 and was among Taiwan's first TFT producers. The company's major products include e-paper module for E-readers and small and medium panels for smartphones and tablets. It began the e-paper business in 2005 after acquiring the e-paper department of Philips and worked with Amazon to launch the Kindle in November 2007. In 2008, E Ink acquired a 74% stake in Hydix and runs two 2.5G, one 3G, and one 3.5G fabs. In 2009, E Ink Corporation, the upstream supplier, was purchased by Prime View International (now E Ink Holdings, Inc.). The company's e-paper display (EPD) module production has >90% global market share and contributed c.50% to total revenues in 2012, while FFS panels made up the remaining c.50%.

Figure 343. E Ink (8069.TW) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	12161.0	16068.9	25178.9	38428.1	26704.8	22906.7	31289.2	17154.5	31983.7
- y/y growth	4.5%	32.1%	56.7%	52.6%	-30.5%	-14.2%	17.2%	-25.1%	2.2%
Gross Margins	7.4%	3.2%	33.0%	31.3%	10.7%	11.9%		10.4%	
Operating Margins	-6.9%	-8.8%	17.2%	18.2%	-5.4%	-0.8%		-2.1%	
EPS	-1.32	-1.42	3.81	6.05	-0.69	0.13	0.93	0.10	1.10
- y/y growth	-170.5%	-7.8%	367.7%	58.7%	-111.5%	118.6%	234.0%	-20.7%	18.4%
Cash	2118.3	2819.1	5767.0	4373.6	6936.0	8987.9		7700.4	
Debt	12515.5	9889.9	7699.8	8966.4	13131.0	13025.3		10169.8	
Net Cash/Shr	-2.0	1.8	4.0	-3.4	0.7	2.3		3.4	
Tangible Book Value/Shr	9.2	21.3	22.1	25.9	22.2	22.3		22.4	

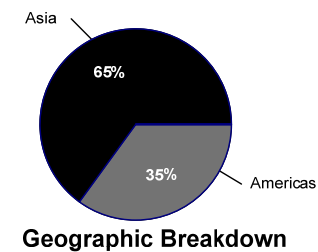
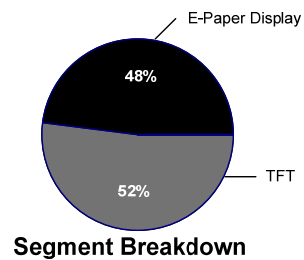
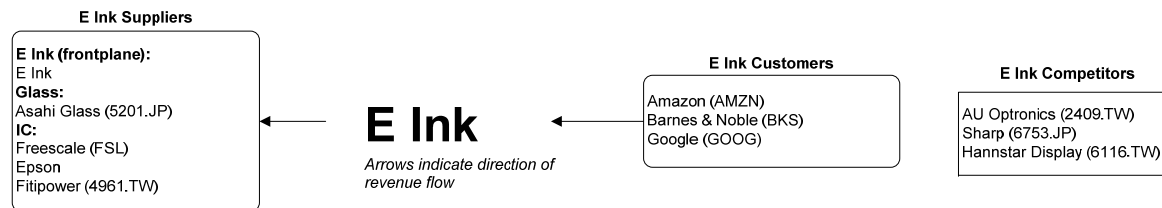
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 344. E Ink (8069.TW)

Sector: Electronic Components

E Ink Holdings (8069.TWO)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jim Suva, CPA

Electronics for Imaging Inc

Electronics for Imaging, Inc. is focused on the transformation of the printing, packaging, and decorative industries from the use of traditional analog based presses to digital on-demand printing. The company's products include industrial super-wide and wide format, label and packaging, and ceramic tile decoration digital inkjet printers that utilize its digital ink; print production workflow, web-to-print, cross-media marketing, and business process automation solutions; and color digital print controllers creating an on-demand digital printing ecosystem. It operates through three segments: Industrial Inkjet, Productivity Software, and Fiery. The Industrial Inkjet segment products (49% of sales) consist of VUTEk super-wide and EFI wide format industrial digital inkjet printers, Jetrion label and packaging digital inkjet printing systems, Cretaprint digital inkjet printers for ceramic tile decoration, and related ink, parts, and services. The Productivity Software segment (16% of sales) engages in the business of process automation software, including Monarch, PSI, Logic, PrintSmith, and PrintFlow, Radius, PrintStream, Prism, Metrics, Technique, and Alphagraph. The Fiery segment brand (35% of sales) consists of print servers, controllers, and DFEs, which transform digital copiers and printers into high performance networked printing devices for the office and commercial printing market. Electronics for Imaging was founded in 1988 and is headquartered in Foster City, CA. It employs approximately 2,400 employees.

Figure 345. Electronics for Imaging (EFI) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	560.4	401.1	504.0	591.6	652.1	699.8	708.3	723.6	758.6
- y/y growth	-9.7%	-28.4%	25.7%	17.4%	10.2%	7.3%	8.6%	3.4%	7.1%
Gross Margins	57.1%	53.0%	53.8%	56.2%	54.6%	55.0%		55.0%	
Operating Margins	7.3%	-4.5%	7.1%	11.7%	12.1%	13.4%		13.5%	
EPS	0.71	-0.22	0.59	1.12	1.29	1.42	1.45	1.58	1.62
- y/y growth	-40.0%	-130.3%	373.1%	88.9%	15.6%	10.0%	12.1%	11.2%	12.2%
Cash	189.4	204.2	229.7	219.2	365.0	355.2		381.4	
Debt	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Net Cash/Shr	3.3	4.1	4.9	4.6	7.7	7.6		8.7	
Tangible Book Value/Shr	8.2	7.6	4.8	7.6	7.7	7.5		8.7	

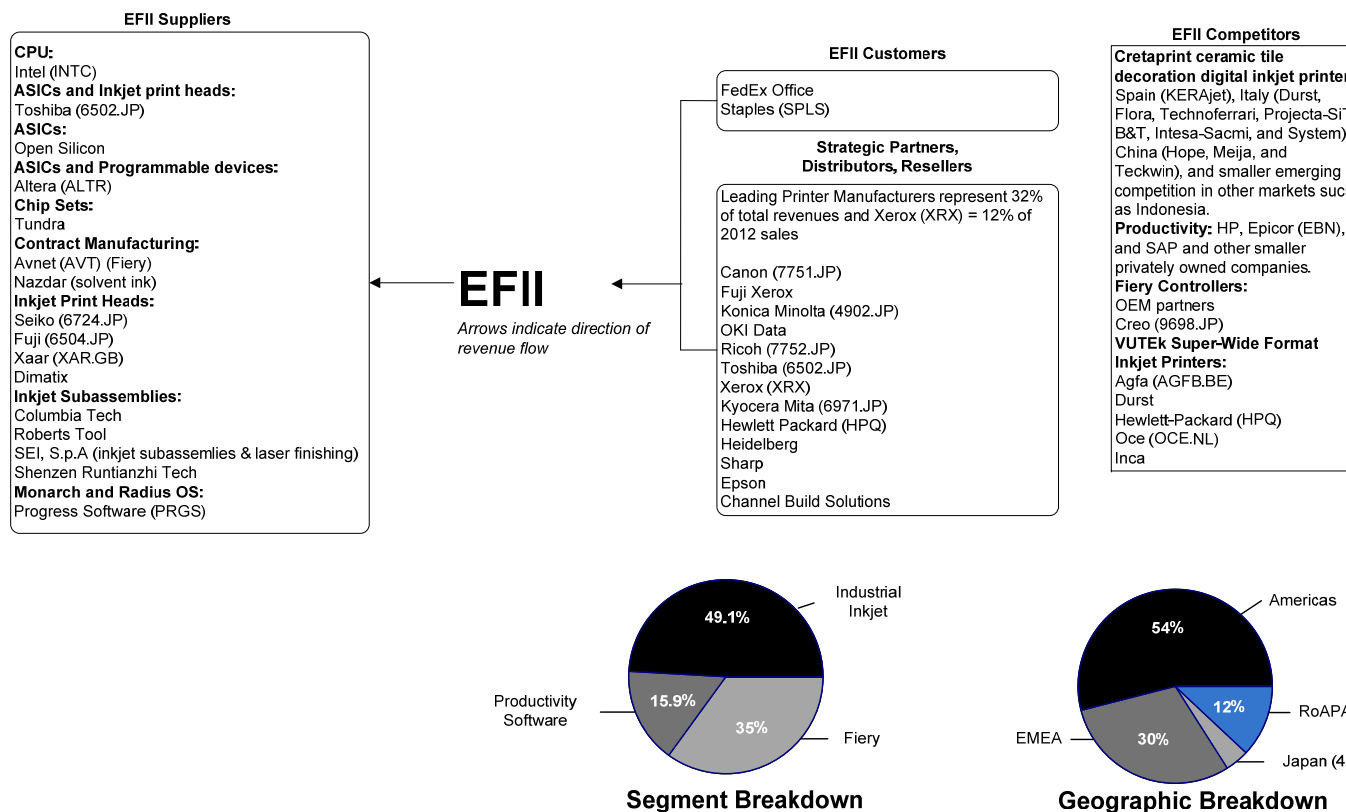
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 346. Electronics for Imaging Inc. (EFII)

Sector: Imaging

Electronics for Imaging Inc. (EFII)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jim Suva, CPA

EMC Corp

EMC Corporation (EMC) has grown from providing memory boards into the early computer market to the world's leading provider of intelligent enterprise infrastructure, with products spanning most every layer of the IT architecture. In addition to being the world's largest storage supplier, EMC is well positioned in such high growth markets as server virtualization, security, content management and network monitoring. The company maintains a controlling interest (~80%) in virtualization software-leader VMware. Based in Hopkinton, MA and founded in 1979, EMC has approximately 60,000 employees globally.

EMC conducts its business through two broad categories: EMC Information Infrastructure (80% of total sales in 2011) & VMware Virtual Infrastructure (20% of total sales in 2011). The company's EMC Information Infrastructure provides a foundation for organizations to store, manage, protect, analyze and secure their vast and ever-increasing quantities of information, improve business agility, lower cost of ownership and enhance their competitive advantage within traditional data centers, virtual data centers and cloud-based IT infrastructures. It operates through three segments: Information Storage, Information Intelligence Group and RSA Information Security. The Information Storage segment offers a comprehensive portfolio of enterprise storage systems and software-scaling from entry-level to datacenter class systems supporting organizations' information storage, back-up and recovery, and management strategies. The Information Intelligence Group segment provides software and services for enterprise capture, information access, customer communications, case management and governance to help organizations get maximum leverage from their information. The RSA Information Security segment delivers products, packaged solutions and services designed to safeguard the integrity and confidentiality of information throughout its lifecycle. It offers solutions in identity assurance and access control, data loss prevention, encryption and key management, enterprise governance, risk and compliance, security information management and fraud protection. These technologies enable organizations to discover, classify and place appropriate controls around their data, secure access to the data both inside and outside the network as well as across physical, virtual or cloud infrastructures, and monitor and enforce these measures to prove compliance with security policies and regulations. The VMware Virtual Infrastructure business category provides virtualization and cloud infrastructure software solutions. Its solutions enable organizations to aggregate multiple servers, storage infrastructure and networks.

Figure 347. EMC Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	14876.2	14025.9	17015.1	20007.6	21713.9	23426.3	23415.0	25296.9	25333.1
- y/y growth	12.4%	-5.7%	21.3%	17.6%	8.5%	7.9%	7.8%	8.0%	8.2%
Gross Margins	56.9%	57.0%	60.4%	62.6%	64.5%	64.8%		65.4%	
Operating Margins	18.0%	17.4%	22.0%	23.9%	24.9%	25.0%		24.9%	
EPS	1.04	0.90	1.26	1.52	1.71	1.85	1.86	1.99	2.06
- y/y growth	14.0%	-13.1%	39.8%	20.0%	12.6%	8.3%	8.6%	7.7%	11.2%
Cash	6807.0	6695.3	5375.3	6318.0	6167.1	8551.6		10206.6	
Debt	3862.3	3100.3	3450.0	3424.3	1710.1	1695.0		1695.0	
Net Cash/Shr	1.6	1.7	2.4	2.8	2.8	3.9		4.6	
Tangible Book Value/Shr	2.6	2.5	1.9	2.5	3.1	4.2		4.9	

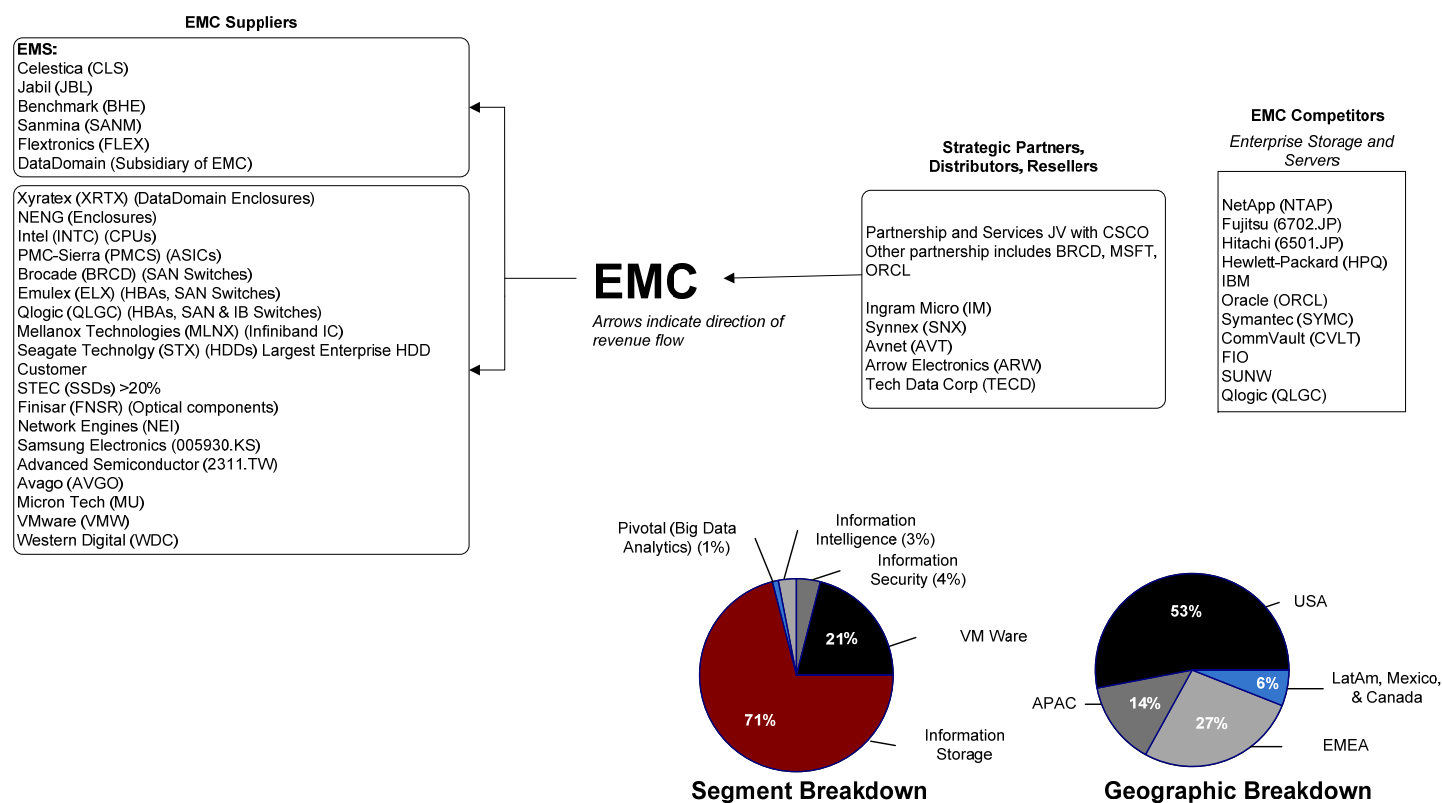
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 348. EMC (EMC)

Sector: Storage

EMC (EMC)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Emulex Corp

Emulex Corp. provides a broad range of enterprise-class connectivity solutions for servers, networks and storage devices within the data center. The company's product portfolio of Fibre Channel Host Bus Adapters, 10Gb Ethernet Network Interface Cards, Ethernet-based Converged Network Adapters, controllers, embedded bridges and switches, and connectivity management solutions are proven, tested and trusted by the demanding Information Technology environments. The company operates within a single business segment that has two primary market-focused product lines, which include: Network Connectivity Products and Storage Connectivity Products. The Ethernet based Network Connectivity Products include Universal Local Area Network on Motherboard application specific integrated circuits, OneConnect Universal Converged Network Adapters, and custom form factor solutions for Original Equipment Manufacturer blade servers that enable high performance, scalable networks and convergence. The Fibre Channel based Network Connectivity Products include Fibre Channel application specific integrated circuits, LightPulse Host Bus Adapters, and custom form factor solutions for Original Equipment Manufacturer blade servers. The company's Storage Connectivity Products include its InSpeed, switch-on-a-chip or backend connectivity, bridge, and router products. Emulex was founded by Fred B. Cox in 1978 and is headquartered in Costa Mesa, CA.

Figure 349. Emulex (ELX) Results and Forecasts

	2008	2009	2010	2011	2012	Street 2013E	Street 2014E
Revenues	488.3	378.2	399.2	452.5	501.8	477.95	496.0
- <i>y/y growth</i>	3.9%	-22.5%	5.5%	13.4%	10.9%	-4.7%	3.8%
Gross Margins	60.4%	59.9%	60.1%	53.7%	24.5%		
Operating Margins	14.2%	1.3%	3.6%	-9.2%	5.5%		
EPS	0.89	0.60	0.72	0.54	0.86	0.70	0.64
- <i>y/y growth</i>	-1.1%	-32.6%	20.0%	-25.0%	59.3%	-18.8%	-8.5%
Cash	350.20	302.43	294.80	168.19	229.93		
Debt	0.00	0.00	0.00	0.00	0.00		
Net Cash/Shr	1.73	0.41	0.76	0.35	0.91		
Tangible Book Value/Shr	5.10	5.41	5.61	3.13	3.28		

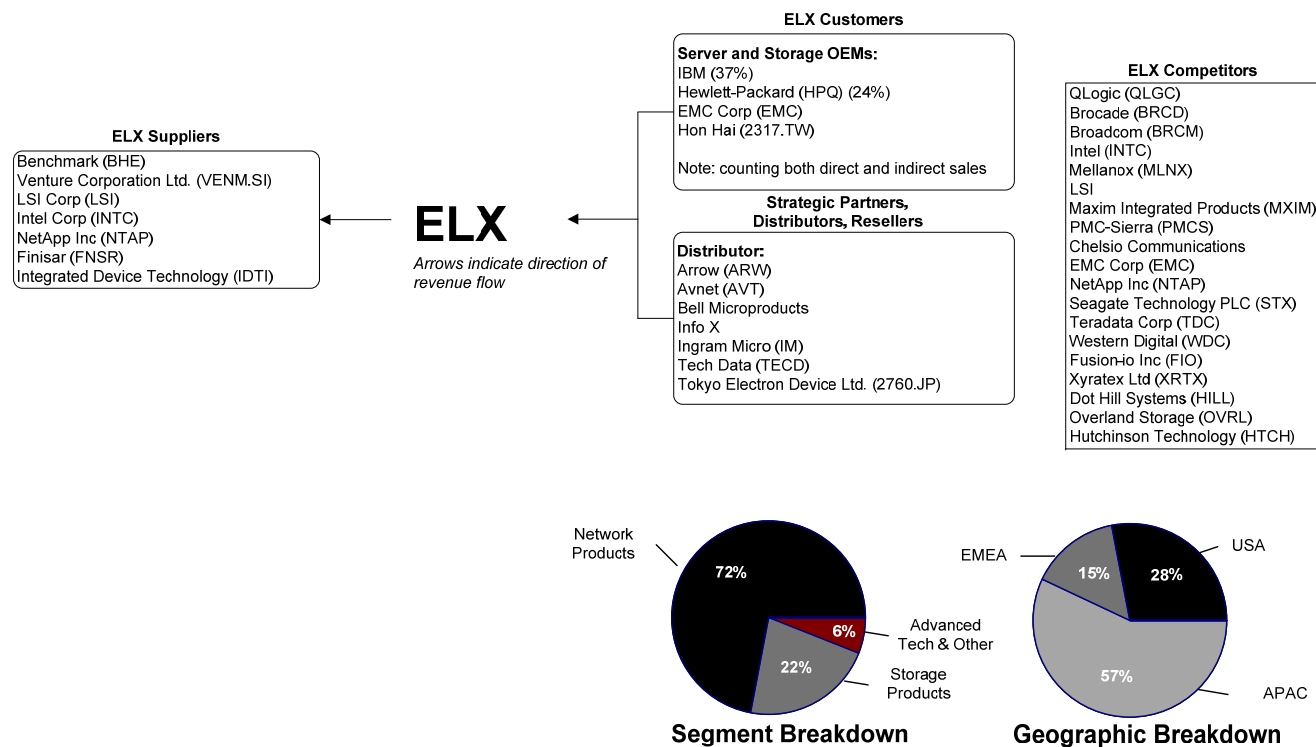
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, FactSet

Figure 350. Emulex (ELX)

Sector: Communications Equipment and Enterprise Hardware

Emulex Corp (ELX)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Terence Whalen

Entegris Inc

Entegris is the leading provider of purification and materials handling solutions to the global semiconductor and related industries. With the recent merger with Mykrolis (formerly a division of Millipore), the combined company has trailing 12-month sales of \$650MM, of which approximately two-thirds were generated from sales of consumables products, with the remaining third coming from gas and liquid delivery, pressure measurement, and other systems related to materials handling. The company's global customer base includes chipmakers as well as equipment OEMs, with particularly heavy exposure in Japan thanks to Mykrolis' long-standing relationship with Tokyo Electron and Dai Nippon Screen, both suppliers of wet semiconductor processing equipment. The company is headquartered in Chaska, Minnesota and has 2,900 employees worldwide, with manufacturing sites in nine countries across North America, Europe, and Asia.

Figure 351. Entegris (ENTG) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	554.7	398.6	688.4	749.3	715.9	674.7	717.7	744.7	786.6
- y/y growth	-11.4%	-28.1%	72.7%	8.8%	-4.5%	-5.8%	0.2%	10.4%	9.6%
Gross Margins	38.1%	34.6%	45.1%	43.5%	42.9%	40.8%		42.1%	
Operating Margins	5.8%	-2.4%	17.4%	18.2%	15.2%	12.8%		15.1%	
EPS	0.04	-0.18	0.72	0.80	0.58	0.48	0.56	0.58	0.69
- y/y growth	-91.6%	-525.8%	497.6%	11.4%	-28.0%	-16.7%	-3.6%	21.4%	23.9%
Cash	115.0	68.7	134.0	273.6	350.4	356.4		423.4	
Debt	163.7	71.8	0.0	0.0	0.0	0.0		0.0	
Net Cash/Shr	-0.3	0.1	1.0	2.0	2.5	2.5		3.0	
Tangible Book Value/Shr	2.1	2.3	3.0	4.1	4.7	5.1		5.6	

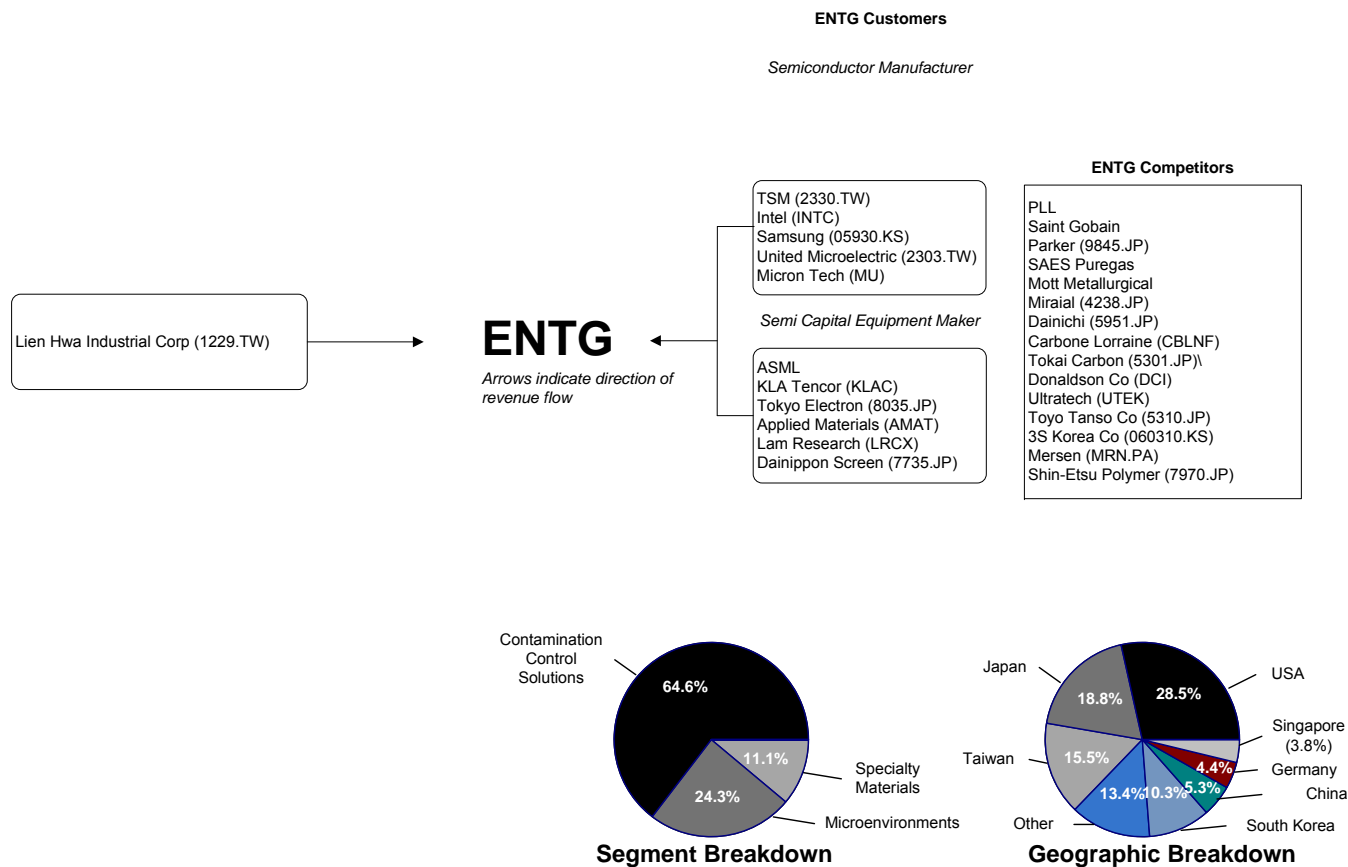
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 352. Entegris (ENTG)

Sector: Semiconductor Equipment

Entegris Inc. (ENTG)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Kevin Dennean, CFA

Ericsson LM

Ericsson is a world-leading provider of telecommunications equipment and related services to mobile and fixed network operators globally. Over 1,000 networks in more than 180 countries use Ericsson network equipment and 40% of all mobile calls are made through its systems. Ericsson provides communications networks, telecom services and multimedia solutions. It supports more than 2bn subscriptions and manages more than 700mn subscribers. Ericsson supplies fixed and mobile communication products and services to carriers, governments and enterprises. Mobile networks and professional services make up the majority of sales.

Figure 353. Ericsson (ERICb) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	208930.0	206477.0	203348.0	226921.0	227779.0	232503.5	233318.6	243203.6	243779.7
- y/y growth	11.3%	-1.2%	-1.5%	11.6%	0.4%	2.1%	2.4%	4.6%	4.5%
Gross Margins	35.5%	34.0%	36.5%	35.1%	31.6%	32.2%		33.4%	
Operating Margins	11.2%	11.9%	12.0%	11.0%	14.8%	10.2%		11.1%	
EPS	5.63	4.68	5.55	4.76	5.30	5.99	4.98	5.97	6.00
- y/y growth	-17.3%	-16.8%	18.6%	-14.3%	11.5%	13.0%	-6.1%	-0.4%	20.5%
Cash	37813.0	22798.0	30864.0	38676.0	44682.0	57225.0		60155.9	
Debt	30481.0	32120.0	30763.0	31021.0	28667.0	28722.0		28722.0	
Net Cash/Shr	4.0	-2.3	1.2	4.8	6.4	10.3		11.2	
Tangible Book Value/Shr	29.1	28.7	30.7	30.9	27.6	28.3		30.5	

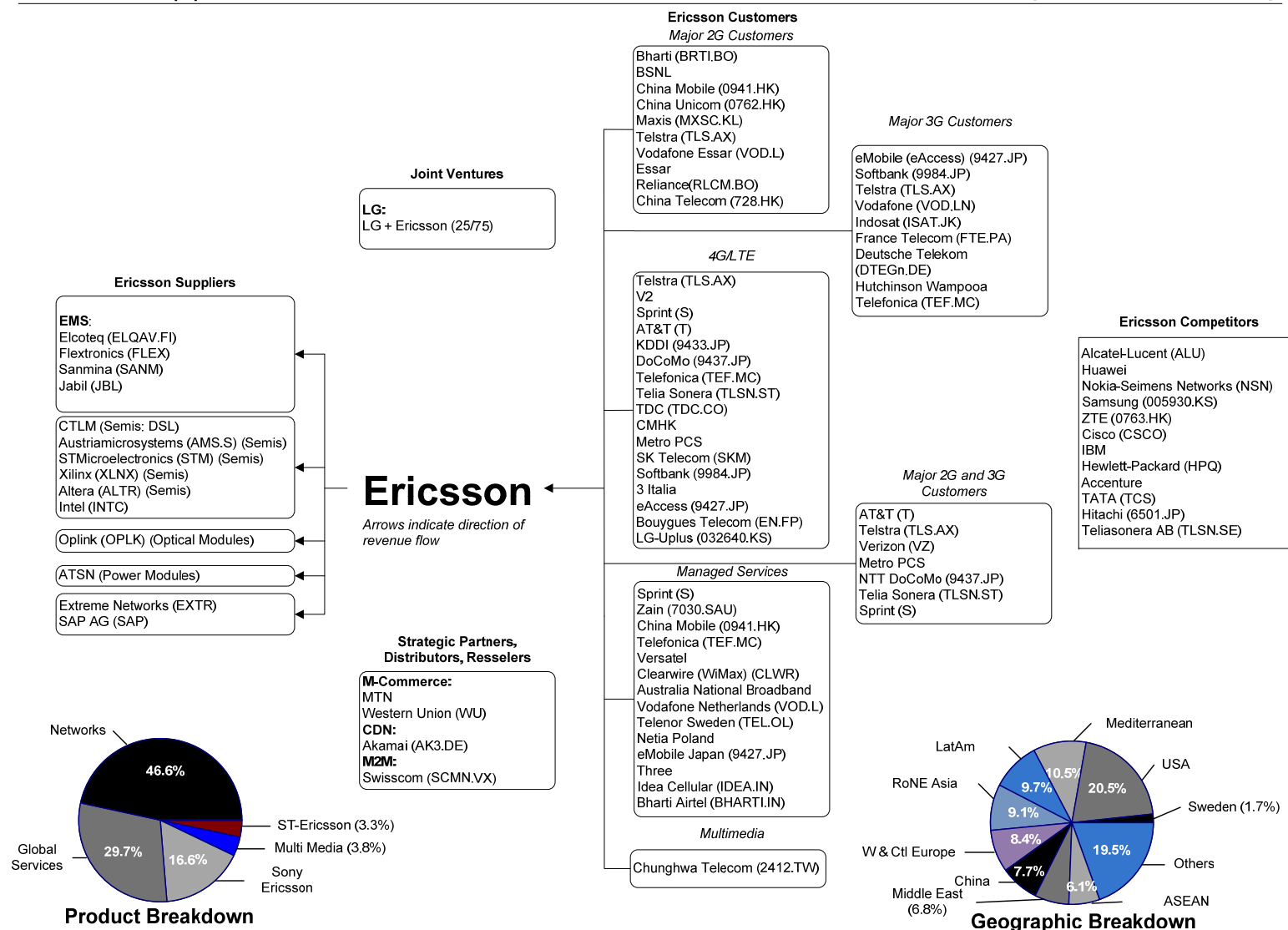
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 354. Ericsson (ERICB) (ERICb)

Sector: Telecom Equipment

Ericsson (ERICB.ST; ERIC)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Kevin Dennean, CFA

F5 Networks Inc

With over 70% market share, F5 is the leading provider of Application Delivery Controllers that improve performance, availability, and security of applications on networks. Application Controllers are often better remembered as the "load balancers" of the early '00s, but the category has evolved in the past decade to provide a range of services and applications beyond simple load balancing, with much of this evolution being driven by F5 itself.

The company's main product line is BIG-IP, a series of hardware solutions with the Traffic Management Operating System (TMOS) that allow deployment of various software modules to improve application delivery and performance.

Founded in 1996, F5 is headquartered in Seattle, WA and had 3,029 employees globally as of the September 2012 fiscal year-end.

Figure 355. F5 (FFIV) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	650.2	653.1	882.0	1151.8	1377.2	1451.8	1458.1	1610.4	1634.8
- y/y growth	23.7%	0.4%	35.0%	30.6%	19.6%	5.4%	5.9%	10.9%	12.1%
Gross Margins	77.7%	79.1%	81.3%	82.8%	84.0%	84.1%		83.9%	
Operating Margins	25.4%	28.1%	34.1%	38.2%	38.3%	35.6%		35.8%	
EPS	1.46	1.69	2.52	3.79	4.38	4.37	4.46	4.75	5.09
- y/y growth	0.7%	15.8%	49.3%	50.3%	15.5%	-0.2%	1.9%	8.6%	14.3%
Cash	190.2	317.1	428.5	542.6	532.2	753.6		1220.5	
Debt	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Net Cash/Shr	2.3	4.0	5.3	6.7	6.7	9.5		15.1	
Tangible Book Value/Shr	5.9	7.2	9.7	10.8	12.4	14.8		19.7	

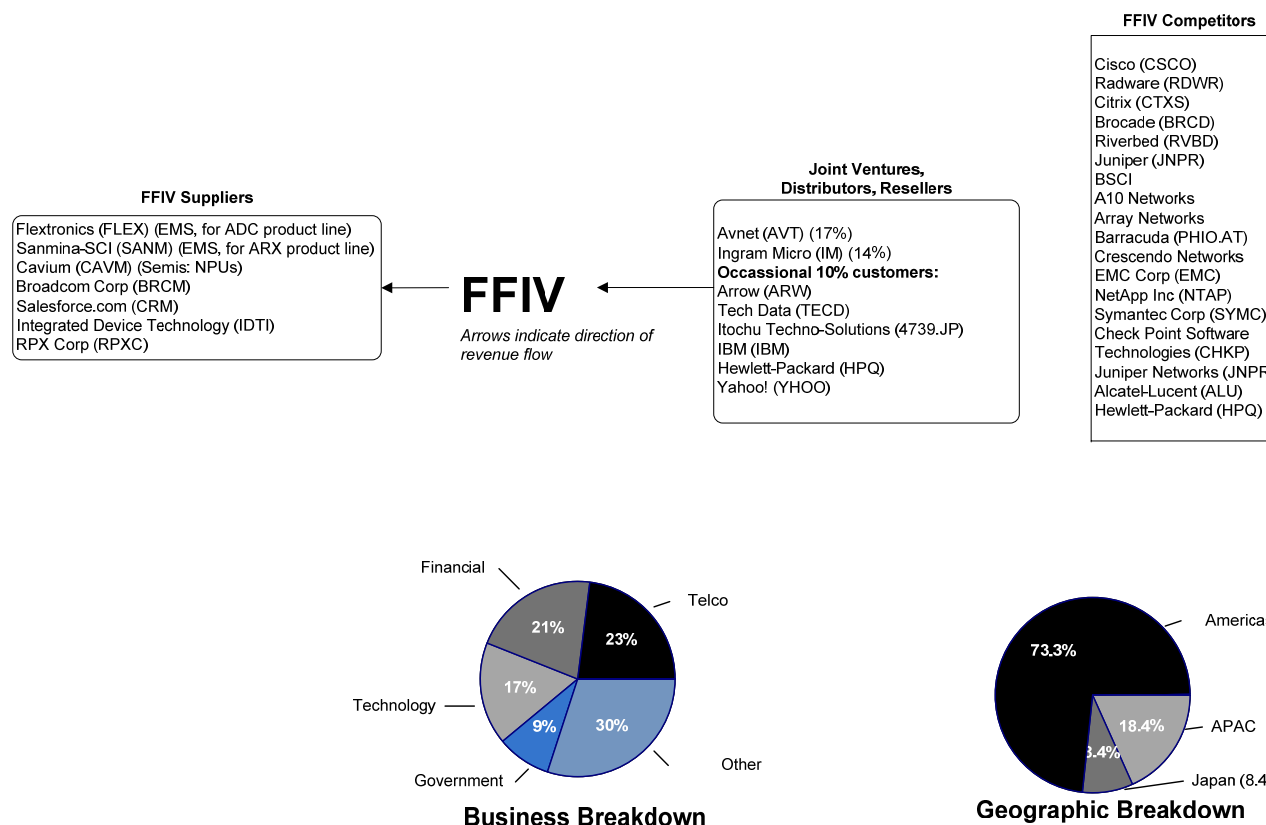
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 356. F5 Networks (FFIV)

Sector: Software Services

F5 Networks (FFIV)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Terence Whalen

Fairchild Semiconductor

Fairchild Semiconductor is a leading supplier of power discrete components, optoelectronics, interface, logic ICs, and has a small but growing analog power management integrated circuit (IC) portfolio. The company has three reportable business segments: Power Conversion, Industrial, and Auto (PCIA - 49% 2012 sales), Mobile, Computing, Consumer, and Communications (MCCC - 41%) and Standard Products (SPG - 10%). Fairchild's gross margins are low by analog standards, though the company has one of the leanest operating expense profiles. FCS is vertically integrated and manufactures 95%+ of products internally. Manufacturing facilities are located in West Jordan, UT, South Portland, ME, Mountaintop, PA, Bucheon, Korea, Singapore, and Malaysia. Competitors include International Rectifier, Intersil, ON Semi, Renesas, ST Microelectronics, and Texas Instruments. FCS derives 62% of sales from third party distributors recognizing the distributor revenue using a sell-in basis both domestically and internationally. Its revenue is consequently susceptible to quarter-to-quarter changes resulting from distributor inventory stocking or destocking. Fairchild's fiscal year ends in December.

Figure 357. Fairchild (FCS) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	1574.2	1187.5	1599.7	1588.8	1405.9	1489.5	1491.9	1607.3	1650.0
- y/y growth	-5.7%	-24.6%	34.7%	-0.7%	-11.5%	5.9%	6.1%	7.9%	10.6%
Gross Margins	28.9%	24.4%	35.2%	35.2%	31.4%	31.9%		36.5%	
Operating Margins	6.5%	-0.2%	12.7%	10.8%	4.3%	4.5%		10.2%	
EPS	0.69	0.01	1.47	1.25	0.55	0.54	0.48	1.20	1.09
- y/y growth	-22.0%	-98.4%	12929.5%	-15.0%	-56.1%	-1.4%	-12.5%	121.4%	126.4%
Cash	352.3	415.9	404.7	423.5	406.0	453.5		643.8	
Debt	535.2	472.2	320.7	300.1	250.1	250.1		250.1	
Net Cash/Shr	-1.4	-0.4	0.7	0.9	1.2	1.6		3.0	
Tangible Book Value/Shr	6.4	6.2	7.4	8.5	9.1	9.6		10.7	

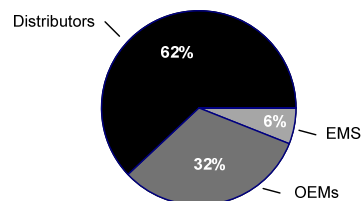
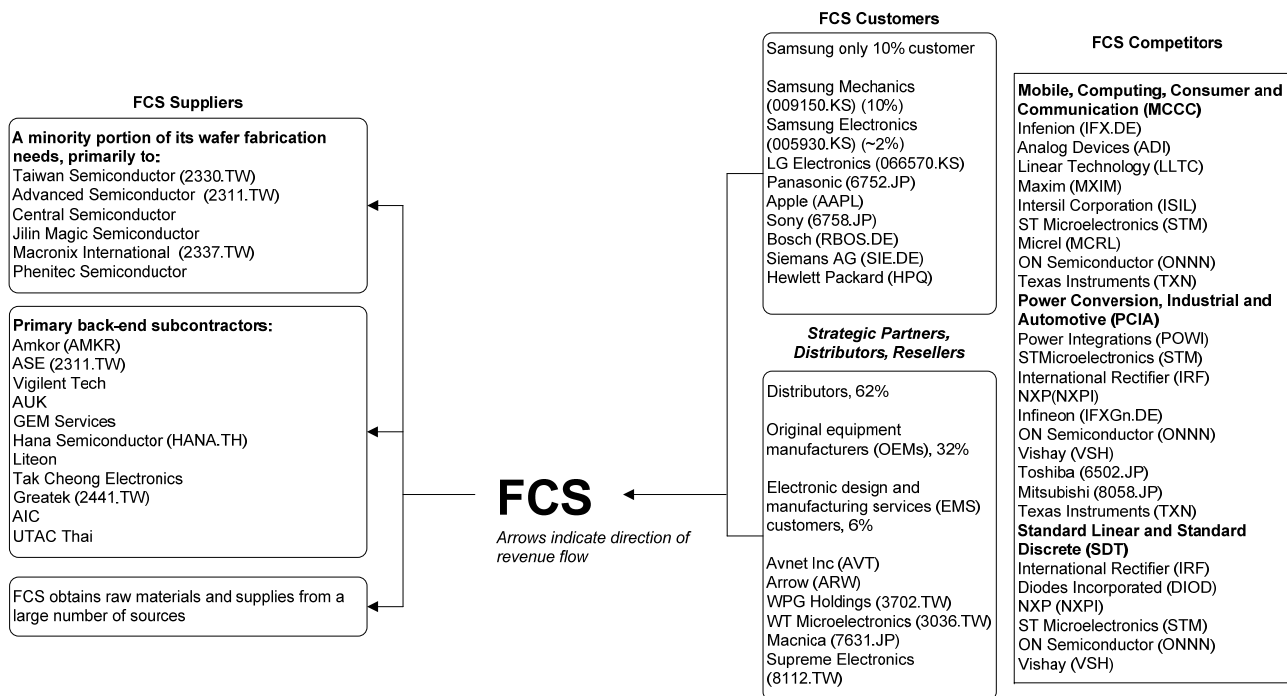
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

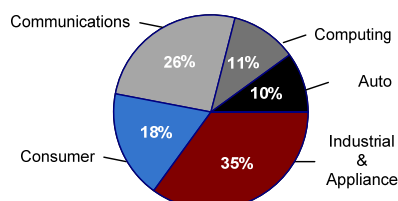
Figure 358. Fairchild Semiconductor (FCS)

Sector: Semiconductors

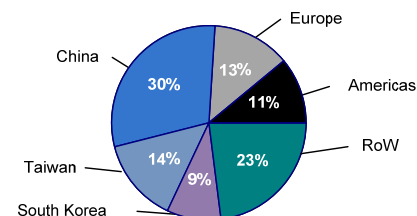
Fairchild Semiconductor International, Inc. (FCS)



Sale Channels Breakdown



End Market Breakdown



Geographic Breakdown

Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Kevin Dennean, CFA

Finisar Corp

Finisar is a leading provider of optical components and subsystems used in telecom and enterprise networks. Optical subsystems include transceivers (components that include both a transmitter and a receiver in the same component that are arranged in parallel, allowing for independent operation in both directions) and transponders (components that receive, amplify, and retransmit optical signals on different wavelengths). The company also provides ROADMs (reconfigurable optical add/drop multiplexers), which allow for the dynamic switching of optical signals without requiring the conversion of the optical signal to the electric domain, thus adding flexibility to the network while lowering its costs. The company also provides components used in cable TV networks.

Most relevant relationships: Finisar is directly leveraged to bandwidth demand in the datacenter, which accounts for ~62% of CY2012 revenue. The United States represents the largest single country for revenue contribution, accounting for ~32% of CY2012 revenue.

Figure 359. Finisar (FNSR) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	440.2	541.2	629.9	948.8	952.6	934.5	933.5	1082.0	1045.0
- y/y growth	5.2%	23.0%	16.4%	50.6%	0.4%	-1.9%	-2.0%	15.8%	11.9%
Gross Margins	37.2%	34.6%	31.0%	34.9%	31.9%	30.5%		32.0%	
Operating Margins	6.4%	5.6%	7.1%	15.6%	9.4%	6.7%		9.8%	
EPS	0.52	0.44	0.52	1.55	0.87	0.60	0.60	0.99	0.94
- y/y growth	-37.6%	-16.4%	19.3%	198.7%	-43.8%	-30.7%	-31.4%	63.0%	57.6%
Cash	110.0	37.2	207.0	314.8	234.5	245.8		302.8	
Debt	255.5	163.4	148.1	40.0	43.2	40.0		40.0	
Net Cash/Shr	-1.1	-2.3	1.2	3.0	2.0	2.1		2.6	
Tangible Book Value/Shr	0.1	1.4	4.3	7.1	6.6	6.7		7.3	

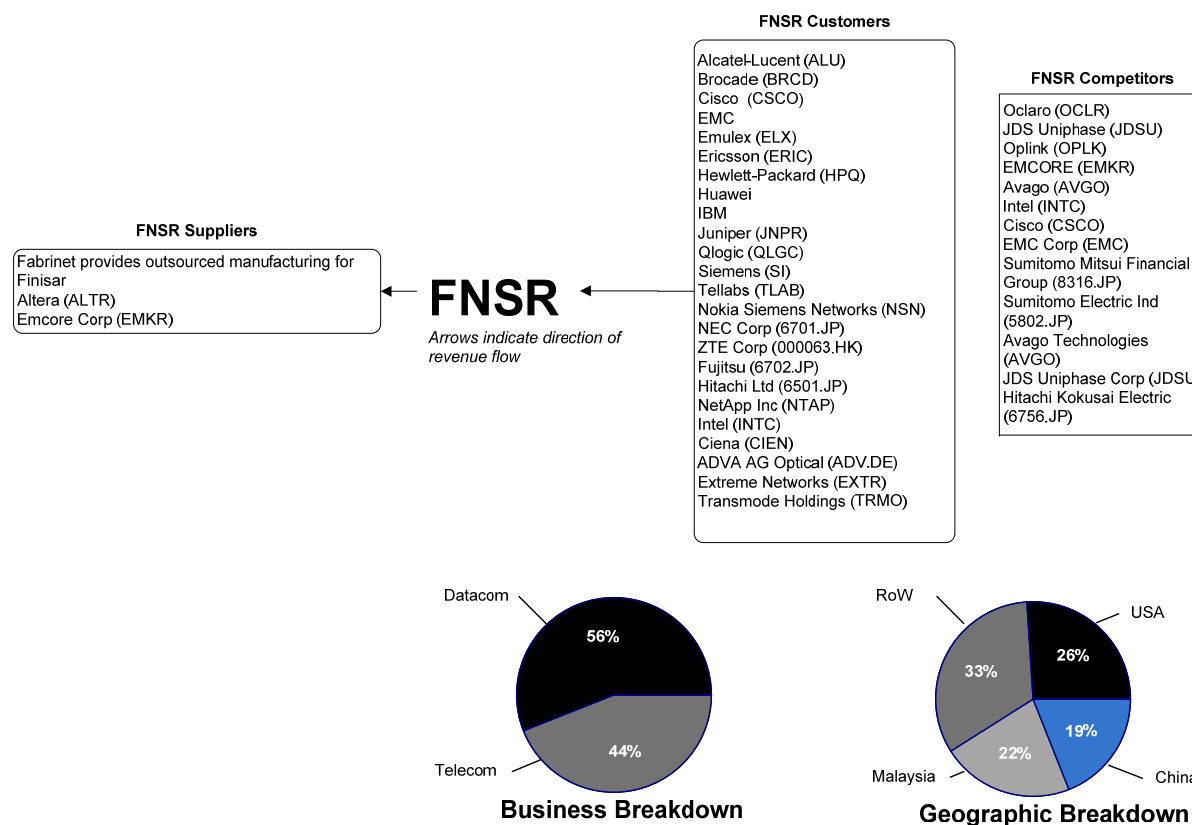
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 360. Finisar (FNSR)

Sector: Communications Equipment

Finisar Corp. (FNSR)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Shahriar Pourreza, CFA

First Solar Inc.

First Solar, Inc. is a leading manufacturer of solar modules based on thin film technology. By leveraging a proprietary process centered on the semiconductor material cadmium telluride, the company has been able to achieve a significant manufacturing cost advantage relative to its silicon-based peers in the solar photovoltaic market – although this benefit has contracted with the drop in Poly prices. Headquartered in AZ, the company boasts a global manufacturing base with sites in North America and Asia. First Solar's copy-exact manufacturing strategy, combined with its minimal need for polysilicon, continues to drive capacity expansion that has fueled better growth than many of its solar PV peers in the utility scale market. Moving forward, First Solar will increasingly become known as a

Figure 361. First Solar (FSLR) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	1246.3	2066.2	2563.5	2766.2	3368.5	4054.8	3841.4	4006.7	3715.4
- y/y growth	147.3%	65.8%	24.1%	7.9%	21.8%	20.4%	14.0%	-1.2%	-3.3%
Gross Margins	55.5%	51.4%	47.0%	40.7%	41.2%	23.6%		20.9%	
Operating Margins	42.5%	37.8%	33.9%	25.2%	29.9%	13.1%		10.9%	
EPS	4.24	7.37	7.68	6.00	4.88	4.31	4.27	3.37	3.26
- y/y growth	196.2%	73.7%	4.2%	-21.9%	-18.6%	-11.7%	-12.6%	-21.8%	-23.6%
Cash	792.3	784.7	933.6	671.8	1003.9	1348.3		1689.8	
Debt	198.5	175.0	237.4	663.6	562.6	562.6		562.6	
Net Cash/Shr	7.7	7.5	8.4	0.6	5.7	9.4		13.0	
Tangible Book Value/Shr	18.4	28.3	35.6	41.6	40.3	44.9		49.2	

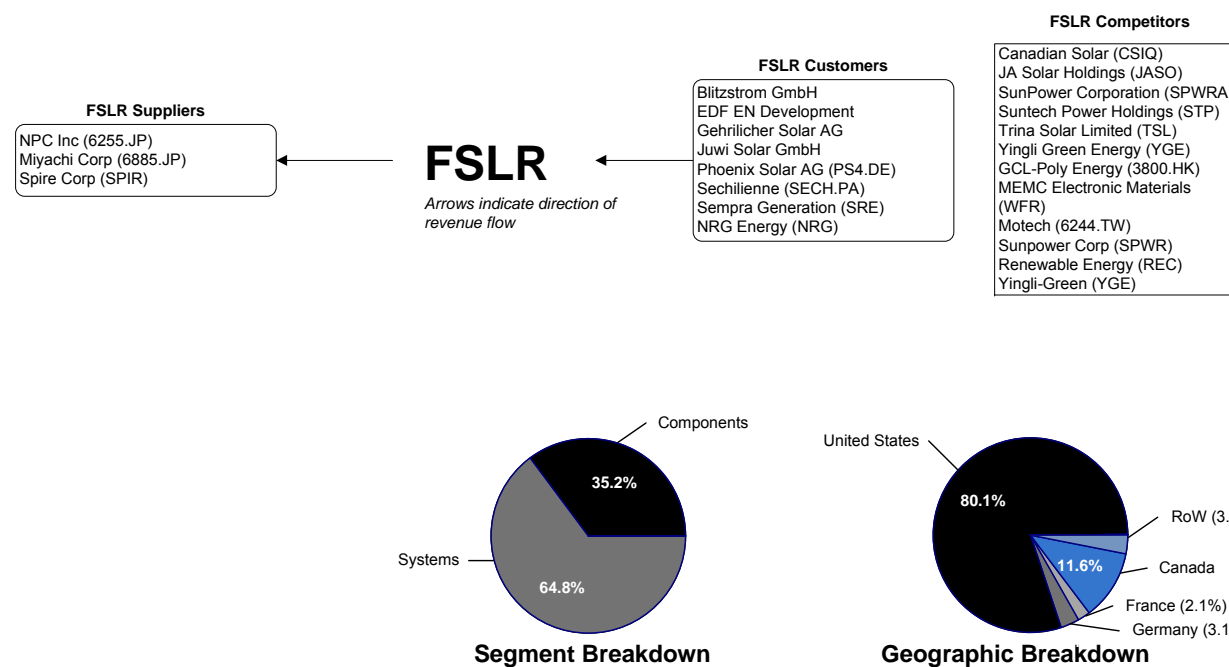
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 362. First Solar (FSLR)

Sector: Alternative Energy

First Solar, Inc. (FSLR)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jim Suva, CPA

Flextronics International Ltd

Flextronics is the world's second largest EMS company, and we believe it is among the lowest-cost producer in the industry, primarily due to its dominant presence in newly industrialized nations, such as China, Hungary, Mexico, and Poland. Leading customers include Research-in-Motion (~5%), Cisco (~9%), Hewlett Packard (~5%), Ericsson, Huawei, Oracle (Sun), Xerox, Alcatel-Lucent, Lenovo, Sony-Ericsson, Microsoft, and Motorola. Flextronics services encompass virtually every aspect of the manufacturing process, including product design and other front-end engineering services; printed circuit board fabrication and assembly; enclosure fabrication and plastic injection molding; materials procurement; inventory management; and final system assembly, testing, and end-customer fulfillment. Sales by end markets include 46% Integrated Network Solutions, 17% Industrial & Emerging Industries, 11% High Reliability Solutions and 26% High Velocity Solutions.

Figure 363. Flextronics (FLEX) Results and Forecasts

	2009	2010	2011	2012	2013	CIR 2014E	Street 2014E	CIR 2015E	Street 2015E
Revenues	30948.6	24111.7	28679.9	29387.7	23583.0	25214.4	24329.9	28685.8	26630.3
- y/y growth	12.3%	-22.1%	18.9%	2.5%	-19.8%	6.9%	3.2%	13.8%	9.5%
Gross Margins	5.4%	5.3%	5.6%	5.2%	5.9%	6.0%		5.8%	
Operating Margins	2.6%	2.5%	2.9%	2.3%	2.6%	2.5%		2.8%	
EPS	0.74	0.53	0.87	0.84	0.84	0.77	0.79	1.08	0.99
- y/y growth	-28.4%	-28.0%	64.0%	-3.0%	-0.5%	-7.8%	-6.3%	39.1%	25.6%
Cash	1821.9	1927.6	1748.5	1518.3	1587.1	1732.2		2460.6	
Debt	2948.1	2256.8	2601.6	2200.3	2067.6	2067.6		2067.6	
Net Cash/Shr	-1.1	-0.1	-0.6	-0.7	-0.1	0.1		1.4	
Tangible Book Value/Shr	1.9	2.1	2.7	3.0	2.9	3.2		4.0	

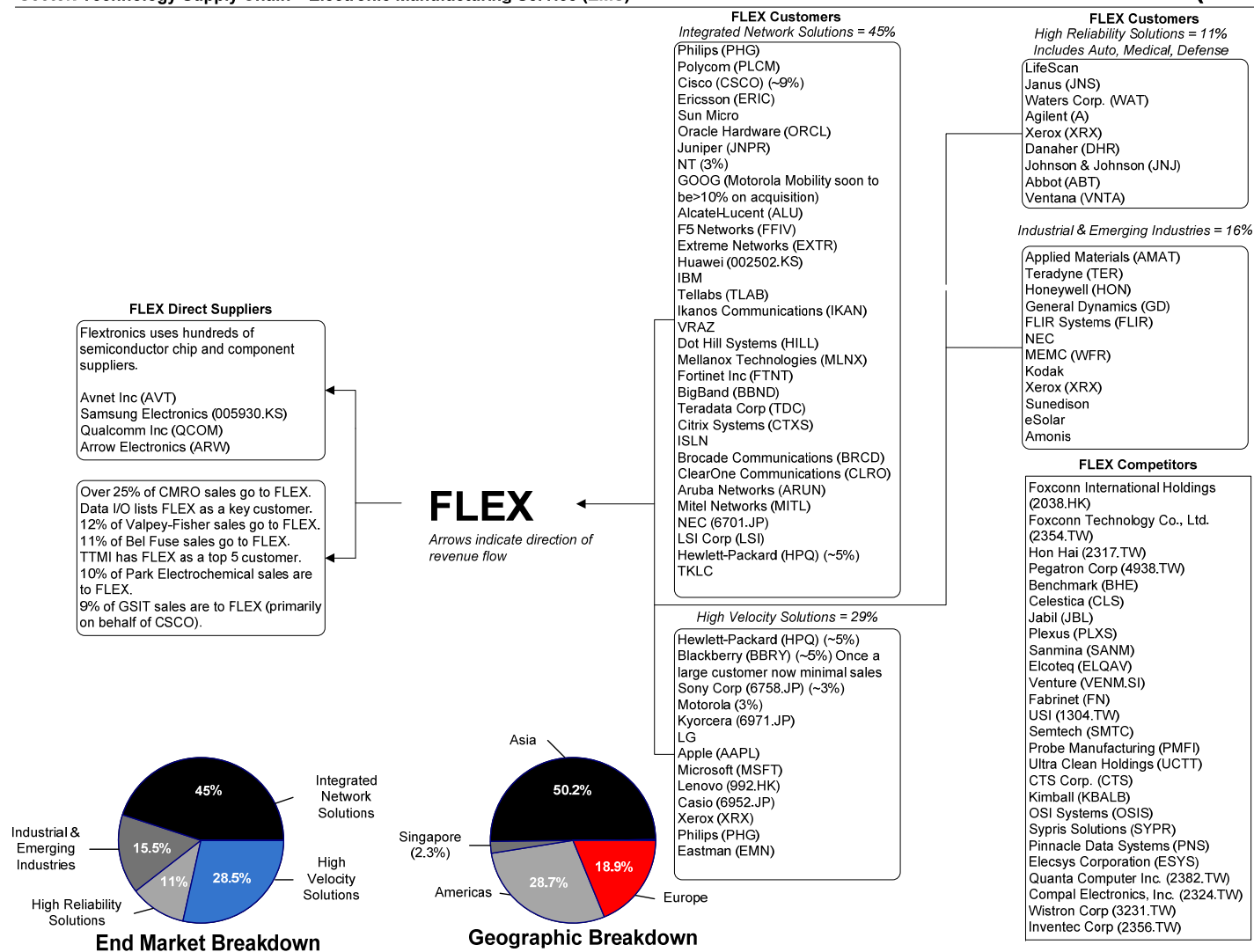
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 364. Flextronics (FLEX)

Sector: Technology Supply Chain – Electronic Manufacturing Service (EMS)

Flextronics (FLEX)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Terence Whalen

FormFactor Inc

FormFactor, Inc. is a leading manufacturer of advanced semiconductor wafer probe cards used in testing integrated circuits during the chip manufacturing process. The company's innovative probe card technology leverages a broad-based intellectual property portfolio, including its patented MicroSpring technology, and is based on highly advanced lithographic, or MEMS-based, manufacturing processes like those used in semiconductor manufacturing. Headquartered in Livermore, CA, FormFactor is the biggest supplier of advanced probe cards to the DRAM market - which has historically accounted for the majority of its revenue - and is also aggressively expanding its presence in the Flash and logic markets via new product rollouts.

Figure 365. Form Factor (FORM) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	210.2	135.3	188.6	169.3	178.5	228.6	249.3	236.0	286.0
- y/y growth	-54.5%	-35.6%	39.3%	-10.2%	5.4%	28.1%	39.7%	3.2%	14.7%
Gross Margins	17.3%	-0.3%	-1.2%	12.4%	14.2%	26.2%		29.1%	
Operating Margins	-59.2%	-100.8%	-66.2%	-40.9%	-35.9%	-11.9%		-3.5%	
EPS	-1.44	-2.08	-2.31	-1.33	-0.92	-0.30	-0.16	-0.11	0.18
- y/y growth	-197.6%	-44.8%	-11.0%	42.2%	31.1%	67.8%	82.3%	62.3%	212.3%
Cash	522.9	449.2	347.6	296.7	165.8	239.6		261.4	
Debt	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Net Cash/Shr	10.7	9.1	6.9	5.9	3.3	4.5		4.9	
Tangible Book Value/Shr	14.4	11.7	8.2	6.9	5.2	6.1		6.2	

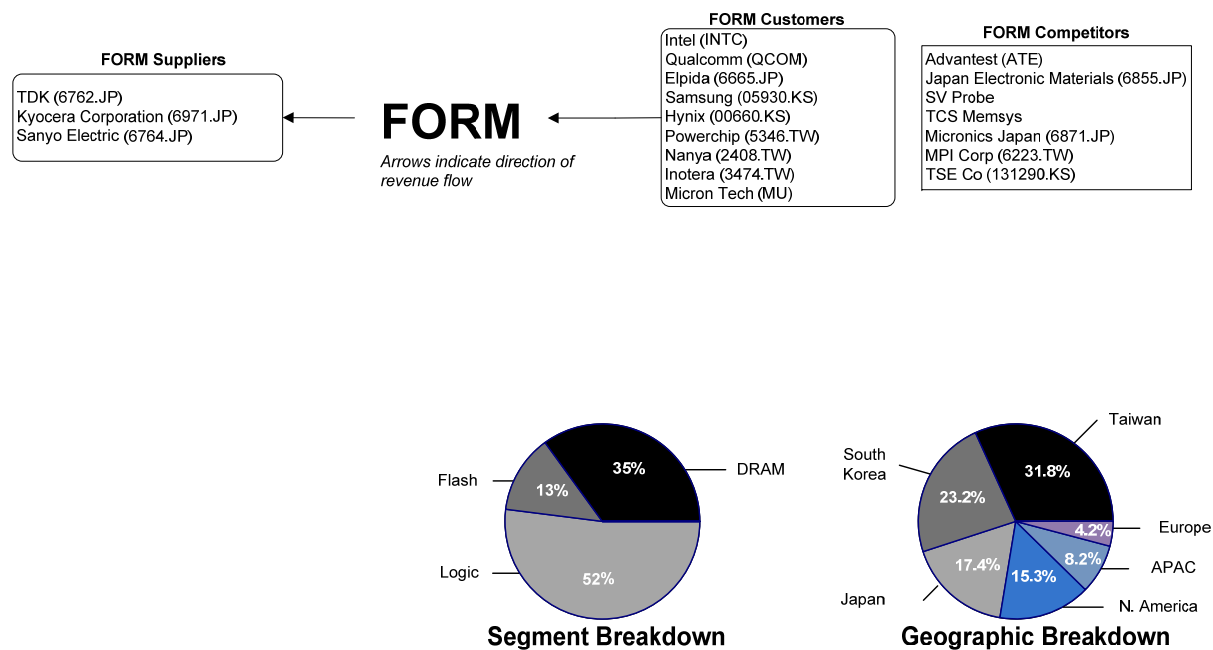
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 366. FormFactor (FORM)

Sector: Semiconductor Production Equipment

FormFactor, Inc. (FORM)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Kevin Chang

Foxconn International Holdings

Foxconn International Holdings (FIH) is the handset division of Hon Hai Precision. After the IPO, Hon Hai remains the largest shareholder of FIH with a controlling stake of about 70%. FIH offers a wide range of services, including mechanical components, module assembly, system assembly and ODM services.

Figure 367. Foxconn International (2038.HK) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	72186.2	55917.2	51476.5	49464.1	45758.6	95659.8	48660.5	135658.0	55425.1
- <i>y/y growth</i>	-13.8%	-22.5%	-7.9%	-3.9%	-7.5%	109.1%	6.3%	41.8%	13.9%
Gross Margins	6.9%	5.9%	4.3%	5.3%	1.9%	6.1%		6.6%	
Operating Margins	3.1%	1.9%	-0.8%	2.2%	-3.3%	2.1%		3.2%	
EPS	0.13	0.04	-0.24	0.08	-0.29	0.27	0.05	0.58	0.17
- <i>y/y growth</i>	-83.4%	-68.3%	-662.0%	133.0%	-473.0%	190.8%	118.5%	117.4%	214.3%
Cash	6491.5	10556.9	12626.2	14928.5	17530.3	15214.7		16717.6	
Debt	3704.1	2811.8	6702.2	3753.2	5455.4	5461.9		5461.9	
Net Cash/Shr	0.9	1.5	1.8	2.1	2.4	2.1		2.3	
Tangible Book Value/Shr	3.8	3.9	3.9	4.0	3.7	3.9		4.5	

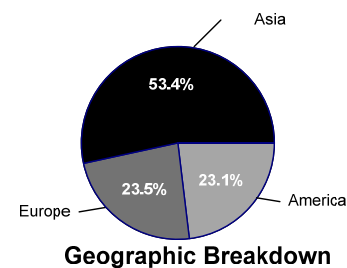
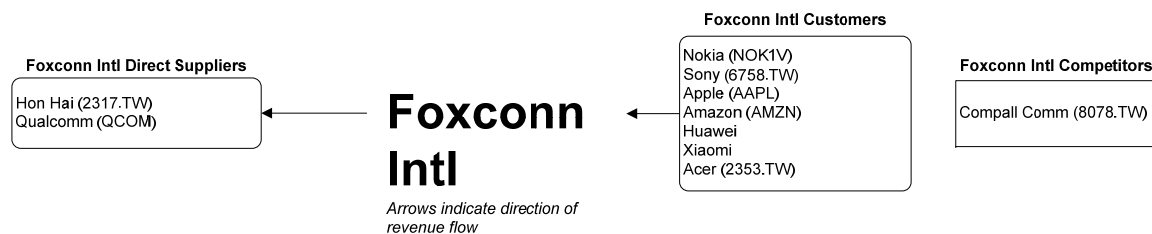
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 368. Foxconn Intl (2038.HK)

Sector: EMS

Foxconn International (2038.HK)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Wei Chen

Foxconn Technology

Foxconn Technology, 31% held by Hon Hai, is a component supplier within the Hon Hai group. Its main products include thermal modules, light metal casing, and consumer-electronics assembly (game consoles such as Nintendo Wii and DS). Its key customers include Nintendo, Apple, and NB/handset brands.

Figure 369. Foxconn Tech (2354.TW) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	159902.6	155058.9	136723.6	131497.9	133616.6	136249.9	143040.1	133684.0	153982.8
- <i>y/y growth</i>	18.4%	-3.0%	-11.8%	-3.8%	1.6%	2.0%	7.1%	-1.9%	7.7%
Gross Margins	8.4%	8.3%	10.8%	9.0%	10.5%	9.5%		9.5%	
Operating Margins	5.3%	5.1%	6.9%	5.4%	6.8%	6.3%		6.0%	
EPS	5.16	5.14	6.22	6.52	6.79	6.32	7.20	6.08	7.96
- <i>y/y growth</i>	-32.2%	-0.4%	20.9%	4.8%	4.2%	-6.9%	6.0%	-3.8%	10.5%
Cash	14615.5	22561.2	18291.5	25593.7	29768.5	39518.7		59941.3	
Debt	25371.6	17798.9	7144.5	9364.2	10351.4	10351.4		10351.4	
Net Cash/Shr	1.0	17.5	13.3	20.8	24.1	31.9		48.5	
Tangible Book Value/Shr	30.5	39.1	41.0	44.2	48.5	53.8		59.0	

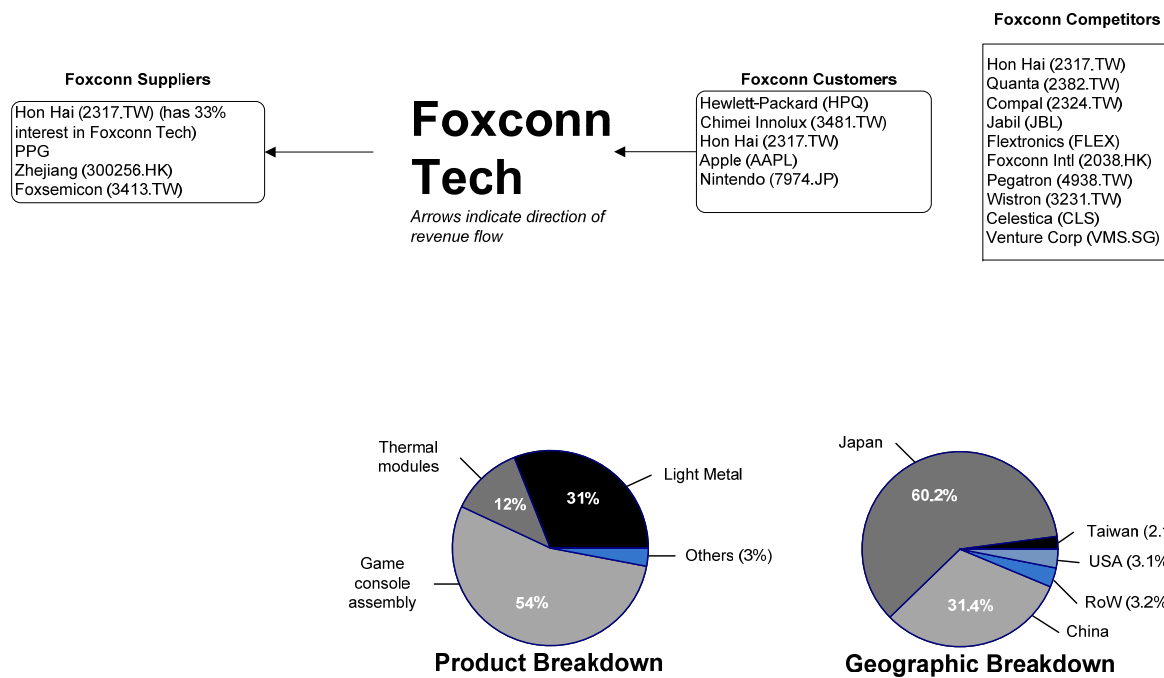
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 370. Foxconn Technology (2354.TW)

Sector: PC & Enterprise Hardware

Foxconn Technology Co. Ltd. (2354.TW)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Glen Yeung

Freescall Semiconductor Holdings

Originally part of Motorola's internal chip division, Freescale is a long-standing player in the global chip industry (50+ years). Now in their second iteration as a public company (the first was 2004-2006), Freescale has evolved into the #1 vendor of embedded processors (microcontrollers, microprocessors, application processors and digital signal processors) in the world (45% share). Freescale groups their offerings into 3 core operating groups: microcontrollers (35% of sales), networking & multimedia (26%), and RF & Analog (26-27%). These 3 business units attack 4 main end-markets: automotive (39%), networking (27%), industrial (14%), consumer (10%), and other the remaining (10%). Freescale serves a diverse customer base (18,000), holds 6100 patent families, and employs 19,000 personnel (5500 in R&D). The company is headquartered in Austin, TX.

Figure 371. Freescale Semi (FSL) Results and Forecasts

	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	4458.0	4572.0	3945.0	4141.5	4125.7	4399.5	4395.8
- <i>y/y growth</i>		2.6%	-13.7%	5.0%	4.6%	6.2%	6.5%
Gross Margins	37.9%	41.4%	41.6%	42.5%		45.9%	
Operating Margins	-1.4%	6.0%	11.7%	13.7%		18.0%	
EPS	-5.36	-1.81	-0.41	0.19	0.47	1.27	1.38
- <i>y/y growth</i>		66.3%	77.5%	147.1%	214.8%	560.7%	195.7%
Cash	1043.0	772.0	711.0	965.2		1445.7	
Debt	7616.0	6591.0	6381.0	6389.0		6389.0	
Net Cash/Shr	-33.3	-25.6	-22.6	-21.0		-19.0	
Tangible Book Value/Shr	-26.7	-20.3	-18.5	-17.7		-16.1	

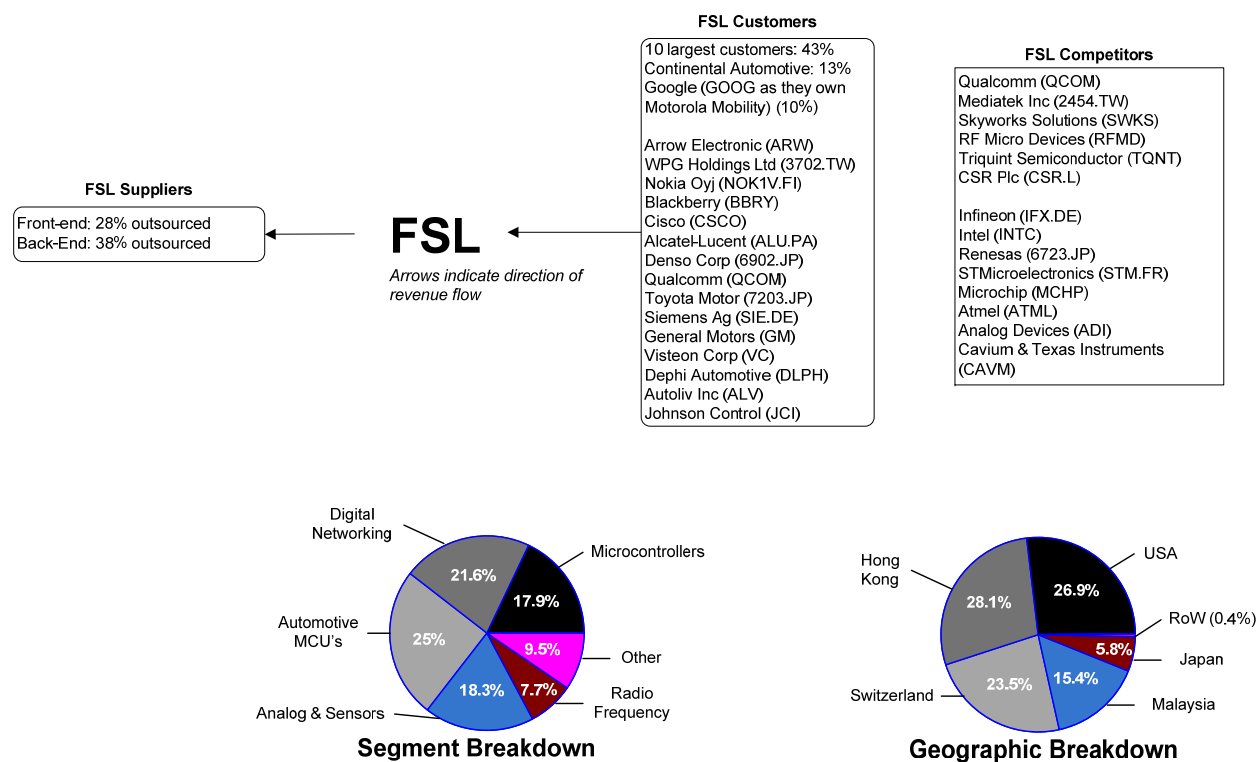
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 372. Freescale Semiconductor (FSL)

Sector: Semiconductors

Freescle Semiconductor Holdings I, Ltd. (FSL)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Fujifilm Holdings

FUJIFILM Holdings, Inc. engages in the development, production, sales, and provision of imaging, information, and document solutions. It operates through the following segments: Imaging Solutions, Information Solutions, and Document Solutions. The Imaging Solutions segment handles color films color paper and chemicals, photofinishing equipment, laboratories, film developing and image services, and electronic imaging. The Information Solutions segment deals with medical systems and life sciences, graphic arts, and recording media. The Document Solutions segment provides office products, printers, and document outsourcing and production services. The company was founded on January 20, 1934 and is headquartered in Tokyo, Japan.

Figure 373. Fujifilm (4901.JP) Results and Forecasts

	2009	2010	2011	2012	2013	CIR 2014E	Street 2014E	CIR 2015E	Street 2015E
Revenues	2434344.0	2181693.0	2217084.0	2195293.0	2214696.0	2285800.0	2283354.0	2341140.0	2333072.0
- y/y growth	-14.5%	-10.4%	1.6%	-1.0%	0.9%	3.2%	3.1%	2.4%	2.2%
Gross Margins	37.9%	39.6%	40.8%	39.5%	38.4%	38.8%		39.2%	
Operating Margins	1.5%	-1.9%	6.2%	5.1%	5.2%	6.5%		7.4%	
EPS	19.22	-70.29	118.35	83.76	106.63	161.48	143.16	197.15	162.86
- y/y growth	-90.3%	-465.7%	268.4%	-29.2%	27.3%	51.4%	34.3%	22.1%	13.8%
Cash	270094.0	406177.0	313070.0	235104.0	445394.0	390047.0		413485.0	
Debt	321546.0	295648.0	189657.0	198870.0	358272.0	240000.0		180000.0	
Net Cash/Shr	29.4	486.2	359.1	411.1	251.1	383.6		567.6	
Tangible Book Value/Shr	3482.0	3573.7	3576.0	3574.3	3878.5	4084.4		4324.1	

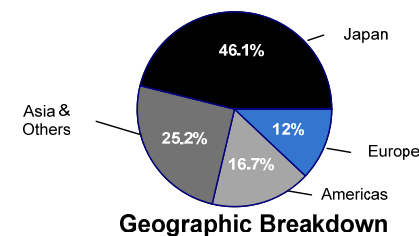
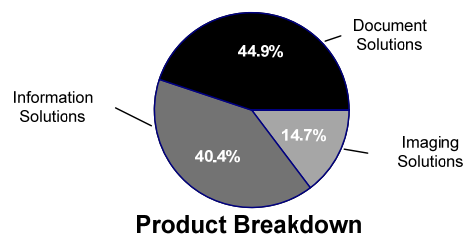
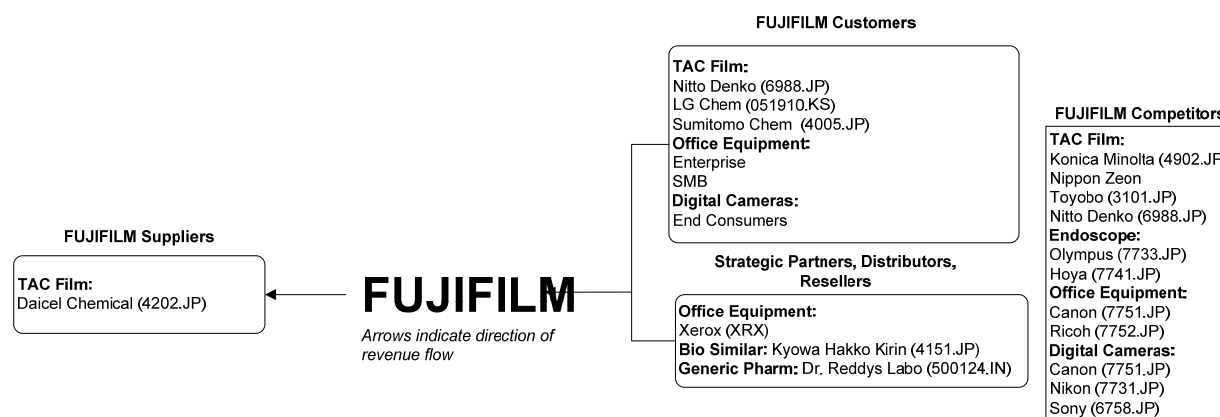
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 374. FUJIFILM (4901.JP)

Sector: Imaging

FUJIFILM Holding Corp. (4901.JP)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Kota Ezawa

Fujitsu

Fujitsu Ltd. engages in the field of information and communication technology. It operates through the following segments: Technology Solutions, Ubiquitous Solutions, Device Solutions, and Other. The Technology Solutions segment delivers services that integrate products, software, and services such as systems integration, infrastructure services, and network products. The Ubiquitous Solutions segment provides ubiquitous terminals, including personal computers, mobile phones, car audio, navigations systems, mobile communication equipment, and automotive electronic tools. The Device Solutions segment deals with large scale integration devices used in digital home appliances, automobiles, mobile phones, servers, and electronic components such as semiconductors and batteries. The Other segment handles operations not included in the reportable segments such as Japan's Next-Generation Supercomputer project, facility services, and the development of information systems for group companies, and welfare benefits for group employees. The company was founded on June 20, 1935 and is headquartered in Tokyo, Japan.

Figure 375. Fujitsu (6702.JP) Results and Forecasts

	2009	2010	2011	2012	2013	CIR 2014E	Street 2014E	CIR 2015E	Street 2015E
Revenues	4692991.0	4679519.0	4528405.0	4467574.0	4375964.7	4406250.0	4383673.0	4394500.0	4415779.0
- y/y growth	-12.0%	-0.3%	-3.2%	-1.3%	-2.1%	0.7%	0.2%	-0.3%	0.7%
Gross Margins	25.6%	26.6%	27.8%	27.7%	28.3%	29.3%		30.3%	
Operating Margins	1.5%	2.0%	2.9%	2.4%	2.3%	3.2%		3.9%	
EPS	-49.36	40.70	25.07	20.48	-45.55	33.50	31.64	41.65	38.40
- y/y growth	-332.8%	182.5%	-38.4%	-18.3%	-322.4%	173.6%	169.5%	24.3%	21.4%
Cash	537604.0	427960.0	364694.0	273925.0	290176.7	318049.3		344053.0	
Debt	883480.0	577443.0	470823.0	381148.0	531148.0	481148.0		431148.0	
Net Cash/Shr	35.6	31.0	54.4	10.4	14.6	39.9		64.4	
Tangible Book Value/Shr	260.0	251.6	275.1	295.2	260.5	294.2		325.0	

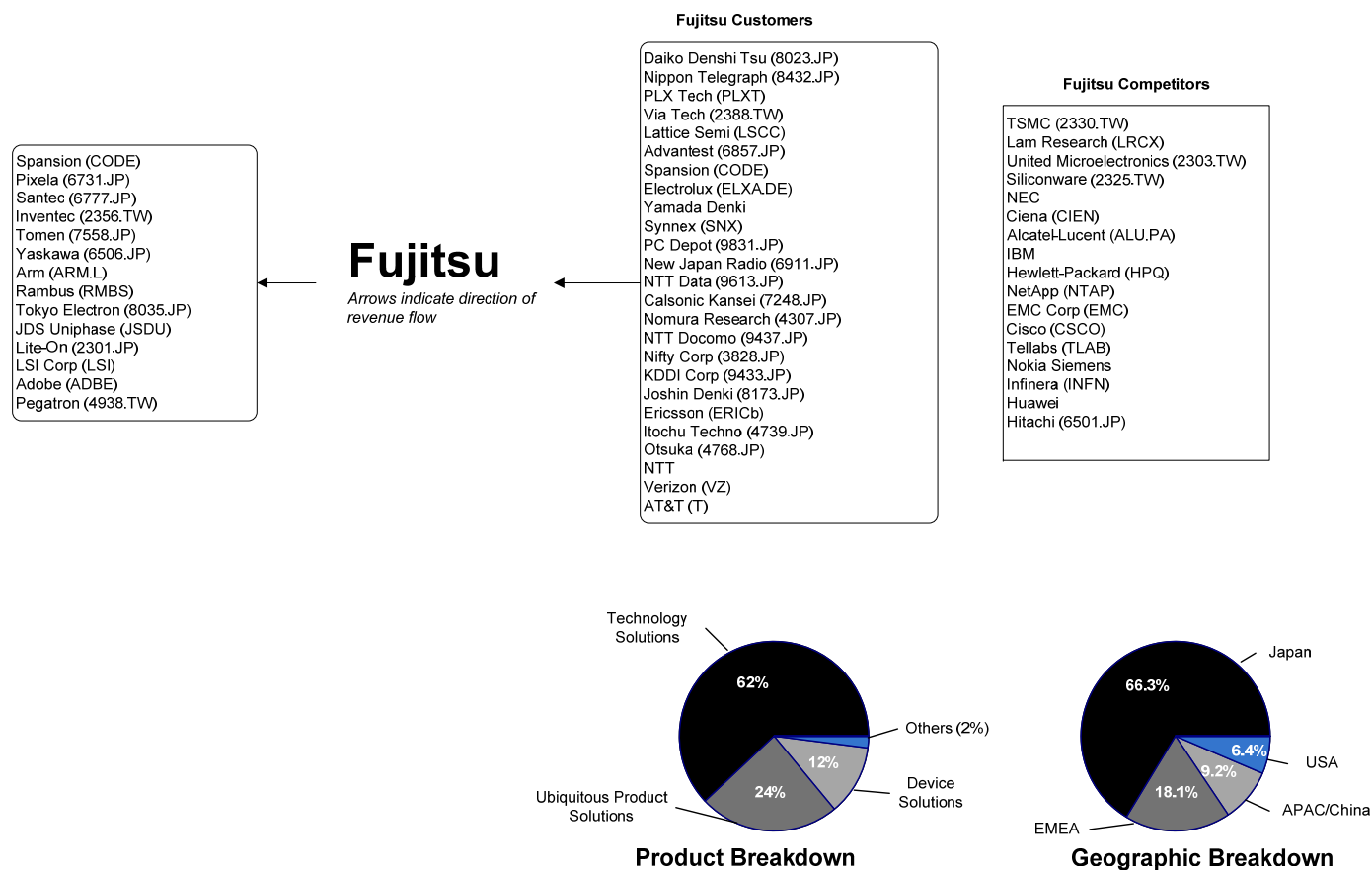
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 376. Fujitsu (6702.JP)

Sector: Technology - General

Fujitsu (6702.JP)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jim Suva, CPA

Hewlett-Packard Co

Hewlett-Packard is a leading vendor of IT hardware (currently #1 in PCs), imaging solutions, and services worldwide. As of FY11 HP has five major business segments: 1) Imaging & Printing Group (IPG; approx 20% of total revs; 15% op margin) provides laser and inkjet printers, supplies, multifunction and photo printers, wide/large-format printers, digital cameras and accessories, online photo services (through Snapfish), and imaging & software solutions and related professional & consulting services. 2) Personal Systems Group (PSG; approx 31% of total revs; 6% op margin) provides computing systems for the enterprise, SMB and consumers, including PCs & workstations, handhelds, digital entertainment systems, calculators, and software & related services. 3) Enterprise Servers and Storage (ESS; approx. 17% of total revs; 14% op margin). 4) Software (3% of total revs; 22% op margin) which includes enterprise software to manage data centers and the Mercury Interactive acquisition. 5) Services (28% of total revs; 14% op margin) include technology services, consulting, integration, managed services, as well as the EDS acquisition.

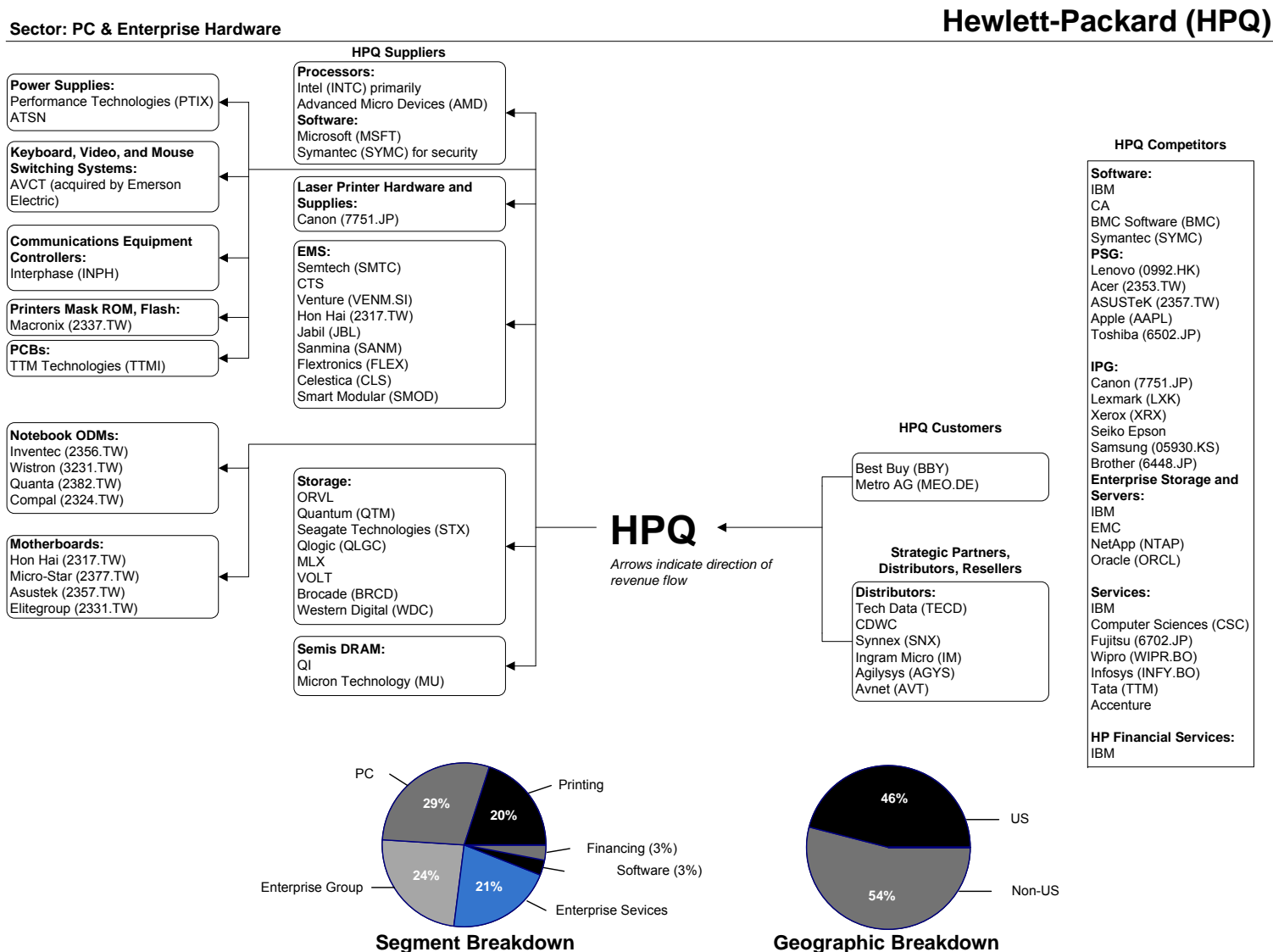
Figure 377. Hewlett-Packard (HPQ) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	118364.0	114552.0	126033.0	127387.0	120357.0	109141.9	113285.1	100739.8	111326.6
- y/y growth	13.5%	-3.2%	10.0%	1.1%	-5.5%	-9.3%	-5.9%	-7.7%	-1.7%
Gross Margins	24.0%	23.6%	23.9%	23.9%	23.3%	23.1%		23.2%	
Operating Margins	10.0%	11.0%	11.4%	10.8%	9.3%	8.3%		8.2%	
EPS	3.63	3.85	4.60	4.89	4.06	3.30	3.49	3.04	3.61
- y/y growth	23.9%	6.2%	19.6%	6.2%	-16.9%	-18.6%	-14.0%	-8.1%	3.4%
Cash	10246.0	13334.0	10934.0	8043.0	11301.0	15652.7		19981.4	
Debt	17852.0	15830.0	22304.0	30634.0	28436.0	28227.0		28227.0	
Net Cash/Shr	1.0	-0.3	-1.8	-6.8	-5.3	-3.1		-0.9	
Tangible Book Value/Shr	-0.6	0.3	-2.4	-8.3	-6.5	-4.0		-1.5	

(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 378. Hewlett-Packard (HPQ)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Hi-P International Ltd

Hi-P International Ltd. engages in design and fabrication of mold, precision plastic injection molding and metal stamping. The company operates as a supplier of electro-mechanical modules to the telecommunications, consumer electronics and computing industries. It offers diversified services ranging from industrial and product design, manufacture, assembly, ancillary value-added services such as surface decoration finishing and precision metal stamping as well as turnkey contract manufacturing. The company operates through three segments: Precision Plastic Injection Molding, Mold Design and Fabrication and Provision of Sub-Product Assembly and Full-Product Assembly Services. Hi-P International was founded in 1980 and is headquartered in Singapore.

Figure 379. Hi-P (HIPI) Results and Forecasts

	2008	2009	2010	2011	2012	Street 2013E	Street 2014E
Revenues	1077.1	749.9	957.7	1203.9	1166.7	1351.00	1458.0
- <i>y/y growth</i>	10.3%	-30.4%	27.7%	25.7%	-3.1%	15.8%	7.9%
Gross Margins	18.3%	18.1%	19.0%	10.9%	8.4%		
Operating Margins	11.1%	8.9%	11.0%	4.3%	1.0%		
EPS	0.12	0.06	0.08	0.05	0.02	0.05	0.05
- <i>y/y growth</i>	77.5%	-50.0%	33.3%	-35.0%	-59.6%	128.6%	7.6%
Cash	132.76	247.03	220.37	340.70	178.91		
Debt	5.68	5.23	3.95	195.07	155.79		
Net Cash/Shr	0.19	0.22	0.08	0.12	-0.01		
Tangible Book Value/Shr	0.63	0.65	0.64	0.72	0.70		

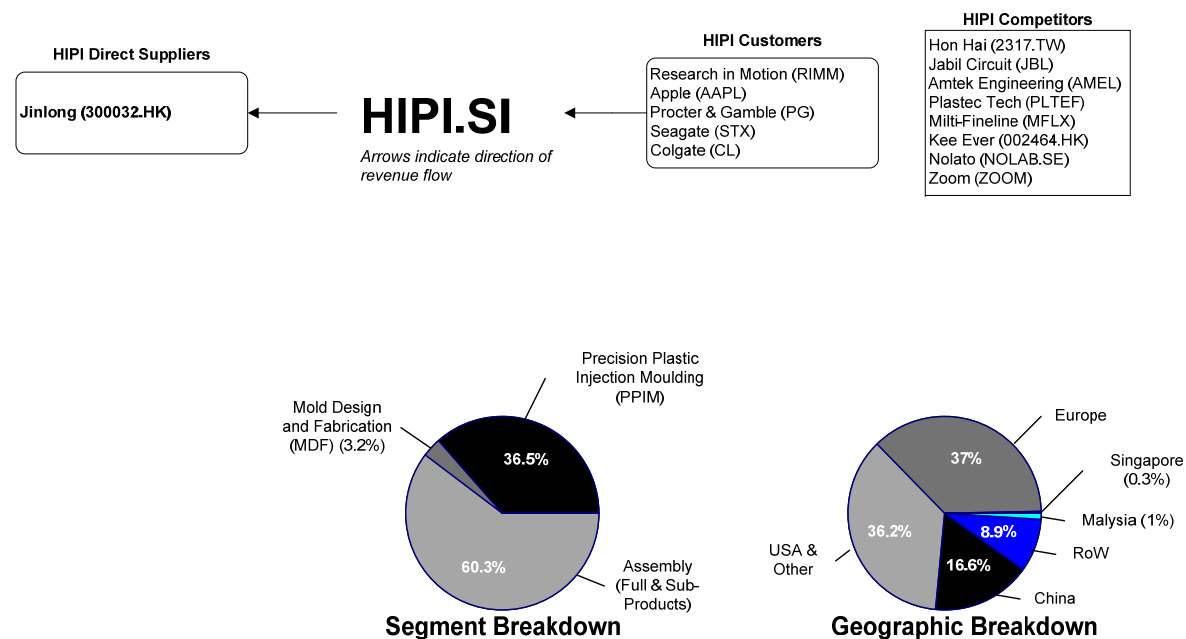
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, FactSet

Figure 380. Hi-P International (HIPI.SI)

Sector: Electronic Components

Hi-P International (HIPI.SI)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research

Citi Analyst: Yuta Fukasawa

Hirose Electric

Hirose Electric Co., Ltd. engages in the manufacture and sale of connectors and other electronic components. It operates through the following segments: Multi-Pin Connector, Coaxial Connector, and Other. The Multi-Pin Connector segment covers connectors for ribbon cables, printed circuit boards, and flexible printed circuit boards; and manufactures circular, rectangular, and nylon connectors. The Coaxial Connector segment deals with high performance connectors, such as optical fiber connectors, for microwave and other high-frequency signals. The Other segment includes medical electronics equipment, micro switches, and instruments for connectors. The company was founded by Keizo Hirose on August 15, 1937 and is headquartered in Tokyo, Japan.

Figure 381. Hirose (6806.JP) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	118043.0	89872.0	84468.0	92440.0	94790.0	94714.0	95259.0	102200.0	105551.0
- <i>y/y growth</i>	2.2%	-23.9%	-6.0%	9.4%	2.5%	-0.1%	0.5%	7.9%	10.8%
Gross Margins	45.8%	40.9%	43.3%	43.1%	40.7%	42.9%		43.1%	
Operating Margins	30.0%	21.3%	24.2%	23.8%	20.6%	21.6%		22.5%	
EPS	587.41	356.67	363.18	330.26	366.17	366.55	384.17	453.70	485.90
- <i>y/y growth</i>	-5.4%	-39.3%	1.8%	-9.1%	10.9%	0.1%	4.9%	23.8%	26.5%
Cash	145251.0	137713.0	129616.0	131833.0	135438.0	146759.6		154053.4	
Debt	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Net Cash/Shr	3775.5	3690.6	3548.2	3716.5	3866.6	4241.1		4451.9	
Tangible Book Value/Shr	5868.1	5691.4	5705.0	5821.9	5875.8	6160.8		6427.7	

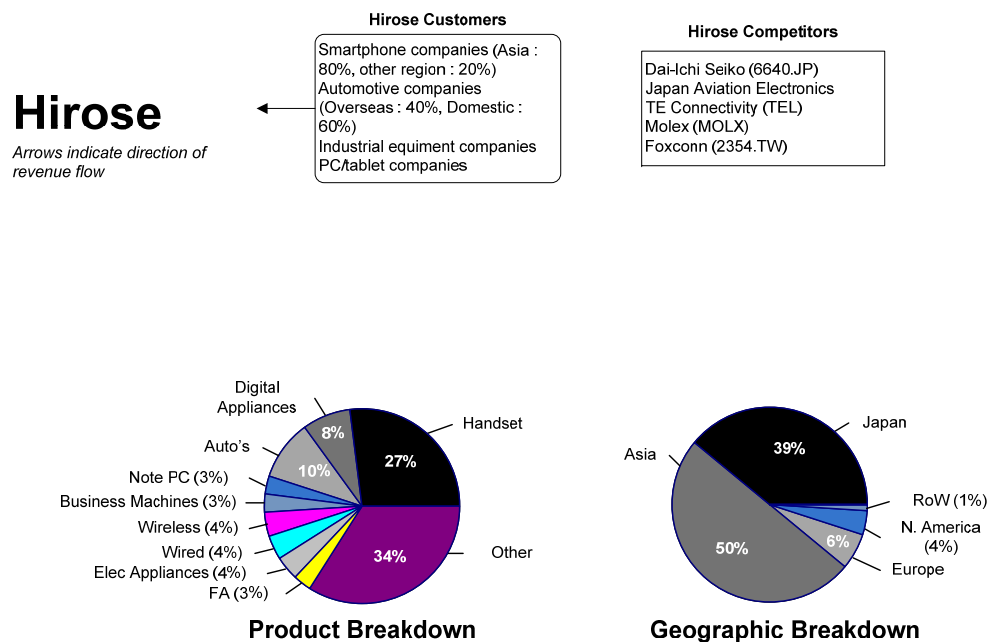
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 382. Hirose (6806.JP)

Sector: Electronic Components

Hirose Electric (6806.JP)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Kota Ezawa

Hitachi

Hitachi Ltd. engages in the manufacture of electronic and electrical equipment. It operates through the following segments: Information and Telecommunication Systems, Power Systems, Social Infrastructure and Industrial Systems, Electronic Systems and Equipment, Construction Machinery, High Functional Materials and Components, Automotive Systems, Components and Device, Digital Media and Consumer Products, Financial Services, and Others. The Information and Telecommunication Systems segment offers systems integration, outsourcing services, software, disk array subsystems, servers, mainframes, telecommunications equipment, and an automated teller machine (ATM) services. The Power Systems segment includes thermal, nuclear, hydroelectric, and wind power generation systems. The Social Infrastructure and Industrial Systems segment provides infrastructure products and services, industrial equipment, and energy-saving solutions that help to reduce environmental impact. The Electronic Systems and Equipment segment manufactures semiconductor, liquid crystal display (LCD), hard disk drive (HDD), test and measurement equipment, medical electronics equipment, power tools, and electronic parts manufacturing systems. The Construction Machinery segment offers products for civil engineering and construction, building and structural demolition, mining and excavation such as hydraulic excavators, wheel loaders, and mining dump trucks. The High Functional Materials and Components segment produces wires and cables, copper products, semiconductor and display-related materials, circuit boards and materials, specialty steels, magnetic materials and components, and high grade casting components and materials. The Automotive Systems segment offers engine management systems, electric power train systems, drive control systems, and car information systems. The Components and Devices segment offers LCD, HDD, information storage media, and batteries. The Digital Media and Consumer Products segment offers digital media products and home appliances such as optical disk drives, flat-panel television sets, LCD projectors, room air conditioners, refrigerators, washing machines, and air-conditioning equipment. The Financial Services segment provides leases, loan guarantees and insurance services, and conducts business in the area of securitization. The Other segment offers logistics and property management services. The company was founded in 1910 and is headquartered in Tokyo, Japan.

Figure 383. Hitachi (6501.JP) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	11226735.0	10000369.0	8968546.0	9315807.0	9665883.0	8914300.0	8946124.0	8995400.0	9195818.0
- y/y growth	9.6%	-10.9%	-10.3%	3.9%	3.8%	-7.8%	-7.4%	0.9%	2.8%
Gross Margins	21.8%	21.8%	23.6%	25.2%	24.7%	26.0%		26.1%	
Operating Margins	3.1%	1.3%	2.3%	4.8%	4.3%	4.8%		5.7%	
EPS	-17.48	-236.86	-22.33	49.43	70.20	32.67	34.31	47.92	54.05
- y/y growth	-77.6%	-1254.8%	90.6%	321.3%	42.0%	-53.5%	-51.1%	46.7%	57.6%
Cash	560960.0	807926.0	577584.0	554810.0	619577.0	625000.0		725000.0	
Debt	2480894.0	2806389.0	2350878.0	2100490.0	2154341.0	2300000.0		2300000.0	
Net Cash/Shr	-258.9	-144.9	-216.0	-154.3	-127.2	-116.3		-98.3	
Tangible Book Value/Shr	222.0	-60.4	6.3	-26.6	61.6	42.1		36.5	

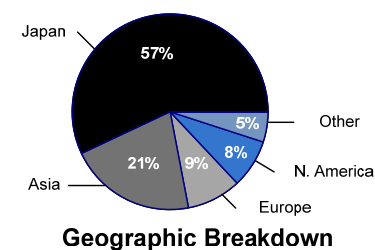
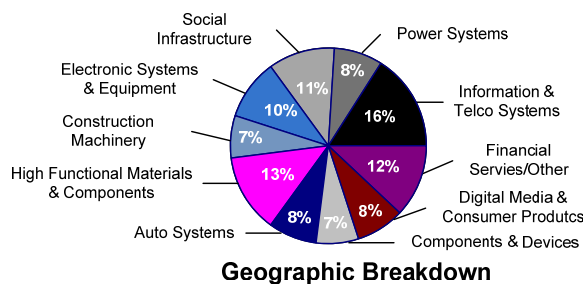
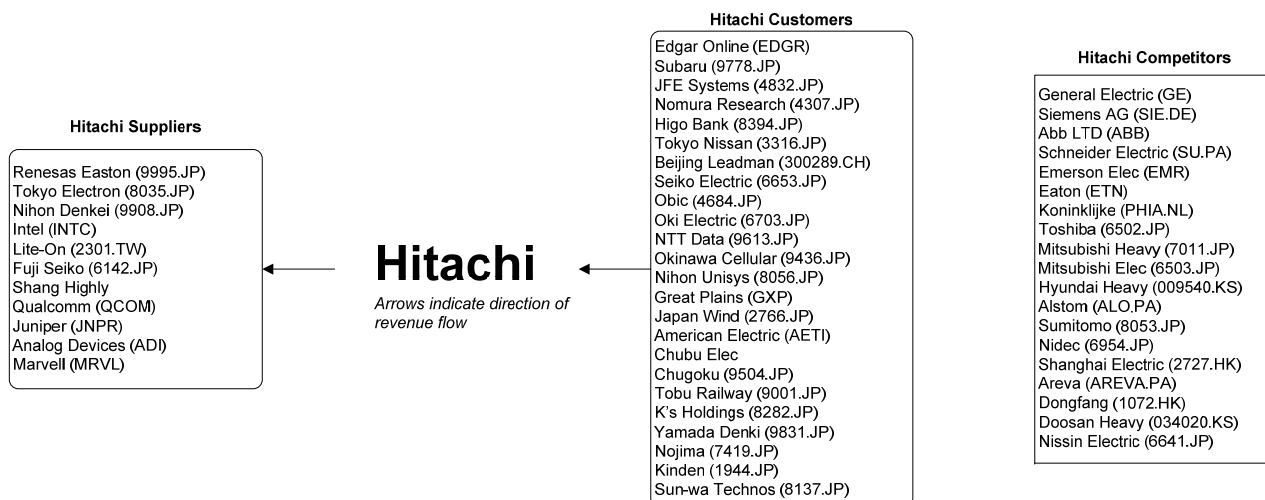
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 384. Hitachi (6501.JP)

Sector: Technology - General

Hitachi (6501.JP)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Kevin Chang

Hon Hai Precision

Established in 1974, Hon Hai (HH) has become the largest EMS player in the world in terms of sales. Through its vertical integration model or "eCMMS" (e-enabled Components, Modules, Moves and Services), Hon Hai provides components, modules and system assembly products to many global OEMs in PC, communication and consumer sectors.

Figure 385. Hon Hai (2317.TW) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	1950481.3	1959182.5	2997205.3	3452681.7	3903861.6	3822974.8	3875556.5	4524215.6	4314157.3
- y/y growth	14.6%	0.4%	53.0%	15.2%	13.1%	-2.1%	-0.7%	18.3%	11.3%
Gross Margins	8.8%	9.5%	8.1%	7.7%	8.4%	8.8%		8.7%	
Operating Margins	3.8%	4.3%	2.9%	2.4%	2.7%	3.2%		3.4%	
EPS	4.86	6.53	6.62	6.96	8.01	9.19	8.50	11.34	9.78
- y/y growth	-30.2%	34.4%	1.4%	5.1%	15.0%	14.8%	6.1%	23.4%	15.1%
Cash	99987.7	179143.0	255296.0	330538.2	708210.9	800794.8		916445.6	
Debt	128209.8	148893.8	318409.8	387490.9	515055.2	515055.2		515055.2	
Net Cash/Shr	4.4	10.1	14.4	18.3	50.1	57.7		67.5	
Tangible Book Value/Shr	34.6	40.9	44.2	52.5	61.2	68.4		77.7	

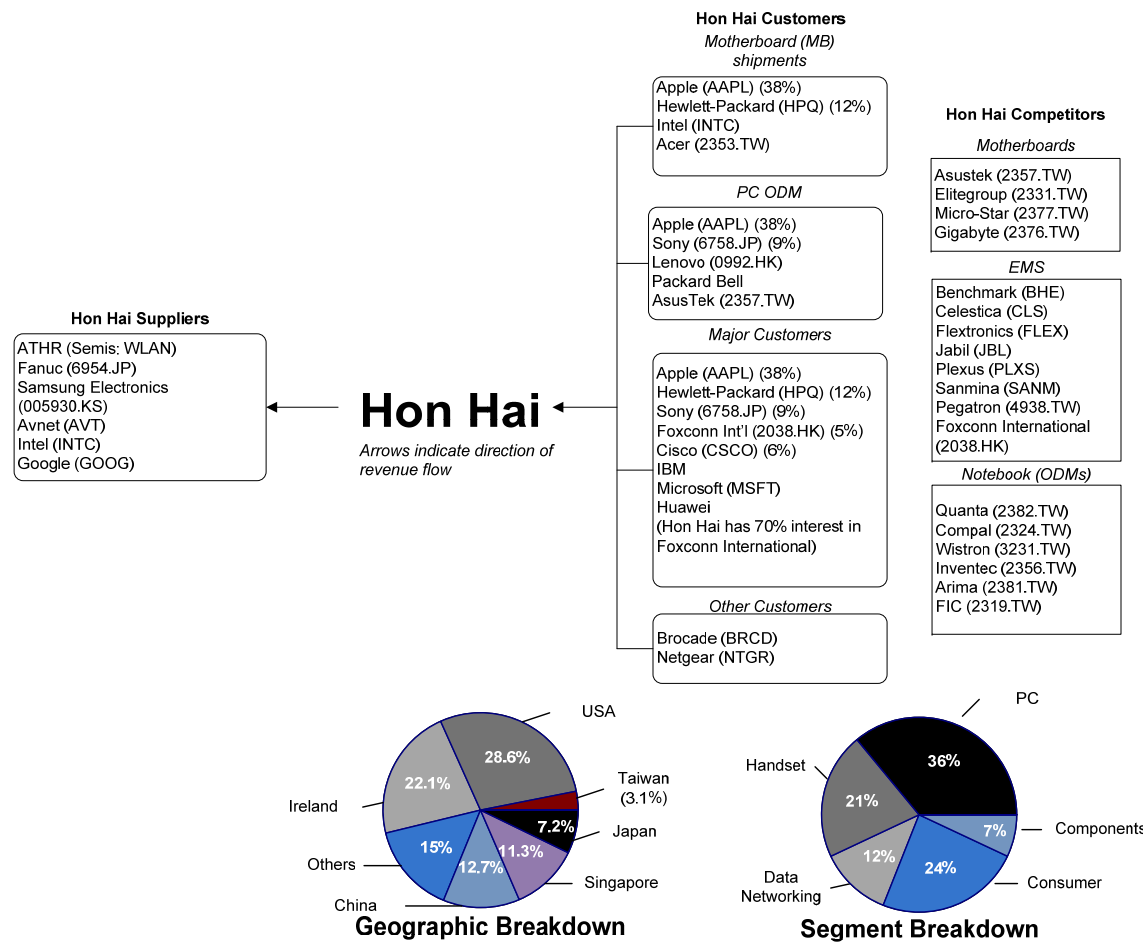
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 386. Hon Hai (2317.TW)

Sector: Electronic Manufacturing Services

Hon Hai (2317.TW)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Yuta Fukasawa

Hosiden

Hosiden Corp. is engaged in the manufacture and sale of electrical appliances, information telecommunications equipment, office machines, medical equipment, and electronic products. It operates through the following segments: Mechanical Parts, Acoustic Components, Liquid Crystal Display (LCD) Device, and Composite Parts. The Mechanical Parts segment includes connectors, jacks, and switches. The Acoustic Components segment consists of microphones, headphones, headsets, speakers, and receivers. The LCD Device segment comprises mainly of passive LCD units. The Composite Parts segment deals with other products such as remote controls and solenoids. The company was founded in April 1947 and is headquartered in Yao, Japan.

Figure 387. Hosiden (6804.JP) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	419496.0	453739.0	307883.0	201680.0	172936.0	226714.0	218000.0	225200.0	232225.0
- y/y growth	34.1%	8.2%	-32.1%	-34.5%	-14.3%	31.1%	26.1%	-0.7%	6.5%
Gross Margins	7.3%	8.6%	7.8%	7.1%	3.5%	3.9%		5.8%	
Operating Margins	3.9%	5.5%	3.8%	1.6%	-2.4%	-0.3%		1.6%	
EPS	99.66	187.04	94.43	19.29	-78.56	5.54	14.13	34.41	24.72
- y/y growth	163.2%	87.7%	-49.5%	-79.6%	-507.3%	107.0%	118.0%	521.6%	75.0%
Cash	26317.0	30215.0	48619.0	56941.0	57655.0	39922.6		40624.6	
Debt	32966.0	31909.0	14664.0	14402.0	5026.0	5347.0		5347.0	
Net Cash/Shr	204.2	270.6	519.4	630.2	862.7	597.4		607.9	
Tangible Book Value/Shr	1180.3	1312.0	1394.9	1366.8	1246.9	1250.1		1272.4	

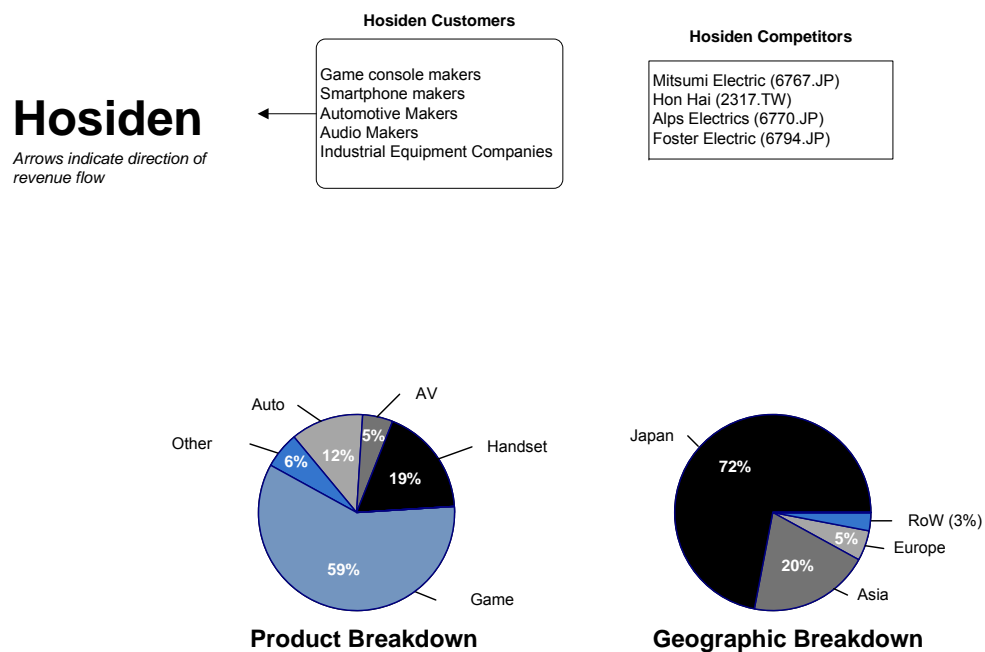
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 388. Hosiden (6804.JP)

Sector: Electronic Components

Hosiden (6804.JP)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Masahiro Shibano

Hoya

HOYA CORP. engages in the manufacture and sale of imaging products, electronics, and medical-related equipment. Its operations are carried out through the following segments: Information Technology, Life Care, and Other. The Information Technology segment includes electronics and imaging-related products. The Life Care segment offers health care and medical-related products. The Other segment comprises of information system design and new business operations. The company was founded on November 1, 1941 and is headquartered in Tokyo, Japan.

Figure 389. Hoya (7741.JP) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	481631.0	454194.0	413524.0	423063.0	376940.0	363900.0	365380.0	380500.0	381499.0
- y/y growth	23.5%	-5.7%	-9.0%	2.3%	-10.9%	-3.5%	-3.1%	4.6%	4.4%
Gross Margins	45.4%	41.8%	43.6%	45.9%	46.3%	46.4%		48.1%	
Operating Margins	19.7%	13.0%	15.6%	17.5%	15.5%	19.2%		17.3%	
EPS	189.08	58.01	87.65	138.10	98.93	137.91	134.00	123.91	117.68
- y/y growth	-2.3%	-69.3%	51.1%	57.6%	-28.4%	39.4%	35.4%	-10.2%	-12.2%
Cash	181467.0	214540.0	173307.0	185252.0	204772.0	235784.3		260667.1	
Debt	128448.0	116206.0	105418.0	103184.0	102045.0	101000.0		101000.0	
Net Cash/Shr	157.9	242.3	165.5	195.8	333.7	407.5		465.1	
Tangible Book Value/Shr	905.0	776.8	812.0	866.3	884.6	995.2		1052.4	

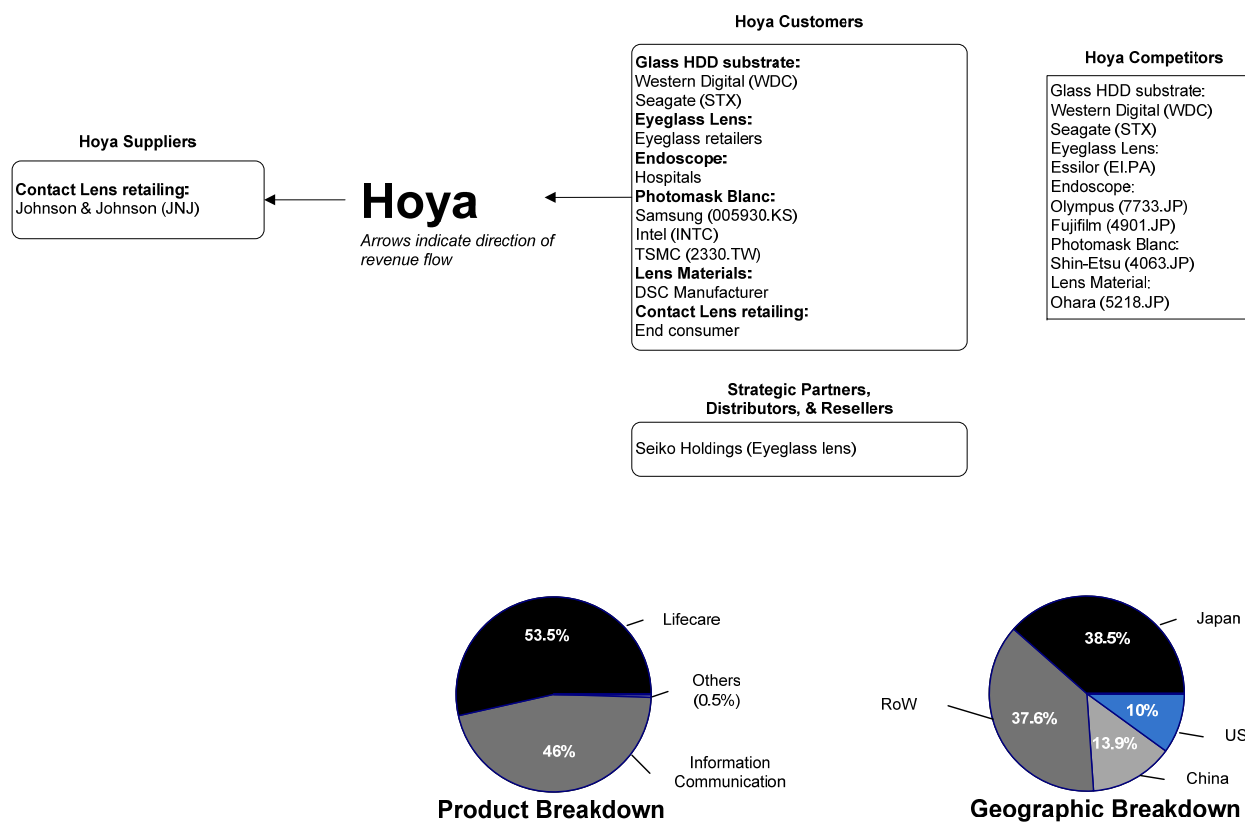
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 390. Hoya (7741.JP)

Sector: Hardware

Hoya (7741.JP)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Kevin Chang

HTC

Taiwan-based HTC is a leading smartphone player. It focuses on designing Windows Mobile and Android Mobile Platform converged handhelds under operator brands as well as its own "hTc" brand.

Figure 391. HTC (2498.TW) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	152353.2	144492.5	278761.2	465794.8	289020.2	253944.9	272529.7	236182.4	316229.0
- <i>y/y growth</i>	28.9%	-5.2%	92.9%	67.1%	-38.0%	-12.1%	-5.7%	-7.0%	16.0%
Gross Margins	33.5%	31.9%	30.1%	28.3%	25.2%	24.3%		24.1%	
Operating Margins	19.9%	17.0%	15.8%	14.8%	6.5%	4.4%		4.3%	
EPS	33.10	26.05	46.00	72.15	19.69	12.33	11.87	11.16	19.11
- <i>y/y growth</i>	-2.1%	-21.3%	76.6%	56.8%	-72.7%	-37.4%	-39.7%	-9.5%	60.9%
Cash	64237.7	64638.3	74462.9	87501.5	53878.1	62266.3		59188.3	
Debt	150.6	119.2	24.4	0.0	0.0	0.0		0.0	
Net Cash/Shr	74.2	74.4	86.6	101.9	63.2	73.1		69.5	
Tangible Book Value/Shr	70.2	75.7	86.9	119.2	94.3	96.0		100.5	

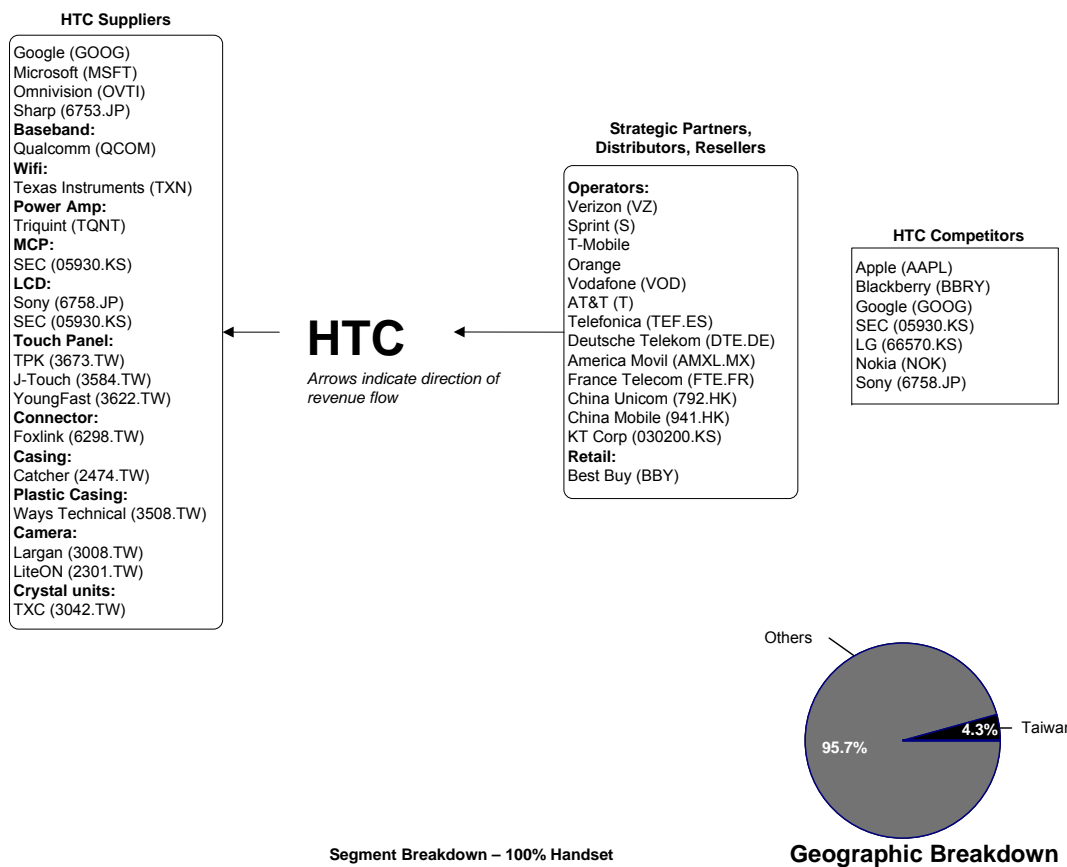
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 392. HTC (2498.TW)

Sector: Telecom Equipment

HTC Corporation (2498.TW)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Huawei Technology Co Ltd

Huawei Technology Co. Ltd. engages in the design, research & development, manufacture and distribution of toy series. Its five main product series include smart toys, plastic toys, model toys, cartoon toys, and others. The company was founded on August 26, 1997 and is headquartered in Shantou, China.

Figure 393. Huawei Results and Forecasts

	2008	2009	2010	2011	2012	Street	Street
Revenues	379.2	428.9	470.9	480.6	448.1		
- <i>y/y growth</i>	18.0%	13.1%	9.8%	2.1%	-6.8%		
Gross Margins	17.6%	19.3%	21.7%	22.3%			
Operating Margins	11.8%	11.6%	12.7%	10.0%			
EPS			0.35	0.34			
- <i>y/y growth</i>				-2.7%			
Cash	11.97	27.54	559.07	552.09			
Debt	115.50	119.17	0.00	0.00			
Net Cash/Shr	-0.01	0.15	0.47	0.25			
Tangible Book Value/Shr	0.70	0.99	5.64	5.86			

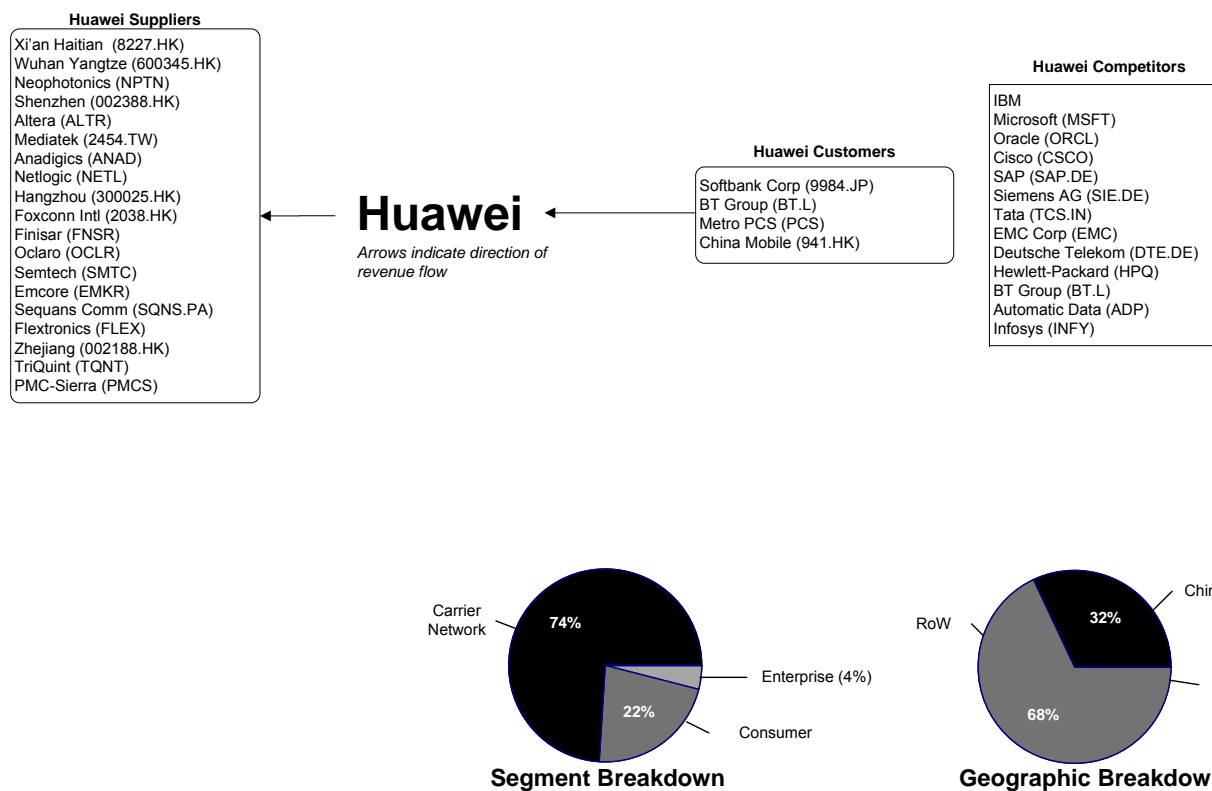
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, FactSet

Figure 394. Huawei

Sector: Networking & Telecommunications Equipment

Huawei



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Henry Kim, CFA

SK Hynix

SK Hynix manufactures semiconductors, such as DRAM, NAND flash memory and SRAM chips.

Figure 395. SK Hynix (000660.KS) Results & Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	6817984.9	7906350.0	12098667.0	10395811.0	10162000.0	14119195.2	12694403.0	15714634.8	13653769.0
- y/y growth	-21.1%	16.0%	53.0%	-14.1%	-2.2%	38.9%	24.9%	11.3%	7.6%
Gross Margins	-8.0%	20.6%	39.5%	16.1%	15.9%	39.7%		42.7%	
Operating Margins	-28.2%	2.4%	27.1%	3.1%	-2.2%	26.1%		28.6%	
EPS	-10194.83	-588.42	4459.56	-94.91	-228.60	4040.04	2722.60	4849.79	3346.54
- y/y growth	-1462.0%	94.2%	857.9%	-102.1%	-140.9%	1867.3%	1291.0%	20.0%	22.9%
Cash	719657.4	1518461.0	2194706.0	1875927.0	1784616.0	2766659.0		3869827.3	
Debt	7748637.2	7016374.0	5943117.0	6776465.0	6471976.0	5471976.0		4371976.0	
Net Cash/Shr	-9540.5	-4157.3	-2018.6	-3475.1	-2821.0	-911.8		1242.8	
Tangible Book Value/Shr	9919.0	8413.2	12834.1	12033.1	12550.9	16591.0		21440.7	

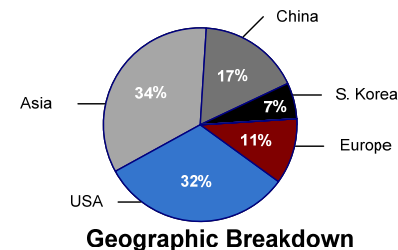
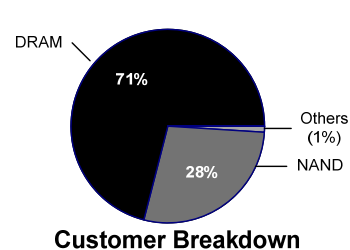
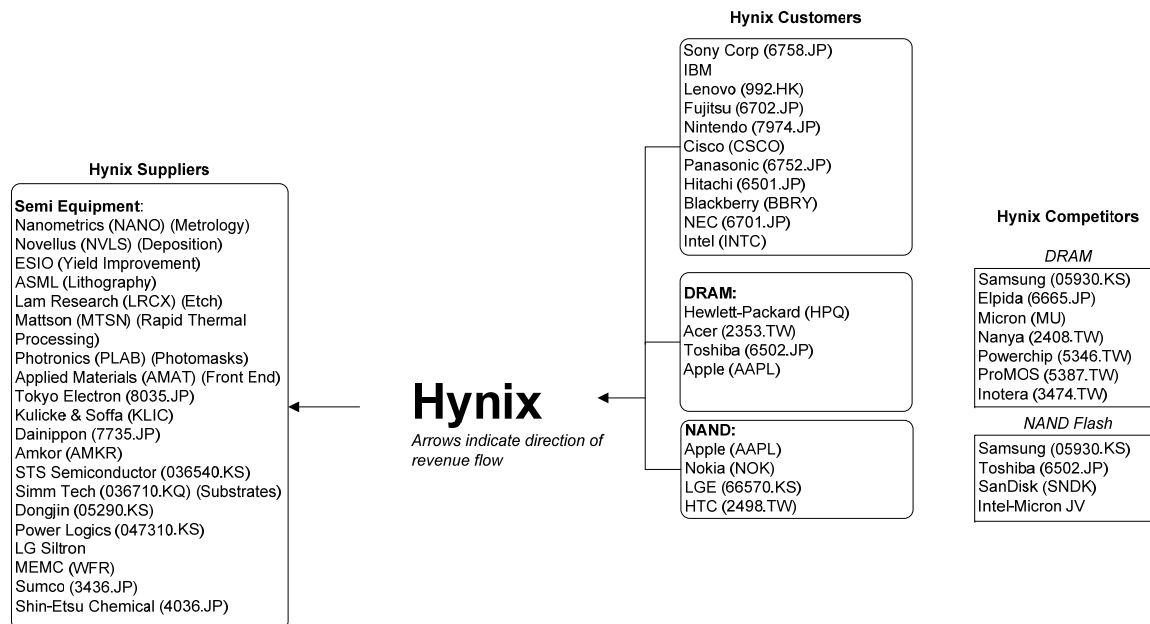
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 396. Hynix (000660.KS)

Sector: Semiconductors

Hynix Semiconductor (000660.KS)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Yuta Fukasawa

Ibiden

IBIDEN Co., Ltd. engages in the manufacture and sale of electronics, ceramics, housing materials, resin, and food products; provision of equipment work, maintenance, and services; and transportation of the group's products and raw materials. It operates through the following segments: Electronics, Ceramics, Housing Materials, Construction, and Other. The Electronics segment covers printed wiring boards, package substrates, and pattern design for printed wiring boards. The Ceramics segment manufactures and sells environment-related ceramic products, graphite specialty products, ceramics fiber, and fine ceramic products. The Housing Materials segment includes housing equipment, melamine decorative boards, and its related component materials. The Construction segment designs and builds civil engineering works such as slope protection, landscape gardening, and environmental facilities. The Other segment processes synthetic resin, agricultural, and marine products; sells petroleum products, and provides information services. The company was founded on November 25, 1912 and is headquartered in Ogaki, Japan

Figure 397. Ibiden (4062.JP) Results and Forecasts

	2009	2010	2011	2012	2013	CIR 2014E	Street 2014E	CIR 2015E	Street 2015E
Revenues	309300.0	274204.0	304968.0	300863.0	281886.0	269380.0	307914.0	276200.0	316808.0
- y/y growth	-25.2%	-11.3%	11.2%	-1.3%	-6.3%	-4.4%	9.2%	2.5%	2.9%
Gross Margins	19.4%	23.9%	27.1%	21.6%	18.3%	23.0%		25.0%	
Operating Margins	3.4%	7.8%	11.1%	5.2%	1.9%	5.9%		8.3%	
EPS	-59.76	81.06	135.65	73.70	18.83	79.58	92.72	115.42	109.88
- y/y growth	-119.4%	235.6%	67.3%	-45.7%	-74.5%	322.7%	392.5%	45.0%	18.5%
Cash	83824.0	80120.0	94299.0	105154.0	103021.6	108678.8		121754.5	
Debt	54103.0	21697.0	23463.0	63737.0	64221.0	64221.0		64221.0	
Net Cash/Shr	518.5	509.7	613.0	416.2	411.7	452.3		546.0	
Tangible Book Value/Shr	1676.8	1727.8	1745.2	1761.9	1725.3	1771.4		1850.7	

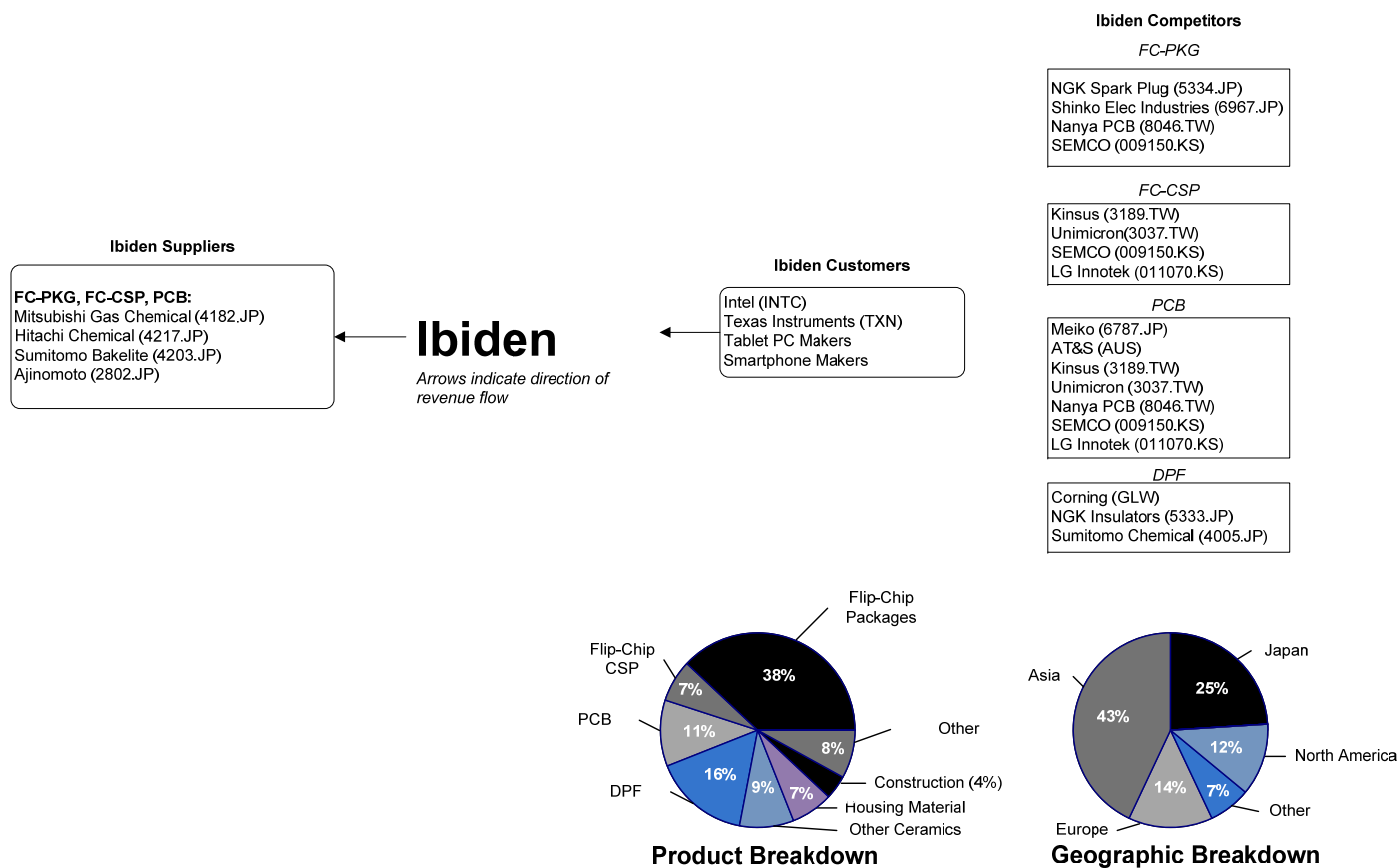
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 398. Iriden (4062.JP)

Sector: Electronic Components

Iriden (4062.JP)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Amit Harchandani

Infineon Technologies

Infineon Technologies offers semiconductors and system solutions for automotive and industrial electronics and chip card and security applications. In the 2012 fiscal year (ending September 2012), the company reported sales of €3.9 billion.

Most Relevant Relationships: Siemens

Figure 399. Infineon Technologies (IFXg.DE)

	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	2184.0	3295.0	3997.0	3904.0	3714.6	3738.0	4040.5	4117.1
- y/y growth		50.9%	21.3%	-2.3%	-4.9%	-4.3%	8.8%	10.1%
Gross Margins	3.8%	37.5%	41.4%	36.6%	33.0%		36.3%	
Operating Margins	-29.3%	14.4%	19.7%	13.5%	7.9%		12.1%	
EPS	-1.22	0.56	0.98	0.38	0.16	0.20	0.33	0.38
- y/y growth		146.2%	74.1%	-61.6%	-56.7%	-46.3%	103.7%	85.6%
Cash	1507.0	1727.0	2692.0	2235.0	2179.2		2340.6	
Debt	850.0	396.0	305.0	295.0	268.0		230.0	
Net Cash/Shr	1.4	1.2	2.1	1.8	1.8		1.9	
Tangible Book Value/Shr	2.0	2.3	3.0	3.2	3.2		3.4	

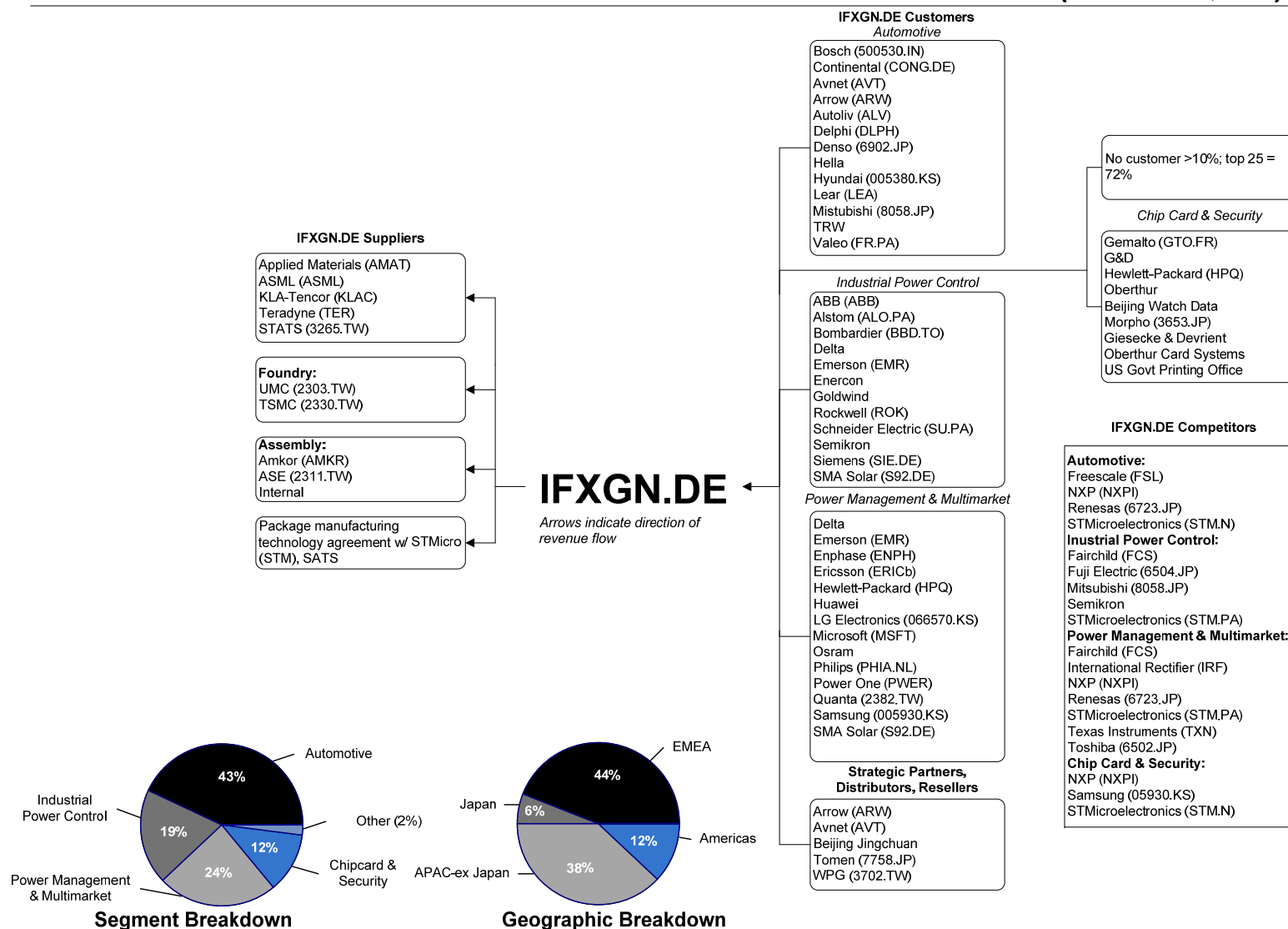
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 400. Infineon (IFXGn.DE)

Sector: Semiconductors

Infineon (IFXGN.DE; IFX)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Kevin Dennean, CFA

Infinera Corp

Infinera is a supplier of optical telecommunications equipment, focusing on Dense Wave Division Multiplexing (DWDM). The company pioneered the development of large scale photonic integrated circuits, or PICs, which combine as many as 60 discrete optical components into a pair of semiconductor chips for a 10G system and as many as 600 discrete optical components into a pair of semiconductor chips for its new 100G system. The PICs are used in the company's DTN (10G)/DTN-X (100G) systems, allow carriers to perform more frequent optical-electronic-optical conversion of their data traffic at lower costs than traditional DWDM systems, allowing for simpler network architecture, faster time to service and overall lower operating costs.

Infinera is headquartered in Sunnyvale, CA.

Figure 401. Infinera (INFN) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	353.4	309.1	454.4	404.9	438.4	525.2	535.7	561.5	598.5
- y/y growth	14.3%	-12.5%	47.0%	-10.9%	8.3%	19.8%	22.2%	6.9%	11.7%
Gross Margins	42.6%	35.8%	47.2%	42.8%	37.9%	38.2%		41.7%	
Operating Margins	2.5%	-15.7%	4.8%	-7.6%	-9.4%	-2.4%		1.9%	
EPS	0.15	-0.47	0.22	-0.30	-0.38	-0.12	-0.05	0.08	0.21
- y/y growth	-60.5%	-419.1%	146.7%	-234.9%	-30.2%	69.7%	86.2%	171.8%	501.9%
Cash	235.0	253.2	281.7	195.8	180.8	167.1		199.7	
Debt	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Net Cash/Shr	2.4	2.6	2.8	1.8	1.6	1.4		1.7	
Tangible Book Value/Shr	4.4	3.8	4.1	3.7	3.2	3.0		3.0	

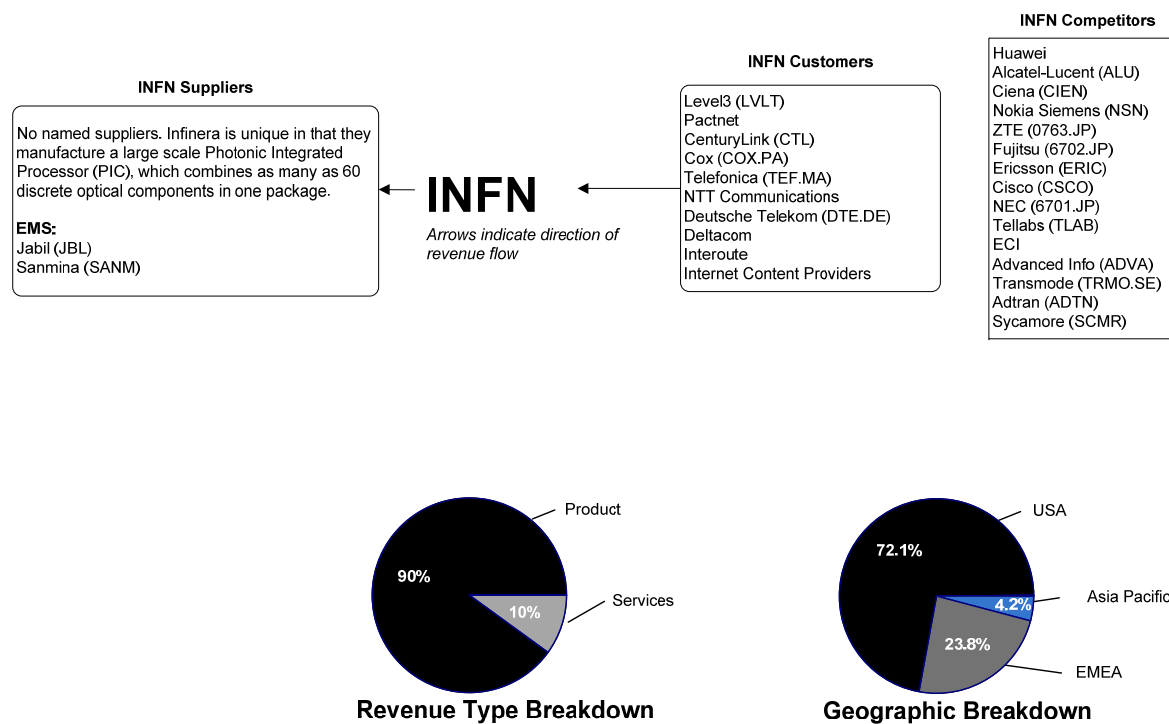
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 402. Infinera (INFN)

Sector: Communications Equipment

Infinera Corp. (INFN)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jim Suva, CPA

Ingram Micro Inc

Ingram Micro is one of the world's largest IT distributors (by revenue) and competes with Tech Data and Synnex. Ingram Micro operates more than 100 distribution centers worldwide, bringing to market the products of more than 1,300 suppliers. Product categories include networking (10-15% of revenues), software (15-20%), systems (30-35%), and peripherals/other (35-40%). Services offered include marketing, market research, business intelligence, and supply chain services. Ingram Micro's customer base of 190,000 various resellers include VARs (value added resellers), corporate resellers, direct marketers, retailers, Internet-based resellers, and government and education resellers. Fiscal 2011 revenues of \$37.8B were 42% from North America, 31% Europe, 22% APAC, and 5% Latin America. For these same regions, operating margin was 1.9%, 1.2%, 0.6% and 1.4%, respectively, with an overall operating margin of 1.3%. Ingram is based in Santa Ana, CA and employs about 15,500 people.

Figure 403. Ingram Micro (IM) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	34362.2	29515.4	34589.0	36328.7	37827.3	43568.5	43396.0	45010.0	45099.7
- y/y growth	-2.0%	-14.1%	17.2%	5.0%	4.1%	15.2%	14.7%	3.3%	3.9%
Gross Margins	5.6%	5.6%	5.4%	5.3%	5.4%	5.8%		5.9%	
Operating Margins	1.2%	1.1%	1.4%	1.3%	1.3%	1.3%		1.5%	
EPS	1.60	1.34	1.90	1.73	1.94	2.17	2.16	2.54	2.38
- y/y growth	-8.4%	-16.4%	41.6%	-8.6%	12.3%	11.5%	11.0%	17.1%	10.1%
Cash	763.5	910.9	1155.6	891.4	595.1	855.8		1017.3	
Debt	478.4	379.5	636.4	392.4	1054.5	1202.0		1202.0	
Net Cash/Shr	2.4	3.7	3.8	3.7	-2.3	-1.2		-0.2	
Tangible Book Value/Shr	16.1	17.8	20.1	20.9	18.5	20.2		21.8	

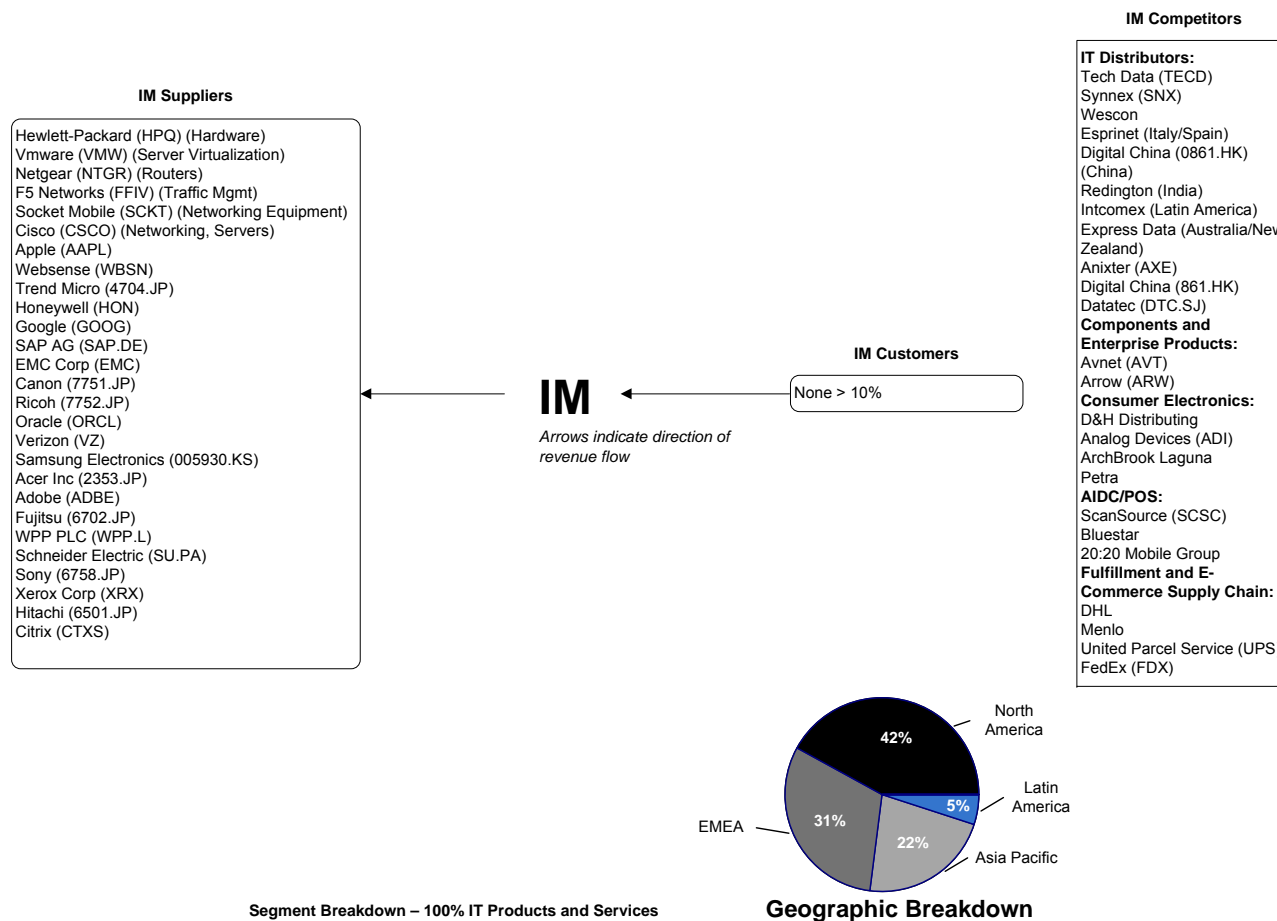
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 404. Ingram Micro (IM)

Sector: Wholesale IT Distribution

Ingram Micro (IM)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Arthur Lai

Innolux Corp

Following the acquisition of Chi Mei Optoelectronics and Toppoly from March 2010, Innolux Corp is now engaged in LCD panels, OEM, and touch panel businesses. It is the largest panel maker in Taiwan in terms of capacity and the worldwide market share of its large-size panels was 17% in 2012.

Figure 405. Innolux (3481.TW) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	160653.3	164726.2	480044.0	501134.2	480913.0	500712.7	480730.3	504658.7	522769.3
- <i>y/y growth</i>	2.2%	2.5%	191.4%	4.4%	-4.0%	4.1%	0.0%	0.8%	8.7%
Gross Margins	7.6%	2.6%	4.0%	-7.2%	1.0%	7.9%		8.0%	
Operating Margins	3.6%	-2.1%	-1.3%	-12.6%	-3.9%	2.8%		2.9%	
EPS	1.54	-0.74	-2.30	-8.81	-3.98	0.83	0.72	1.02	1.75
- <i>y/y growth</i>	-73.3%	-148.2%	-209.8%	-283.3%	54.9%	120.9%	118.0%	22.3%	144.5%
Cash	58906.2	36510.5	62561.5	54378.1	39056.0	89773.6		103522.0	
Debt	35454.9	46543.5	293332.0	330786.6	269283.0	252387.9		206482.1	
Net Cash/Shr	14.4	1.9	-18.7	-0.1	-15.4	-5.1		-1.4	
Tangible Book Value/Shr	30.1	29.2	35.4	26.8	21.4	21.2		22.2	

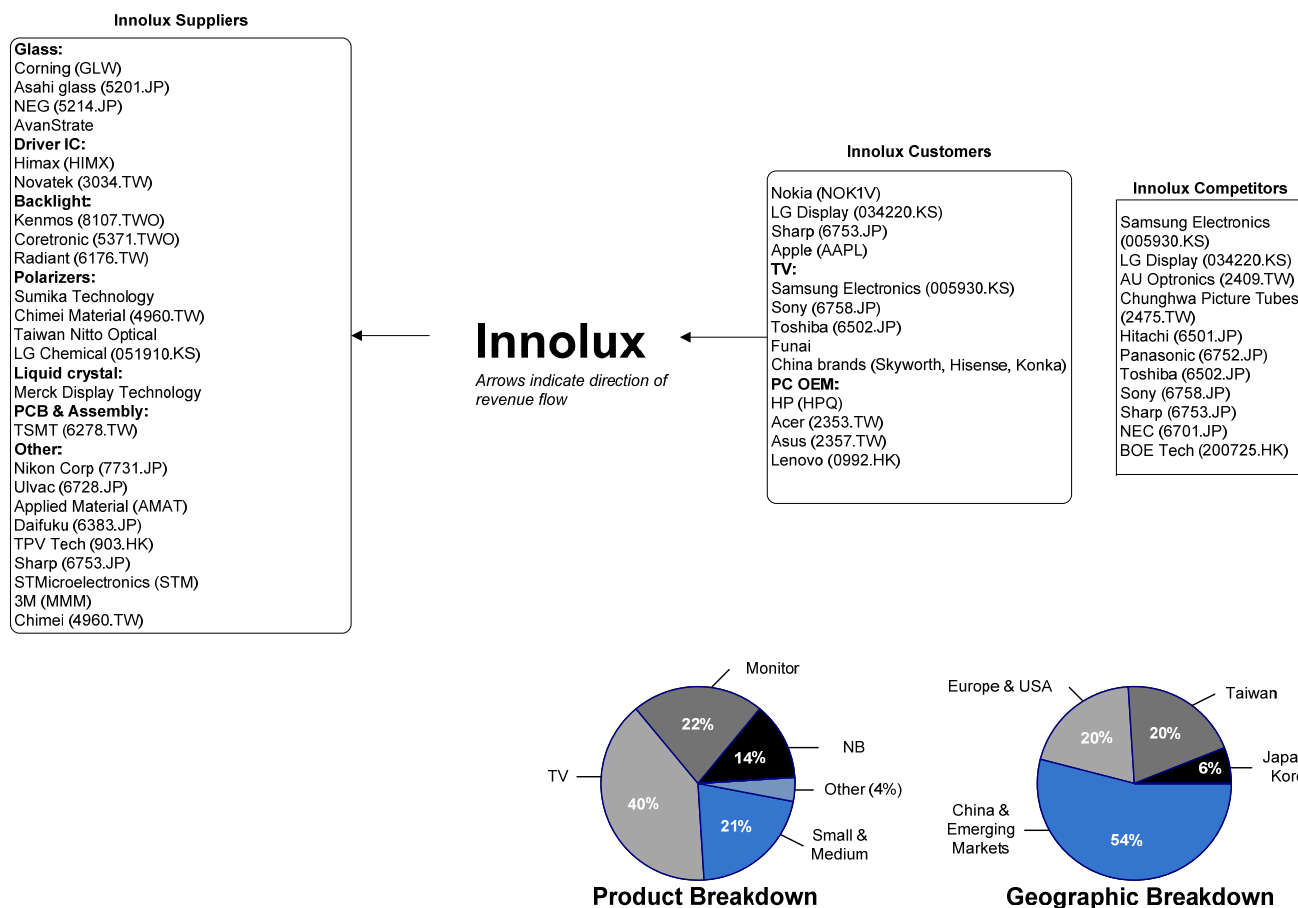
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 406. Innolux (3481.TW)

Sector: Technology General

Innolux Corp (3481.TW)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Glen Yeung

Integrated Device Technology Inc

Integrated Device Technology is a manufacturer of a broad array of semiconductor devices. On an end-market basis, Computing (PC clocks, PC audio, Memory Interface) accounts for 37% of total revenue. Communications (communications clocks, enterprise, wireless, wireline, switching solutions) accounts for about 46% of revenue. The consumer segment (game consoles, DisplayPort) accounts for 17% of sales. While 1/3 of IDT's wafers are manufactured at foundries, with 2/3 at its Hillsboro, Oregon fab currently, IDT expects to move to outsourcing to foundries over the next few years. IDT has approximately 2,053 employees worldwide and is headquartered in San Jose, CA.

Figure 407. Integrated Device (IDT) Results and Forecasts

	2009	2010	2011	2012	2013	CIR 2014E	Street 2014E	CIR 2015E	Street 2015E
Revenues	663.2	535.9	625.7	526.7	487.2	495.5	494.8	542.1	536.0
- y/y growth	-15.1%	-19.2%	16.8%	-15.8%	-7.5%	1.7%	1.6%	9.4%	8.3%
Gross Margins	50.8%	50.4%	56.9%	56.7%	58.7%	59.3%		60.7%	
Operating Margins	16.3%	8.6%	15.5%	11.5%	7.9%	10.7%		17.1%	
EPS	0.65	0.29	0.62	0.38	0.21	0.31	0.30	0.54	0.46
- y/y growth	-32.0%	-55.7%	114.0%	-38.4%	-44.3%	46.4%	42.6%	75.2%	51.0%
Cash	296.1	343.2	299.2	325.5	297.2	319.8		328.2	
Debt	14.3	21.8	15.8	16.5	22.0	22.0		22.0	
Net Cash/Shr	1.7	1.9	1.8	2.1	1.9	2.0		2.0	
Tangible Book Value/Shr	2.5	2.6	2.9	3.4	3.0	3.2		3.4	

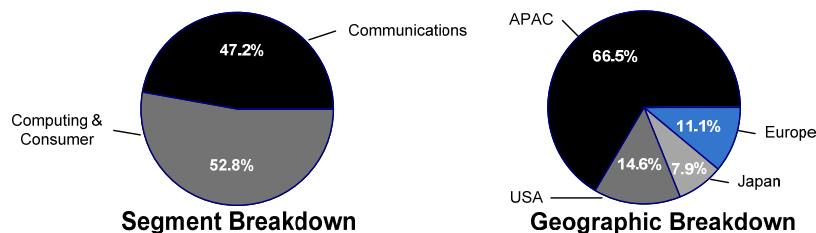
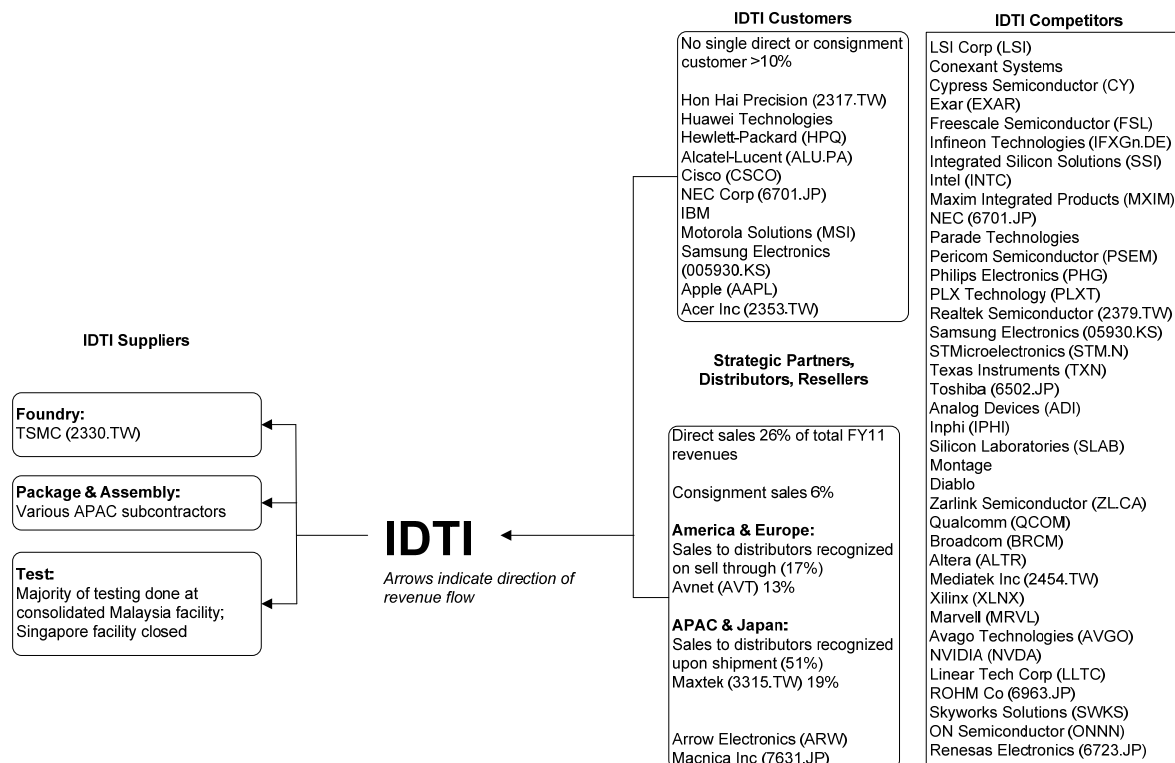
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 408. Integrated Device Technology (IDTI)

Sector: Semiconductors

Integrated Device Technology, Inc. (IDTI)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Glen Yeung

Intel Corp

Intel Corporation (INTC) is the largest semiconductor manufacturer in the world and supplies the world with most of the CPUs used in PCs, workstations, and servers. Intel derives most of its sales from client PCs (notebook and desktop) as well as servers. Intel has recently diversified its revenue sources with the purchase of McAfee (software) and Infineon's Wireless Communications unit, in addition to other services and silicon (NAND). Intel manufactures microprocessors, chipsets and other products at its fabs in Arizona, Oregon, Massachusetts, New Mexico, Ireland, and Israel.

Figure 409. Intel (INTC) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	37586.0	35127.0	43623.0	53999.0	53341.0	53115.9	53583.1	53813.6	55879.6
- y/y growth	-2.0%	-6.5%	24.2%	23.8%	-1.2%	-0.4%	0.5%	1.3%	4.3%
Gross Margins	55.5%	55.8%	65.3%	62.5%	62.1%	59.3%		58.8%	
Operating Margins	25.7%	24.7%	35.7%	32.4%	27.4%	23.1%		22.3%	
EPS	1.04	1.04	2.01	2.39	2.13	1.82	1.87	1.76	2.03
- y/y growth	8.3%	0.1%	93.4%	18.9%	-10.9%	-14.7%	-12.2%	-3.2%	8.2%
Cash	11843.0	13920.0	21885.0	14837.0	18162.0	16938.7		15935.4	
Debt	1988.0	2221.0	2115.0	7331.0	13448.0	13231.0		13231.0	
Net Cash/Shr	1.7	2.1	3.5	1.4	1.0	0.8		0.6	
Tangible Book Value/Shr	5.1	5.7	7.2	4.9	6.2	7.2		7.7	

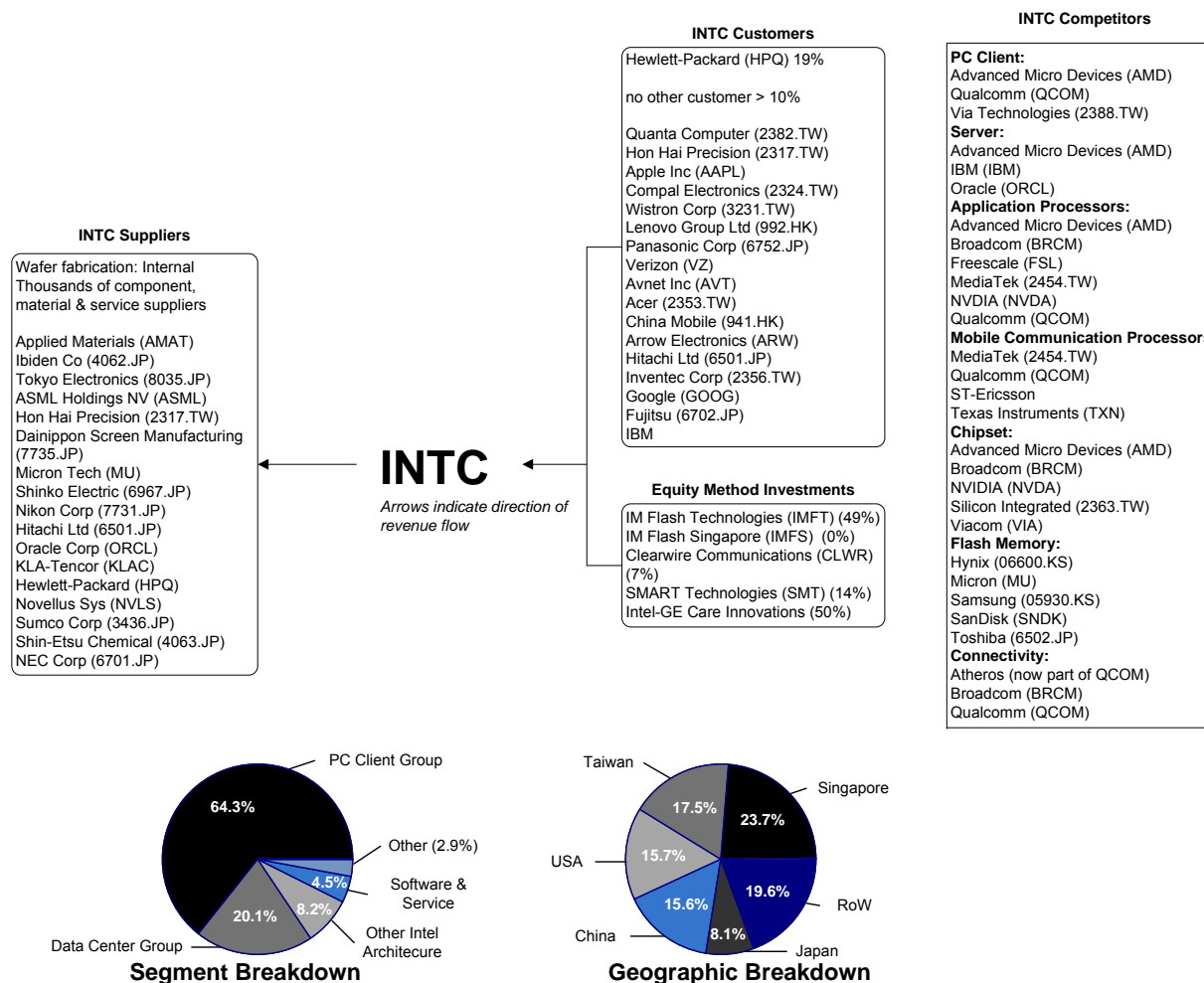
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 410. Intel (INTC)

Sector: Semiconductors

Intel (INTC)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jim Suva, CPA

International Business Machines Corp

IBM is the world's largest enterprise IT company and is a significant player in virtually every major segment of the enterprise market, including services, servers, storage, software, and semiconductors. The company generated almost \$105B revenue in 2012 and has led the world in the number of US patents granted for more than a decade. Revenue categories include Global Services, Hardware, Software, and Global Financing, which were 56%, 17%, 24%, and 2% of 2012 total revenue, respectively. The same categories showed 35%, 39%, 89%, and 47% gross margins, respectively, with an aggregate gross margin of 49%. IBM operates labs around the world and its R&D expense in 2012 was \$6.3 billion as the company continues to innovate and evolve for future enterprise needs.

Figure 411. IBM Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	103630.0	95757.0	99870.0	106917.0	104507.0	104738.1	103624.4	109641.3	106135.4
- y/y growth	4.9%	-7.6%	4.3%	7.1%	-2.3%	0.2%	-0.8%	4.7%	2.4%
Gross Margins	44.1%	45.7%	46.1%	47.2%	48.7%	49.3%		49.9%	
Operating Margins	17.2%	17.8%	18.3%	19.5%	20.8%	22.7%		24.3%	
EPS	8.97	10.03	11.72	13.49	15.30	16.71	16.67	18.77	18.35
- y/y growth	24.7%	11.9%	16.9%	15.1%	13.4%	9.2%	9.0%	12.3%	10.1%
Cash	12907.0	13974.0	11651.0	11922.0	11129.0	15600.8		16893.9	
Debt	33925.0	26100.0	28624.0	31320.0	32040.0	33397.0		33397.0	
Net Cash/Shr	-7.1	-5.9	-8.0	-9.0	-11.2	-8.2		-7.2	
Tangible Book Value/Shr	-14.9	-7.2	-11.6	-15.1	-20.2	-19.2		-18.2	

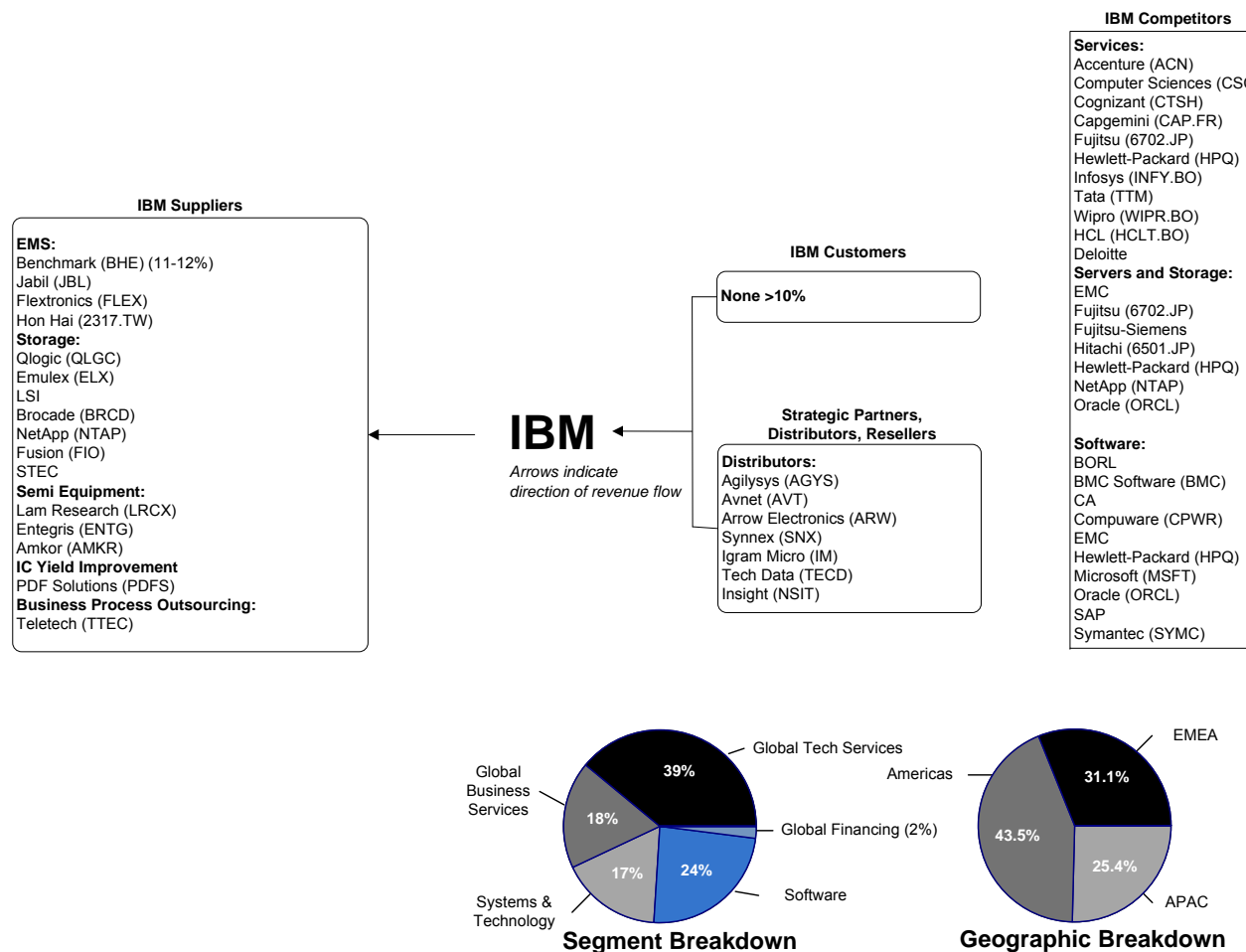
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 412. International Business Machines (IBM)

Sector: PC & Enterprise Hardware

IBM (IBM)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Terence Whalen

International Rectifier

International Rectifier is a leading manufacturer of power transistors, power control modules and analog power integrated circuits that control, condition and convert electrical power for a wide range of motors, electronic systems, lighting and automotive subsystems. IRF reports revenue across six product segments: Power Management Devices (39% of sales), Energy Saving Products (23%), Enterprise Power (11%), Automotive (10), High-Rel / Aerospace and Defense (16%), and Intellectual Property (1%). The company derives 23% of its sales from the U.S., 19% from Europe, 48% from Asia-Pacific and 10% from Japan. On November 1, 2006, International Rectifier announced the sale of its non-focus businesses (-\$300M annual sales) to Vishay. The transaction closed April 2007. International Rectifier's fiscal year ends in June.

Figure 413. International Rectifier (IRF) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	984.8	740.4	895.3	1176.6	1050.6	960.6	960.6	1019.0	1050.7
- y/y growth		-24.8%	20.9%	31.4%	-10.7%	-8.6%	-8.6%	6.1%	9.4%
Gross Margins	32.8%	30.4%	32.7%	39.5%	32.4%	26.0%		32.7%	
Operating Margins	2.6%	-9.3%	2.2%	12.3%	-0.4%	-6.9%		2.5%	
EPS	0.93	-1.33	0.17	1.99	-0.27	-1.12	-1.02	0.25	0.34
- y/y growth		-243.1%	113.0%	1056.5%	-113.6%	-312.8%	-274.2%	122.6%	133.7%
Cash	426.5	482.9	541.1	484.7	369.9	389.4		443.8	
Debt	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Net Cash/Shr	5.8	6.7	7.6	6.9	5.5	5.6		6.3	
Tangible Book Value/Shr	18.3	14.7	15.7	17.2	17.3	16.1		16.6	

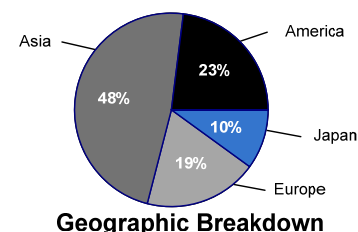
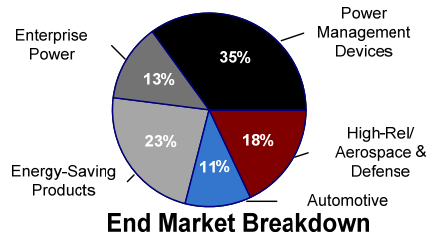
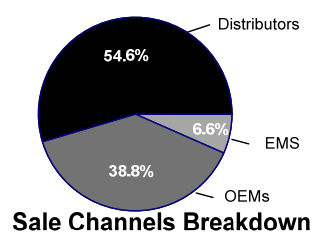
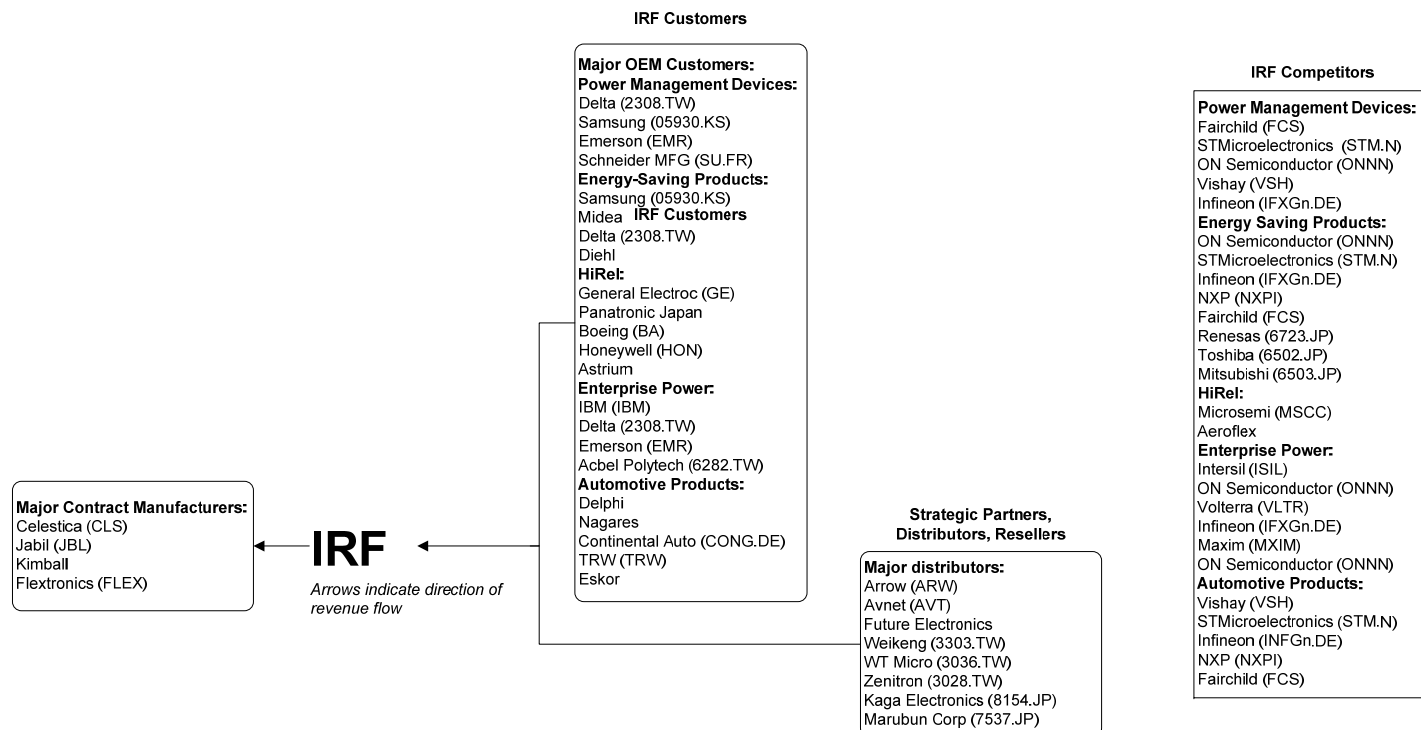
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 414. International Rectifier (IRF)

Sector: Semiconductors

International Rectifier Corp. (IRF)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Terence Whalen

Intersil Corporation

Intersil Corporation (ISIL) develops and manufactures analog integrated circuits (ICs) including both power management and signal path devices. Intersil reports revenue across three end-markets: consumer (20% of 2012 revenue), computing (23%), and industrial (57%). Approximately 60% to 65% of sales are application specific (ASSP) products with 12-month life cycles and 35% to 50% are general-purpose (GP) products with seven year+ life cycles. Intersil manufactures 50% of its products internally at its 6-in wafer fabrication facility in Palm Bay, Florida, and outsources the remainder of production to AMIS, IBM, and TSMC. The company outsources the majority of its back-end manufacturing requirements to ChipPAC. Roughly 51% of sales are through distributors where Intersil recognizes revenue on sell-through. Intersil's primary competitors are Advanced Analogic Technology, Fairchild Semiconductor, Linear Technology, Maxim Integrated, ON Semiconductor, Richtek, Texas Instruments, and Volterra. Intersil's fiscal year ends in December.

Figure 415. Intersil (ISIL) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	769.7	611.4	822.4	760.5	607.9	552.9	553.4	564.3	580.9
- y/y growth		-20.6%	34.5%	-7.5%	-20.1%	-9.0%	-9.0%	2.1%	5.0%
Gross Margins	51.9%	54.8%	58.2%	57.5%	54.3%	54.2%		54.4%	
Operating Margins	19.4%	9.3%	15.8%	11.2%	0.0%	0.5%		1.7%	
EPS	1.07	0.42	0.78	0.45	-0.46	0.11	0.02	0.06	0.14
- y/y growth		-61.0%	86.7%	-41.5%	-202.2%	124.0%	103.9%	-50.0%	688.9%
Cash	312.6	361.2	383.0	410.2	163.6	159.5		171.7	
Debt	0.0	0.0	275.0	200.0	0.0	0.0		0.0	
Net Cash/Shr	2.5	3.0	0.9	1.7	1.5	1.3		1.3	
Tangible Book Value/Shr	5.6	5.6	2.7	3.2	2.7	2.6		2.6	

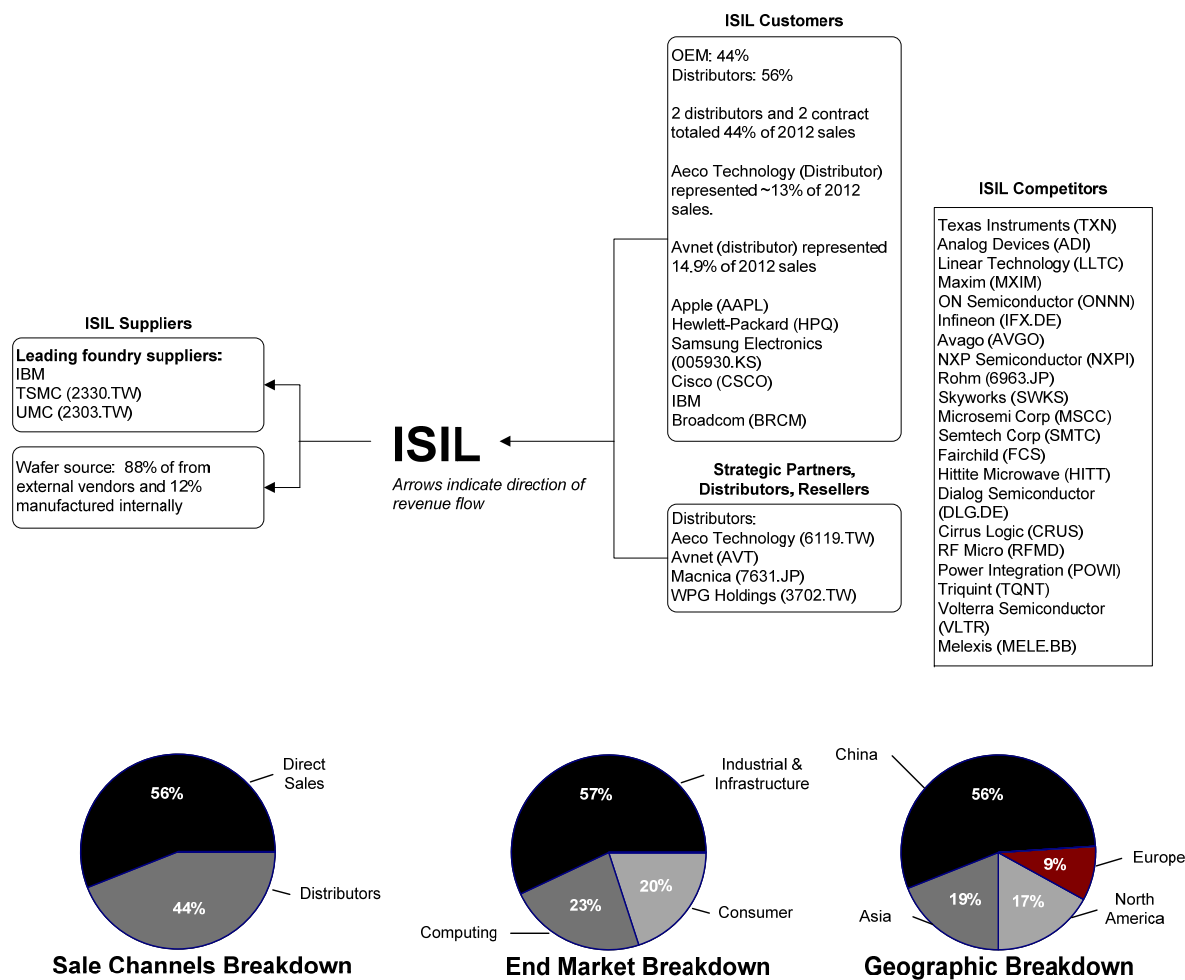
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 416. Intersil (ISIL)

Sector: Semiconductors

Intersil Corp. (ISIL)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jim Suva, CPA

Jabil Circuit Inc

Jabil Circuit is a leading global provider of EMS products and services and is the third-largest contract manufacturer in the world. Its offerings include design, engineering, and manufacturing solutions for OEMs, as well as after-market service and repair. 47% of sales are from Diversified Manufacturing Services, which includes Healthcare & Instrumentation 4%, Industrial & Clean Tech 10% and Specialized Services 31%. Enterprise & Infrastructure represents 31% and High Velocity Systems represent 212%. Jabil has one customer over 10% of revenue (Apple). Cisco, RIMM and HP are all major customers but below the 10% level. The company has a unique work-cell approach to its customers, under which it assigns a worldwide project manager for each customer, who essentially owns, launches, manages, and assumes the risk and rewards for the customer manufacturing relationship.

Figure 417. Jabil (JBL) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	12779.7	11691.8	13409.4	16518.8	17151.9	18108.3	17917.1	19073.8	19173.0
- y/y growth	4.0%	-8.5%	14.7%	23.2%	3.8%	5.6%	4.5%	5.3%	7.0%
Gross Margins	6.8%	6.2%	7.5%	7.6%	7.7%	7.5%		7.6%	
Operating Margins	3.0%	2.1%	3.7%	4.3%	4.3%	4.1%		4.1%	
EPS	1.12	0.64	1.54	2.35	2.41	2.31	2.29	2.51	2.64
- y/y growth	33.3%	-42.3%	138.3%	53.1%	2.3%	-3.8%	-4.7%	8.3%	15.1%
Cash	772.9	876.3	744.3	888.6	1217.3	1255.7		1485.2	
Debt	1369.4	1234.4	1186.5	1186.8	1676.4	1763.3		1763.3	
Net Cash/Shr	-1.6	-0.8	-1.3	-1.0	-2.1	-1.9		-0.8	
Tangible Book Value/Shr	6.9	6.4	6.8	8.1	9.2	10.7		12.5	

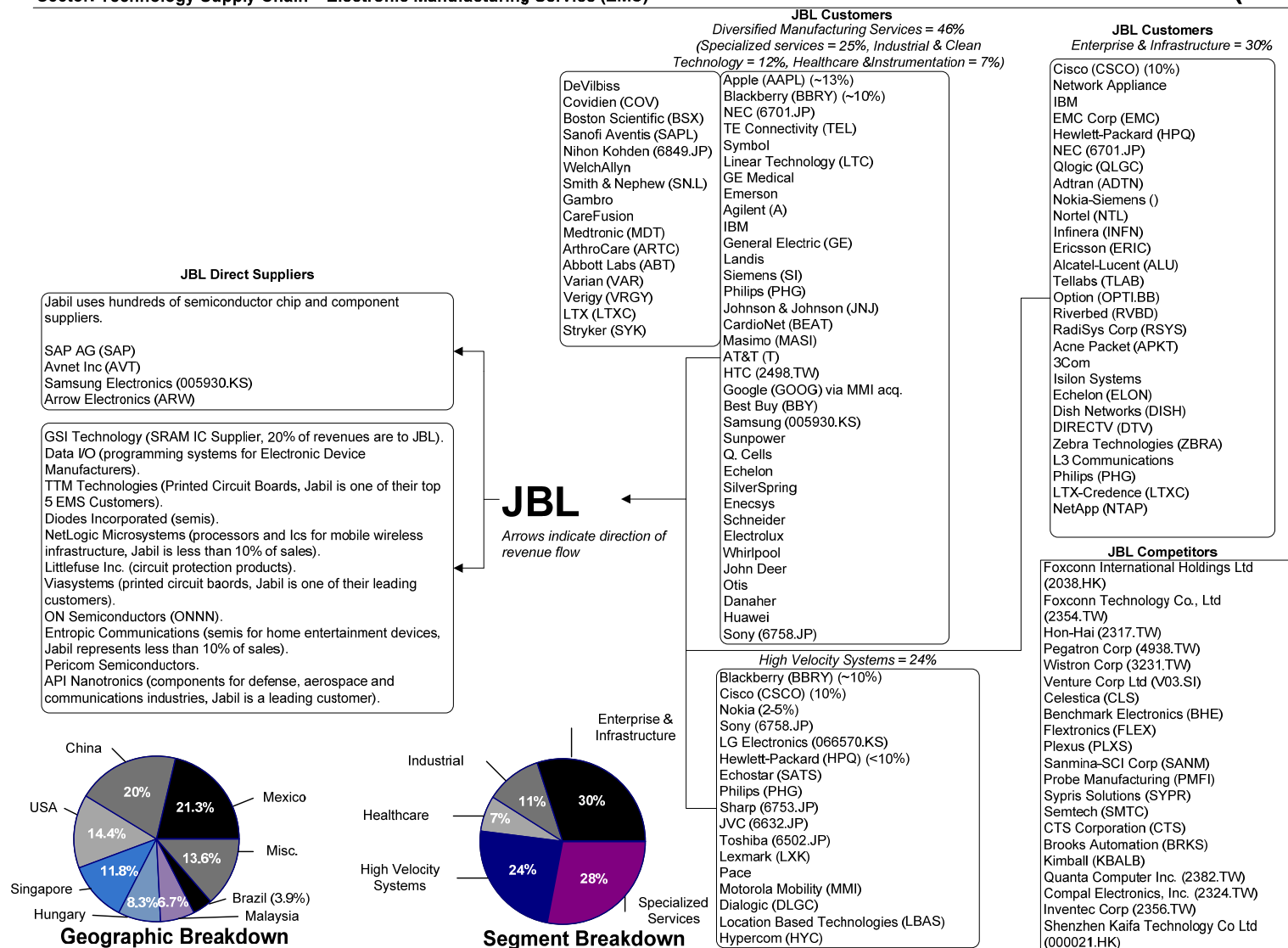
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 418. Jabil Circuit (JBL)

Sector: Technology Supply Chain – Electronic Manufacturing Service (EMS)

Jabil (JBL)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Kevin Dennean, CFA

JDSU Corp

JDSU is a leading provider of optical products and test and measurement equipment for telecom and cable service providers and network equipment manufacturers. The company's optical products are also used in biomedical and environmental instrumentation, semiconductor processing, aerospace and defense, brand authentication, display systems, and custom color product differentiation applications. We view JDSU as an intriguing collection of growth businesses. The company is organized in three operating segments, each with distinct growth and margin characteristics.

The Communications Test & Measurement (CTM) segment has a portfolio of over 300 products and services that enable the design, deployment, and maintenance of communication equipment and networks, as well as ensure the quality of services delivered to the end customer.

The Communications and Commercial Optical Products (CCOP) segment provides optical components for the transmission of optical signals over fiber optic networks (optical transceivers, optical transponders, modulators, and source lasers) that is designed into equipment from network equipment manufacturers and for the transport of optical signals (optical amplifiers, reconfigurable optical add/drop multiplexers ("ROADMs"), pump lasers, passive devices, and array waveguides (AWGs). CCOP also provides lasers used in a variety of OEM applications, including biotechnology, graphics and imaging, remote sensing, and materials processing and precision machining.

The Advanced Optical Technologies (AOT) segment utilizes JDSU's core technology strengths in optics and materials science to manage and manipulated light and color effects. AOT's solutions are used in applications for brand protection and document authentication, custom color solutions, and currency protection.

Most Relevant Relationships: As of the close of the most recent FY, CommTest and CCOP revenue finished at about the same percent of total revenue. North America continues to be an area of strength, accounting for ~50% of FY revenue.

Figure 419. JDSU Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	1531.2	1295.7	1373.4	1816.2	1682.7	1688.0	1687.4	1862.1	1836.6
- y/y growth	9.6%	-15.4%	6.0%	32.2%	-7.4%	0.3%	0.3%	10.3%	8.8%
Gross Margins	42.8%	42.9%	44.6%	47.6%	46.1%	46.8%		47.4%	
Operating Margins	5.1%	2.2%	7.1%	12.7%	9.1%	8.8%		10.3%	
EPS	0.51	0.19	0.41	0.93	0.59	0.55	0.56	0.72	0.77
- y/y growth	65.8%	-63.1%	120.9%	126.5%	-37.2%	-7.0%	-4.7%	32.3%	36.9%
Cash	873.6	685.2	567.6	692.8	721.6	427.1		487.6	
Debt	508.0	325.2	267.3	285.8	292.8	3.8		19.0	
Net Cash/Shr	2.0	1.7	1.3	1.8	3.1	1.8		1.9	
Tangible Book Value/Shr	2.7	2.4	2.2	3.2	3.5	3.3		3.6	

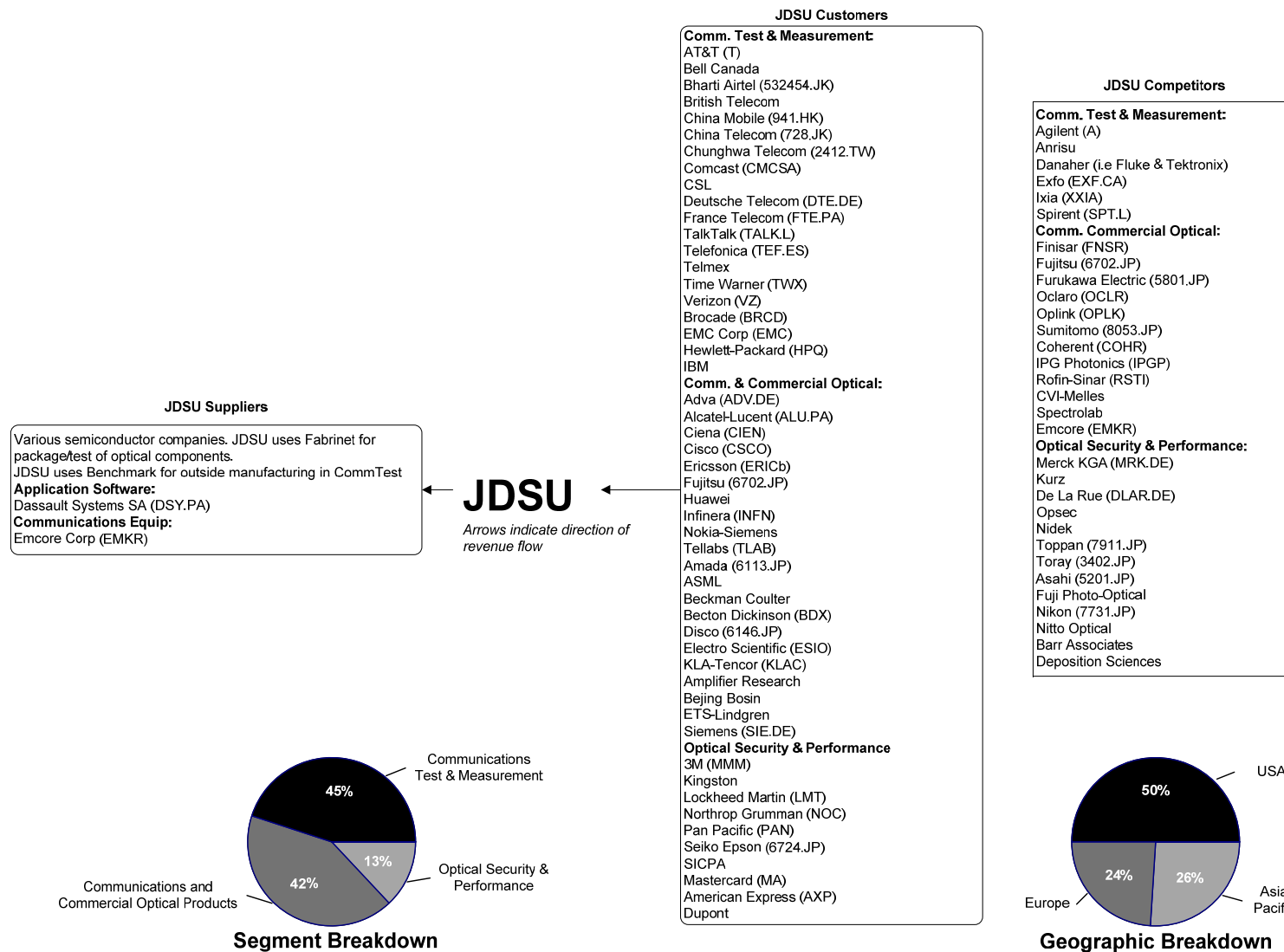
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 420. JDS Uniphase (JDSU)

Sector: Communications Equipment

JDSU Corp. (JDSU)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Kevin Dennean, CFA

Juniper Networks, Inc.

Juniper Networks is a leading provider of carrier routing solutions, with an estimated 26% market share in CY11. The company is also a provider of network security solutions to carriers and enterprises globally, and is an increasingly important player in the enterprise datacenter market. Juniper is organized in two operating segments: Platform Systems Division and the Software Solutions Division.

Products in the Platform Systems Solutions segment includes routing (E, M, MX, PTX and T Series), switching (EX series, QFabric, and WLAN), and security products (branch SRX, branch firewall, and J Series products, and JUNOS Space, a network application platform, as well as associated services. PSD accounted for 80% of revenues in the most recent quarter. The Software Solutions Division consists of security and routing products and services, including SRX services and vGW Virtual Gateways, High-End Firewall virtual private network systems and appliances, secure socket layer virtual private network appliances, intrusion detection and prevention appliances, WAN optimization platforms, and Junos Pulse. Additionally, SSD provides routing services software and mobile applications (such as MobileNext). SSD accounted for 20% of revenues in the most recent quarter.

Headquartered in Sunnyvale, CA, Juniper was founded in 1996. The company had 2,568 employees globally as of December 2011.

Figure 421. Juniper (JNPR) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	3572.4	3315.9	4093.3	4448.6	4365.4	4566.8	4496.4	5095.8	4788.3
- y/y growth	26.0%	-7.2%	23.4%	8.7%	-1.9%	4.6%	3.0%	11.6%	6.5%
Gross Margins	67.9%	65.7%	67.5%	65.5%	64.3%	64.9%		65.1%	
Operating Margins	24.2%	20.2%	24.0%	20.6%	15.6%	20.4%		21.2%	
EPS	1.18	0.91	1.32	1.19	0.86	1.25	1.14	1.39	1.29
- y/y growth	35.2%	-22.6%	44.7%	-9.8%	-28.1%	46.5%	33.2%	11.2%	13.1%
Cash	2192.0	2175.2	2286.4	3551.7	2849.3	3531.0		4383.0	
Debt	0.0	0.0	0.0	999.0	999.2	999.2		999.2	
Net Cash/Shr	4.0	4.1	4.2	4.7	3.5	4.9		6.4	
Tangible Book Value/Shr	4.2	4.2	5.0	5.8	5.5	6.7		7.9	

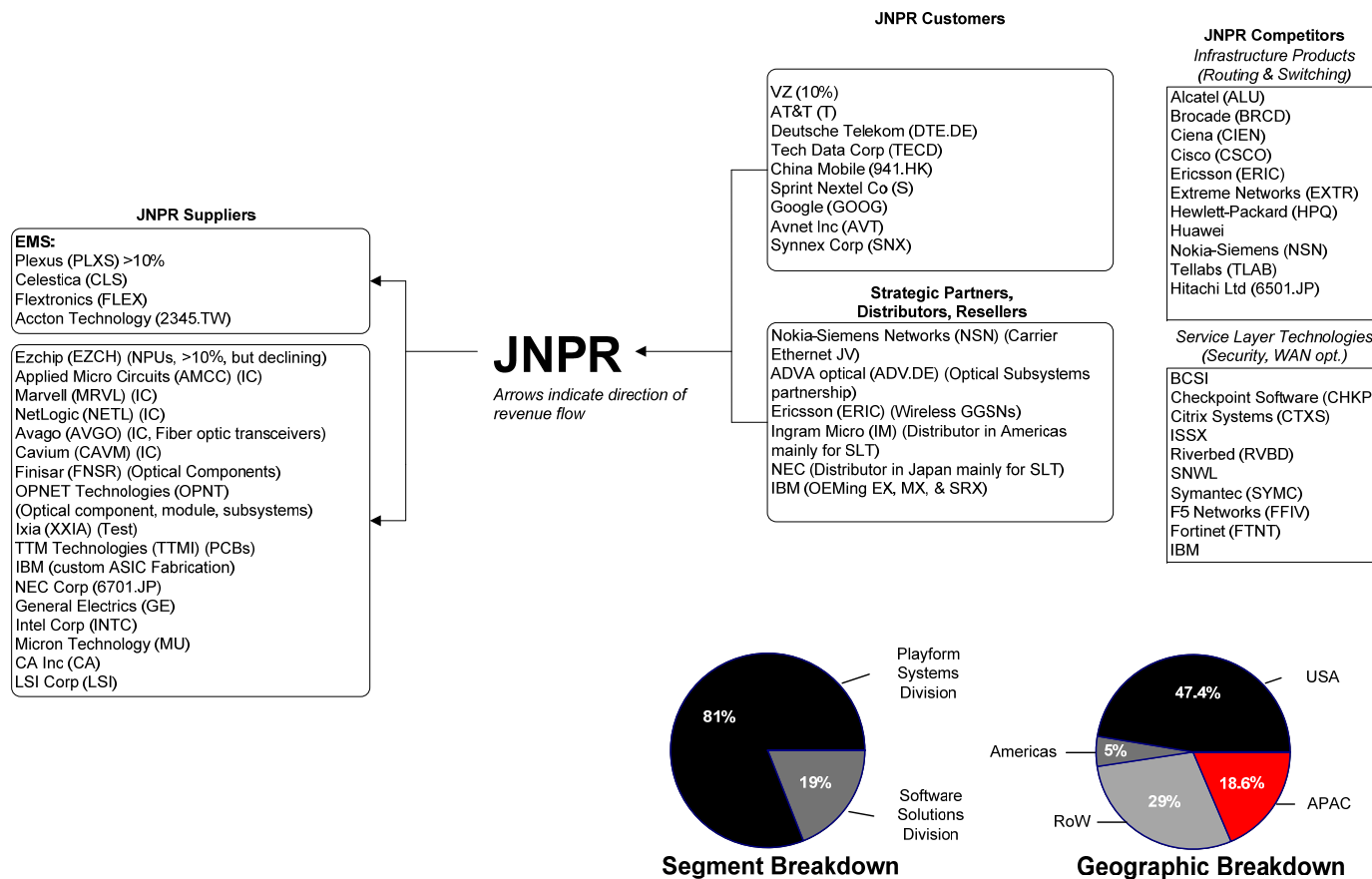
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 422. Juniper (JNPR)

Sector: Telecom Equipment

Juniper Networks (JNPR)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Roland Shu

Kinsus Interconnect Technology

Kinsus was established in 2000. It is a major supplier of substrate, with high exposure to communication (handset and base station >50%, networking >20%). Kinsus' main manufacturing is in Taiwan, and the China site started contributing from 4Q10. Kinsus purchased 51% of Piatek (PCB company in China) from Pegatron, with full revenue integration from 4Q10. Pegatron is the largest shareholder with a 39% holding.

Figure 423. Kinsus Interconnect (3189.TW) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	12215.0	11083.0	17594.8	22752.4	22034.3	23989.8	22639.7	26223.1	24876.6
- y/y growth	-6.0%	-9.3%	58.8%	29.3%	-3.2%	8.9%	2.7%	9.3%	9.9%
Gross Margins	30.6%	30.2%	25.1%	22.7%	23.7%	24.2%		24.6%	
Operating Margins	19.6%	18.6%	16.2%	12.0%	12.7%	13.4%		14.2%	
EPS	4.99	4.30	5.50	6.28	6.27	6.61	7.56	7.50	8.65
- y/y growth	-44.2%	-13.7%	27.8%	14.1%	0.0%	5.5%	20.5%	13.4%	14.4%
Cash	7577.5	9884.1	10524.7	12228.7	14193.6	14980.7		16375.0	
Debt	331.4	1215.3	2775.1	5374.5	5266.0	5496.6		5598.8	
Net Cash/Shr	16.7	20.5	18.9	18.9	25.5	27.0		30.0	
Tangible Book Value/Shr	40.0	42.2	44.8	48.9	52.0	55.4		59.6	

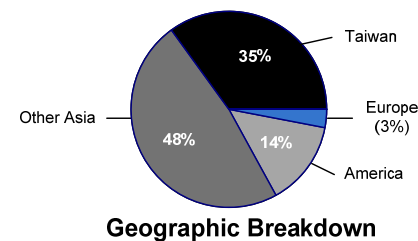
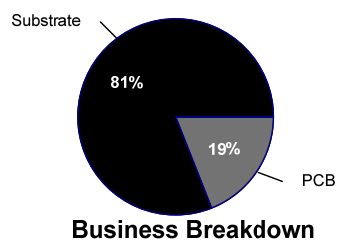
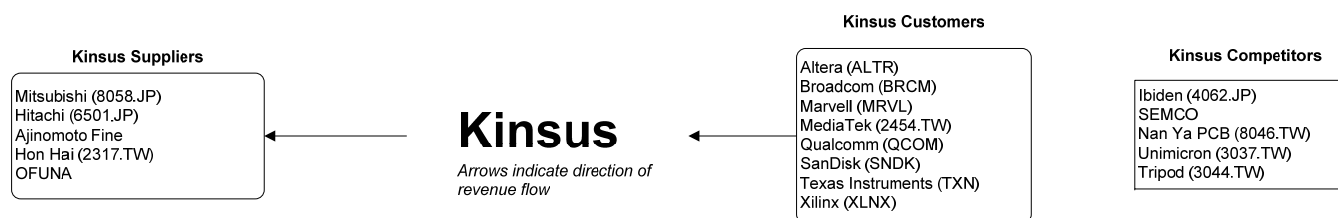
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 424. Kinsus (3189.TW)

Sector: Semiconductors

Kinsus Interconnect Technology (3189.TW)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Terence Whalen

KLA Tencor Corp

KLA-Tencor Corp. (KLAC) is the leading supplier of process control equipment used in the fabrication of integrated circuits. Process control systems are used to analyze product and process quality at critical junctures of the manufacturing process. Data is collected and analyzed, and the results of which are used to optimize processes and enhance yields. The company's products include wafer inspection, thin film measurement, metrology, and reticle inspection systems. Headquartered in San Jose, CA, the company was formed in April 1997, when KLA merged with Tencor Corporation to become the single largest provider of process control equipment in the world.

Figure 425. KLA Tencor (KLAC) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	2521.7	1520.2	1820.8	3175.2	3171.9	2822.5	2825.8	3088.8	3155.4
- y/y growth	-7.7%	-39.7%	19.8%	74.4%	-0.1%	-11.0%	-10.9%	9.4%	11.7%
Gross Margins	54.6%	42.8%	55.2%	60.3%	58.1%	56.3%		57.8%	
Operating Margins	22.5%	1.0%	20.9%	37.8%	33.1%	26.3%		29.5%	
EPS	2.23	-0.22	1.54	4.91	4.65	3.24	3.25	3.90	4.10
- y/y growth	-28.7%	-109.8%	801.7%	218.6%	-5.4%	-30.3%	-30.1%	20.4%	26.2%
Cash	1537.2	1329.9	1534.0	2038.5	2534.4	2931.8		3348.8	
Debt	744.7	745.2	745.7	746.3	746.8	747.2		747.2	
Net Cash/Shr	4.3	3.4	4.6	7.6	10.5	12.9		15.4	
Tangible Book Value/Shr	12.0	10.0	11.4	14.6	17.6	18.6		21.4	

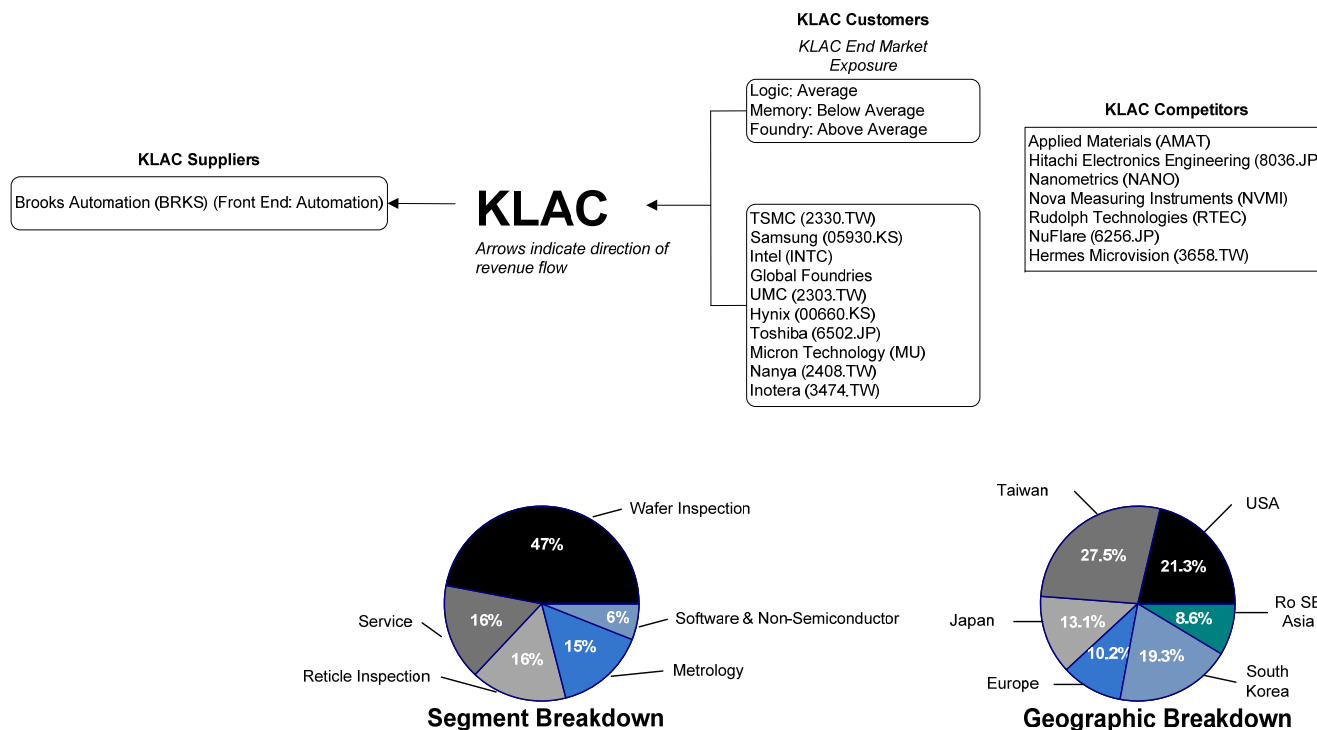
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 426. KLA-Tencor (KLAC)

Sector: Semiconductor Equipment: Front End

KLA-Tencor (KLAC)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Masahiro Shibano

Konica Minolta

Konica Minolta, Inc. operates a holding company with interests in printing equipment manufacturing and distribution, the manufacture and sale of office equipment, imaging systems, optical devices, and measuring instruments. It operates through the following business domains: Offices, Production Printing, Performance Materials Business, Optics and Sensing Business, Sensing, Healthcare Business, Industrial Inkjet Business and Planetarium Business. The Offices domain is in charge of the global deployment of office equipment, centering on multi-functional peripherals and laser printers. The Production Printing domain applies resources in the form of their own digital printing technology, broad product line and global support system. The Performance Materials domain presents business by TAC film for LCD polarizers, barrier film, and functional film for windows, high-precision photo plates and organic light emitting diode lighting. The Optics and Sensing Business includes high value-added pickup lenses for optical disks and glass substrates for HDDs. The Sensing domain utilizes advanced light-measuring technologies to provide customers with products for precise measurements. The Healthcare Business serves the healthcare field with products that use digital imaging technology. The Industrial Inkjet Business targets industrial inkjet markets, including high-performance print heads, multi-function inks, print units for label printing and textile printing systems. The Planetarium Business manufactures planetariums and projectors. The company was founded by Rokusaburo Sugiura in April 1873 and is headquartered in Tokyo, Japan.

Figure 427. Konica Minolta (4902.JP)

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	1071568.0	947843.0	804465.0	777953.0	767879.0	796600.0	797713.0	825300.0	840039.0
- y/y growth	4.3%	-11.5%	-15.1%	-3.3%	-1.3%	3.7%	3.9%	3.6%	5.3%
Gross Margins	49.6%	45.1%	45.3%	45.6%	46.3%	46.4%		47.6%	
Operating Margins	11.2%	5.9%	5.5%	5.1%	5.3%	5.6%		7.5%	
EPS	129.70	28.62	31.93	48.84	38.52	42.24	39.76	59.97	56.83
- y/y growth	-5.1%	-77.9%	11.6%	53.0%	-21.1%	9.7%	3.2%	42.0%	42.9%
Cash	89218.0	85753.0	85533.0	87886.0	90640.0	107064.0		103964.0	
Debt	226024.0	230407.0	197357.0	192567.0	227932.0	215000.0		180000.0	
Net Cash/Shr	-59.5	-70.7	-49.2	-56.9	-174.2	-62.1		-20.8	
Tangible Book Value/Shr	786.7	780.4	792.4	807.8	819.1	866.3		911.1	

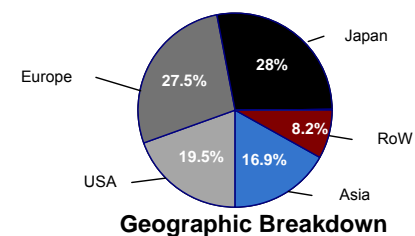
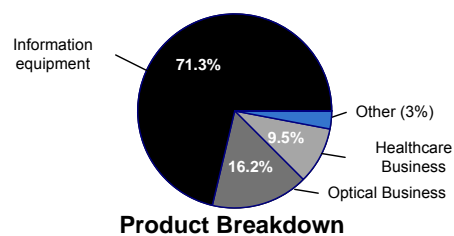
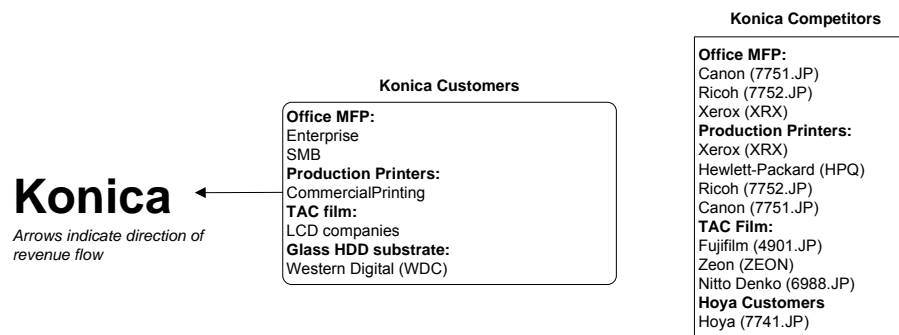
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 428. Konica Minolta (4902.JP)

Sector: Hardware

Konica Minolta Holdings (4902.JP)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Yuta Fukasawa

Kyocera

Kyocera Corp. engages in the design, development, production, and sale of advanced materials, components, devices, equipment, networks, and services. It operates through the following segments: Fine Ceramic Parts, Semiconductor Parts, Applied Ceramic Products, Electronic Devices, Telecommunications Equipment, Information Equipment, and Other. The Fine Ceramic Parts segment provides sections used in the semiconductor processing, light crystal display manufacturing, aluminum foundry, sapphire wafer for light emitting device, high-dielectric ceramics, and decorative fine ceramics. The Semiconductor Parts segment caters parts used in the surface mount packages, image sensor, fiber optic communications, packages for light emitting device, large-scale multiplayer ceramic substrates, multilayer ceramic packages for large scale integration (LSI) devices, and multilayer organic packages for LSI. The Applied Ceramic Products segment handles the solar generating systems and cutting tools. The Electronic Device segment utilizes properties of ceramics needed in communications such as capacitors, timing devices, synthetic quartz crystals, radiometrix, surface acoustic wave equipment, and electromagnetic interference. The Telecommunications Equipment segment markets wireless broadband, voice, and data communication systems. The Information Equipment segment distributes mid-speed and color machines, including multifunctional peripherals and printers. The Other segment administers the research and development activities for new businesses. The company was founded by Kazuo Inamori on April 1, 1959 and is headquartered in Kyoto, Japan

Figure 429. Kyocera (6971.JP) Results and Forecasts

	2009	2010	2011	2012	2013	CIR 2014E	Street 2014E	CIR 2015E	Street 2015E
Revenues	1128586.0	1073805.0	1266924.0	1190870.0	1276524.0	1426600.0	1392760.0	1470800.0	1441860.0
- y/y growth	-12.5%	-4.9%	18.0%	-6.0%	7.2%	11.8%	9.1%	3.1%	3.5%
Gross Margins	25.9%	26.6%	29.8%	26.9%	25.9%	25.8%		24.6%	
Operating Margins	3.8%	5.9%	12.3%	8.2%	6.1%	9.3%		9.0%	
EPS	157.23	218.47	667.23	432.58	332.45	473.72	531.26	475.35	575.44
- y/y growth	-72.2%	38.9%	205.4%	-35.2%	-23.1%	42.5%	59.8%	0.3%	8.3%
Cash	471390.0	525183.0	519300.0	479228.0	573762.6	590683.7		646219.0	
Debt	53403.0	46596.0	43077.0	35869.0	34268.0	34268.0		34268.0	
Net Cash/Shr	2359.8	2703.2	2696.0	2496.8	3014.8	3107.1		3409.8	
Tangible Book Value/Shr	6274.4	6419.1	6865.3	6956.3	7343.0	7677.3		8013.1	

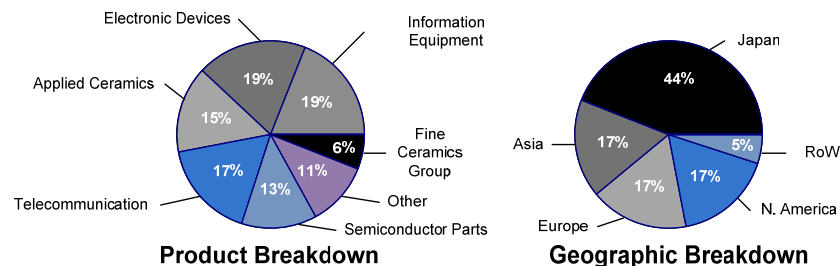
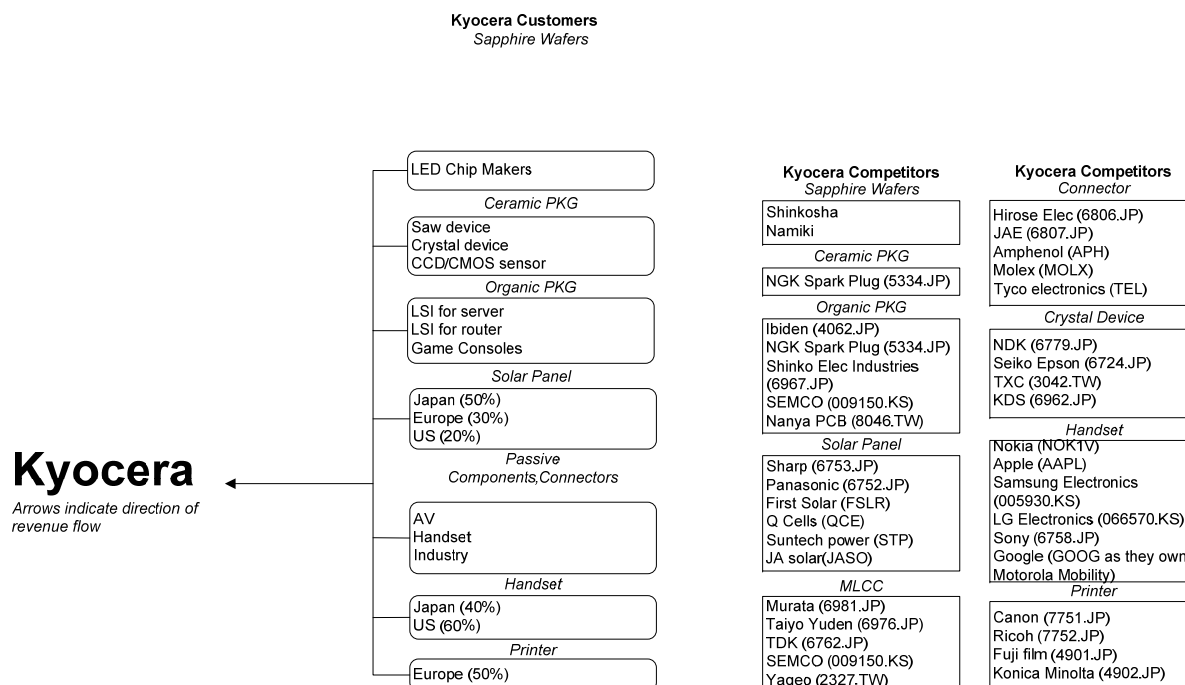
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 430. Kyocera (6971.JP)

Sector: Electronic Components

Kyocera (6971.JP)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Terence Whalen

Lam Research Corp

Lam Research (LRCX) is a leading capital equipment supplier to the global semiconductor industry. The company's core technologies focus on the selective removal of insulating and conductive materials from the surface of a wafer during the chip manufacturing cycle. Lam's product portfolio consists of plasma-based etch solutions for all three key three etch markets. Lam acquired Novellus Systems in 2012 and added deposition and dry strip markets to its portfolio.

Figure 431. Lam Research (LRCX) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	2474.9	1115.9	2133.8	3237.7	2665.2	3587.3	3593.9	4468.8	4296.3
- y/y growth	-3.6%	-54.9%	91.2%	51.7%	-17.7%	34.6%	34.8%	24.6%	19.5%
Gross Margins	47.4%	34.8%	45.7%	46.2%	40.7%	38.9%		42.9%	
Operating Margins	23.9%	-9.8%	19.0%	25.2%	12.2%	11.7%		16.9%	
EPS	3.55	-1.00	2.61	5.86	2.02	2.19	2.13	3.80	3.72
- y/y growth	-26.7%	-128.2%	360.3%	124.5%	-65.5%	8.4%	5.4%	73.5%	74.6%
Cash	1058.7	579.4	826.5	2122.2	2862.7	2299.7		2917.5	
Debt	306.3	46.2	22.6	743.3	1463.3	1805.7		1805.7	
Net Cash/Shr	6.2	4.3	6.3	11.1	14.8	5.8		9.6	
Tangible Book Value/Shr	11.1	9.5	12.1	18.2	19.7	12.4		16.9	

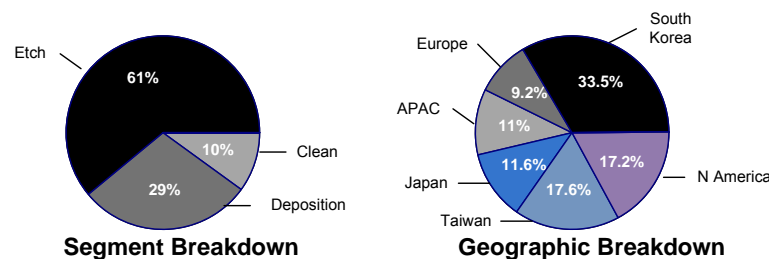
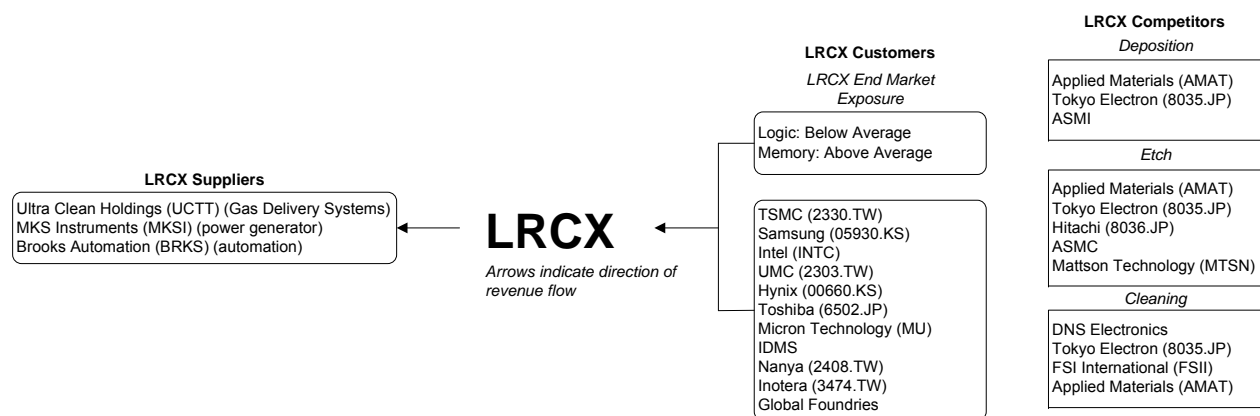
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 432. Lam Research (LRCX)

Sector: Semiconductor Equipment: Front End

Lam Research (LRCX)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Kevin Chang

Largan Precision

Largan is a plastic / glass / hybrid lens supplier in Taiwan. Its end-applications include phone cameras, DSCs, MFPs, and tablets, but over 80% of its revenue is driven by phone camera lenses.

Figure 433. Largan Precision (3008.TW)

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	7478.5	8154.4	12351.5	15984.1	20072.0	23215.1	25024.7	27557.3	29046.2
- <i>y/y growth</i>	27.1%	9.0%	51.5%	29.4%	25.6%	15.7%	24.7%	18.7%	16.1%
Gross Margins	53.6%	43.8%	47.0%	43.4%	41.7%	41.6%		40.2%	
Operating Margins	42.0%	33.4%	37.7%	34.2%	33.9%	33.9%		32.6%	
EPS	24.49	18.68	30.15	38.76	41.58	50.79	54.88	54.29	61.19
- <i>y/y growth</i>	23.4%	-23.7%	61.4%	28.5%	7.3%	22.1%	32.0%	6.9%	11.5%
Cash	5904.1	6626.7	8578.5	11268.2	11604.5	16550.5		20923.1	
Debt	111.0	16.5	111.9	443.9	93.1	93.1		93.1	
Net Cash/Shr	44.6	49.8	64.0	84.0	86.5	123.4		156.0	
Tangible Book Value/Shr	90.1	103.0	122.2	147.7	171.9	205.8		239.7	

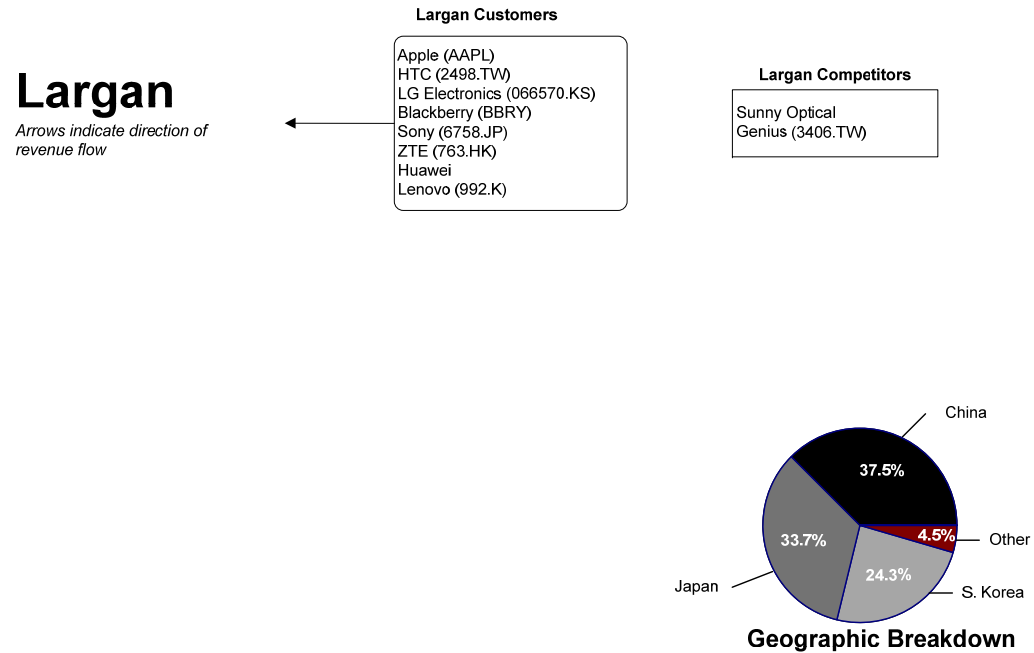
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 434. Largan Precision (3008.TW)

Sector: Electronic Components

LARGAN Precision (3008.TW)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Wei Chen

Lenovo Group

Established in 1984 as New Technology Development Inc, Lenovo is the world's second largest PC OEM with 15% global market share as of 2Q CY12. Lenovo established its market position after acquiring IBM's PC Division in 2Q05. The company was listed on the Hong Kong Stock Exchange in 1994 and maintains principal operations in Raleigh N.C., Beijing, and Singapore.

Figure 435. Lenovo (0992.HK) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	127520.0	115874.5	128751.9	167888.9	230014.3	265340.0	264382.7	286095.8	291612.4
- y/y growth	#VALUE!	-9.1%	11.1%	30.4%	37.0%	15.4%	14.9%	7.8%	10.3%
Gross Margins	15.0%	12.1%	10.8%	10.9%	11.7%	11.8%		11.7%	
Operating Margins	3.1%	-1.3%	1.3%	1.8%	2.0%	2.3%		2.4%	
EPS	0.43	-0.20	0.11	0.22	0.36	0.46	0.47	0.52	0.55
- y/y growth	#VALUE!	-146.2%	155.3%	100.3%	64.7%	27.9%	28.2%	12.0%	18.4%
Cash	17055.6	14441.9	18934.9	23311.0	32393.9	26540.2		31214.7	
Debt	6010.7	6985.2	4578.6	2112.5	488.9	2496.2		2494.9	
Net Cash/Shr	1.3	1.2	1.8	2.4	3.2	2.3		2.8	
Tangible Book Value/Shr	1.4	1.1	1.3	1.4	1.8	1.9		2.2	

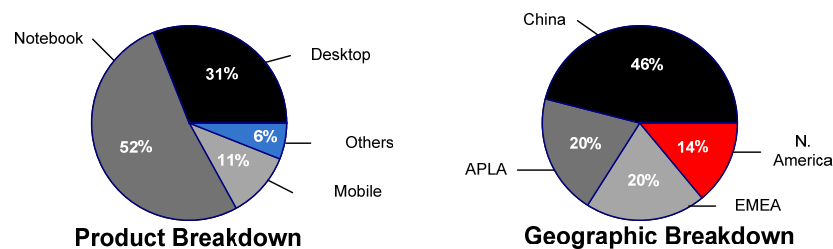
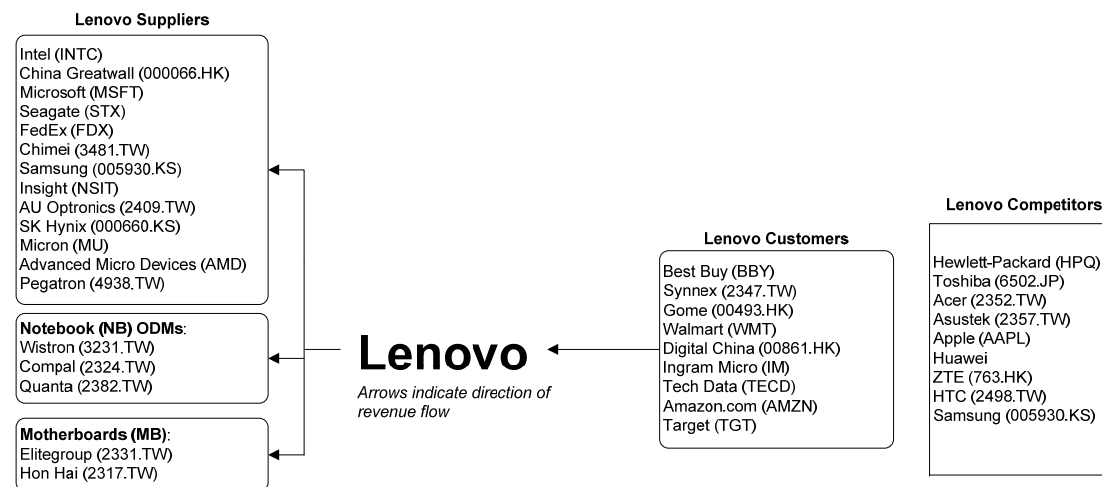
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 436. Lenovo (992.HK)

Sector: PC & Enterprise Hardware

Lenovo (0992.HK)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jim Suva, CPA

Lexmark International Inc

Lexmark develops, manufactures and supplies printing, imaging, document workflow, and content management solutions for the office. The company operates in the office imaging and enterprise content management and business process management markets. Its products include laser printers, inkjet printers (recently announced plans to exit the inkjet market), multifunction devices, dot matrix printers and associated supplies, and ECM and BPM software solutions and services. The company operates through two segments: Imaging Solutions and Services and Perceptive Software. The Imaging Solutions and Services segment offers a broad portfolio of monochrome and color laser printers, laser multifunction products, inkjet all-in-one devices and accessories, as well as software applications, software solutions and managed print services to help businesses efficiently capture, manage and access information. Perceptive Software segment (4% of 2012 revenues) offers a complete suite of ECM and BPM software products and solutions according to the needs of different users in varying industries such as healthcare, higher education, government and financial services.

Primary competitors are HP, Epson, Samsung & Canon, which account for a majority of worldwide market share. Distinguishing itself, however, Lexmark is one of only two companies worldwide to develop and market its own technology in all three high-volume segments of the printer market (color inkjet, mono, and color laser).

The company was founded in 1991 and is headquartered in Lexington, KY. It employs more than 12,000 globally. Lexmark recently announced restructuring actions associated with exiting the inkjet business and related supplies. Restructuring actions are expected to be completed by 2015.

Figure 437. Lexmark (LXK) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	4528.3	3879.9	4210.6	4178.6	3800.8	3427.0	3491.9	3132.3	3296.3
- y/y growth	-9.0%	-14.3%	8.5%	-0.8%	-9.0%	-9.8%	-8.1%	-8.6%	-5.6%
Gross Margins	34.8%	35.1%	37.0%	38.4%	39.0%	41.7%		43.5%	
Operating Margins	8.2%	9.2%	12.3%	12.0%	9.9%	11.1%		11.9%	
EPS	3.20	3.25	4.96	4.70	3.50	3.95	3.81	3.69	3.64
- y/y growth	-8.8%	1.7%	52.5%	-5.2%	-25.5%	12.7%	8.9%	-6.4%	-4.7%
Cash	973.3	1132.5	1217.2	1149.4	905.8	974.6		1098.4	
Debt	654.2	648.9	649.1	649.3	299.6	699.6		699.6	
Net Cash/Shr	3.5	6.2	7.1	6.4	8.7	4.2		6.0	
Tangible Book Value/Shr	10.4	13.0	13.4	14.5	10.7	11.1		12.7	

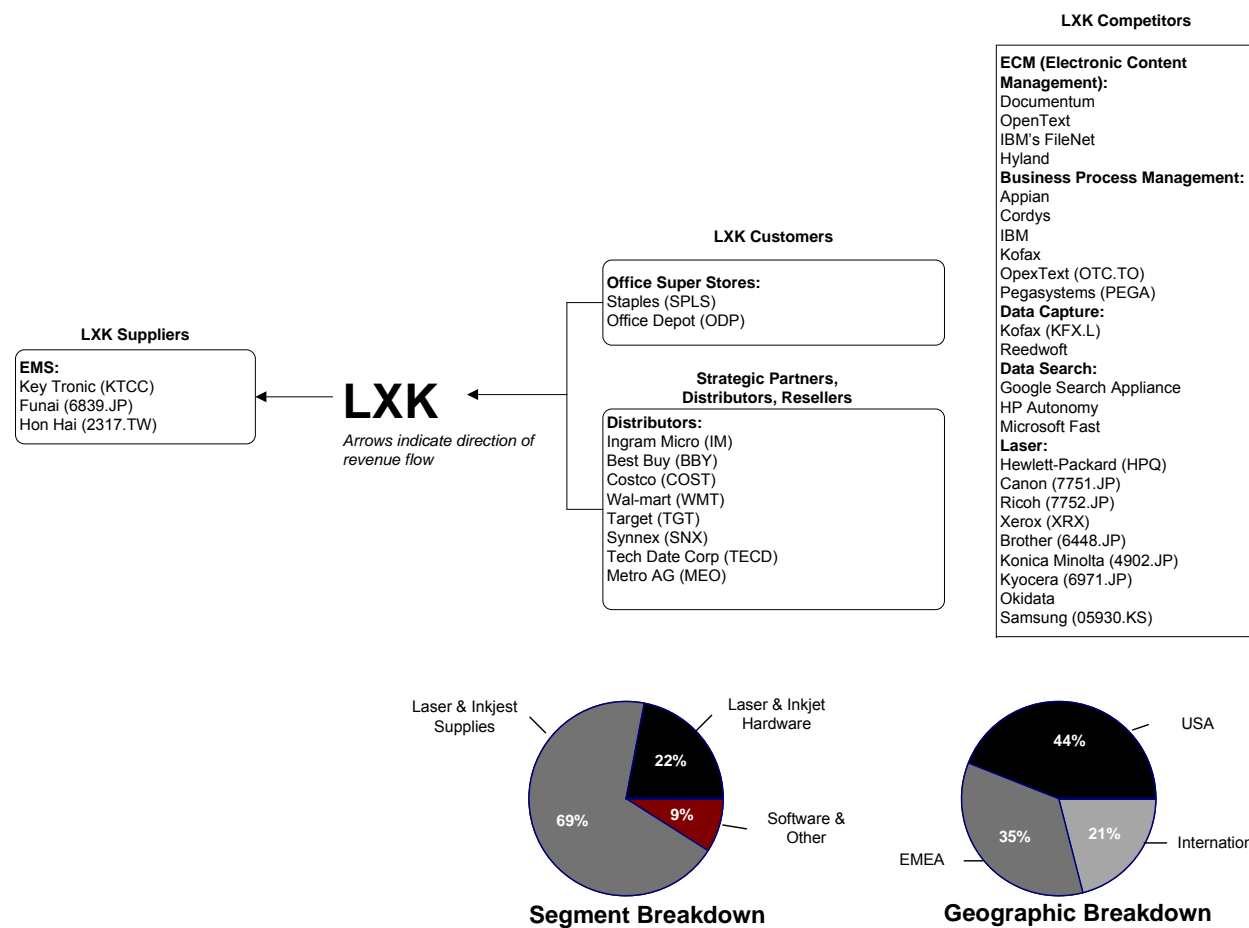
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 438. Lexmark International (LXK)

Sector: Imaging

Lexmark International Inc. (LXK)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Henry Kim, CFA

LG Display

LG Display (LGD), formerly known as LG Philips LCD, is a TFT-LCD manufacturer that has positioned itself as a premium product leader in the industry. The company makes LCD TVs, monitors, notebook PC panels and small/medium panels for mobile applications.

Figure 439. LG Display (034220.KS)

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	16264346.0	20038000.0	25511000.0	24291733.0	29430000.0	28613245.3	30771380.0	26858464.8	32129827.0
- <i>y/y growth</i>	13.3%	23.2%	27.3%	-4.8%	21.2%	-2.8%	4.6%	-6.1%	4.4%
Gross Margins	16.3%	12.8%	14.6%	5.0%	10.2%	12.2%		13.7%	
Operating Margins	10.7%	5.0%	5.1%	-3.1%	3.1%	4.8%		5.7%	
EPS	3038.13	3122.63	3241.88	-2203.40	660.00	2604.90	2790.12	3200.79	3433.67
- <i>y/y growth</i>	-19.1%	2.8%	3.8%	-168.0%	130.0%	294.7%	322.7%	22.9%	23.1%
Cash	3422824.0	2867982.0	3134009.0	2332977.0	2653753.0	3341235.6		3873398.5	
Debt	3887345.0	3379870.0	4558585.0	4523028.0	4455857.0	4381707.4		4381707.4	
Net Cash/Shr	1927.6	2212.9	1887.7	-3883.0	-2199.0	-277.7		1209.6	
Tangible Book Value/Shr	25401.1	24485.1	26399.7	22838.3	23609.3	26214.2		29415.0	

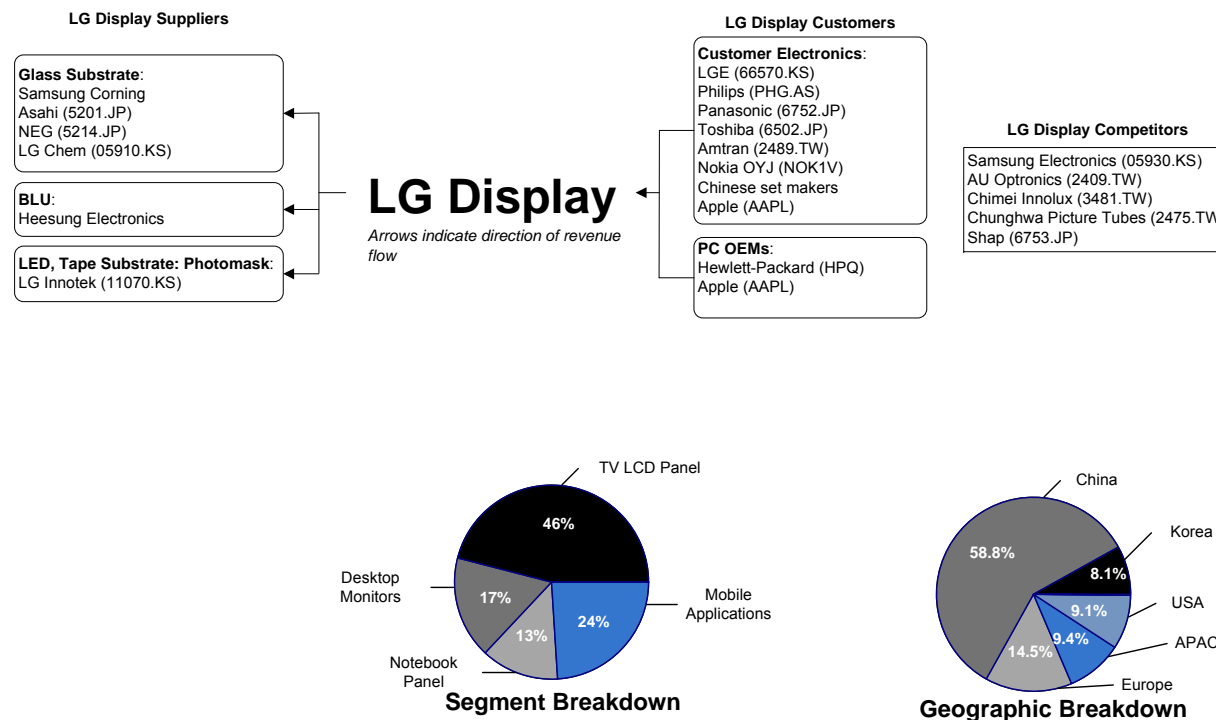
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 440. LG Display (034220.KS)

Sector: LCD Displays

LG Display (034220.KS; LGD)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Henry Kim, CFA

LG Electronics

LGE has four main business divisions: home appliances, display, media, and handsets. The home-appliance division, accounting for 20% of global sales, is the cash cow. LGE boasts leading domestic market shares for many white goods such as air conditioners (54%), washing machines (50%) and refrigerators (49%). The display & media division, accounting for 41% of sales, produces digital storage, TV and PDP modules and should benefit from the accelerating trend towards digital TV. The handset division, accounting for 22% of sales, is the fastest growing unit.

Figure 441. LG Electronics (066570.KS)

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	27638400.0	55492000.0	55753800.0	54256634.0	50960000.0	60277259.2	59964798.0	65644643.0	63578464.0
- y/y growth	17.6%	100.8%	0.5%	-2.7%	-6.1%	18.3%	17.7%	8.9%	6.0%
Gross Margins	24.7%	25.5%	21.6%	22.5%	24.2%	23.9%		24.0%	
Operating Margins	4.4%	4.8%	0.3%	0.7%	2.2%	2.4%		2.5%	
EPS	3261.52	15444.73	8295.29	-2870.19	407.58	7543.11	6473.19	8584.39	9168.12
- y/y growth	-60.5%	373.5%	-46.3%	-134.6%	114.2%	1750.7%	1488.2%	13.8%	41.6%
Cash	1219037.0	2465746.0	1991631.0	2347142.0	1886299.0	2225727.5		2094224.9	
Debt	2317055.0	6908598.0	7192935.0	7435618.0	6470654.0	8938386.0		8838386.0	
Net Cash/Shr	-5376.0	-917.7	-8053.9	-11673.0	-15517.3	-25039.3		-25842.8	
Tangible Book Value/Shr	54271.6	70658.7	74844.4	64322.0	61117.6	63771.9		72926.9	

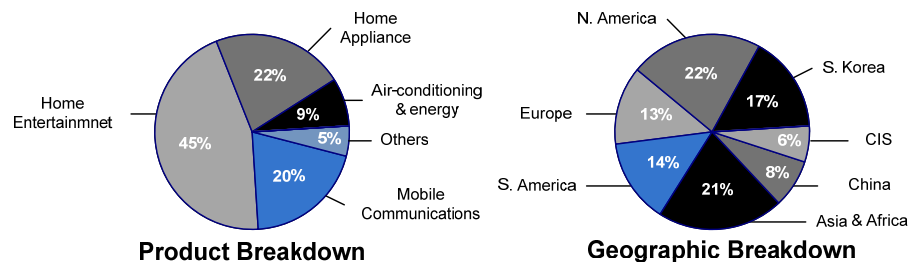
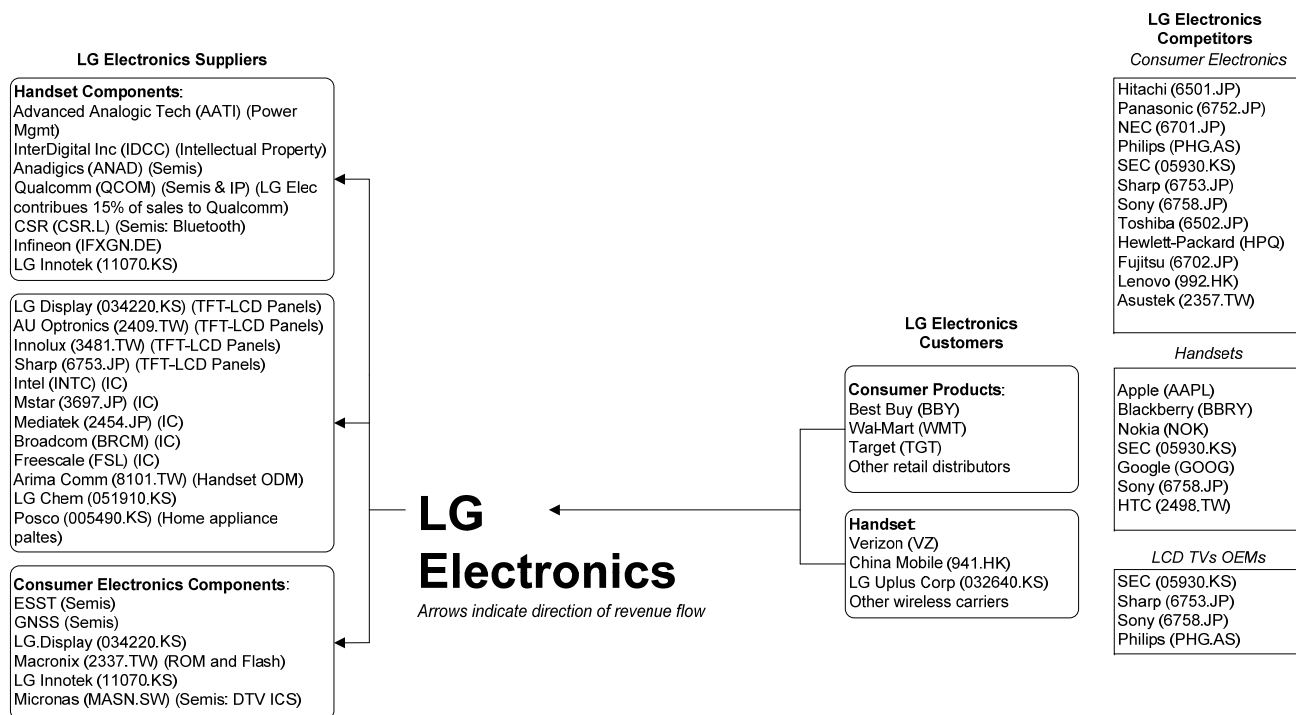
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 442. LG Electronics (066570.KS)

Sector: Diversified Technology

LG Electronics (66570.KS)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Henry Kim, CFA

LG Innotek

Founded in 1970 as Goldstar-Alps Electronics and listed in July 2008, LG Innotek is an affiliate in the LG Group that manufactures electronic components. On July 1, 2009, LG Innotek merged with LG Micron to diversify its product portfolio and enhance economies of scale. Currently it has four business units: LED, Optics Solution, Substrate & Material, and Automotive Components & Electronics.

Figure 443. LG Innotek (011070.KS)

	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	3558014.9	4103500.0	4553018.8	5315900.0	6782221.3	6306893.0	7273409.7	6924855.0
- y/y growth	23.8%	15.3%	11.0%	16.8%	27.6%	18.6%	7.2%	9.8%
Gross Margins	13.6%	12.5%	8.6%	10.6%	9.8%		10.3%	
Operating Margins	5.0%	3.9%	-1.0%	1.5%	2.2%		2.7%	
EPS	3814.77	6395.36	-7212.98	-1234.62	4690.20	2993.96	6678.96	7465.36
- y/y growth	460.8%	67.6%	-212.8%	82.9%	479.9%	342.5%	42.4%	149.3%
Cash	305220.0	245241.0	435601.0	352807.0	323082.8		365426.7	
Debt	993656.0	1648829.0	2244761.0	2167732.0	1976727.0		1883393.7	
Net Cash/Shr	-14990.2	-59859.4	-55341.3	-56766.5	-54762.5		-49192.8	
Tangible Book Value/Shr	47686.8	67017.4	59190.5	55696.7	62310.0		69994.4	

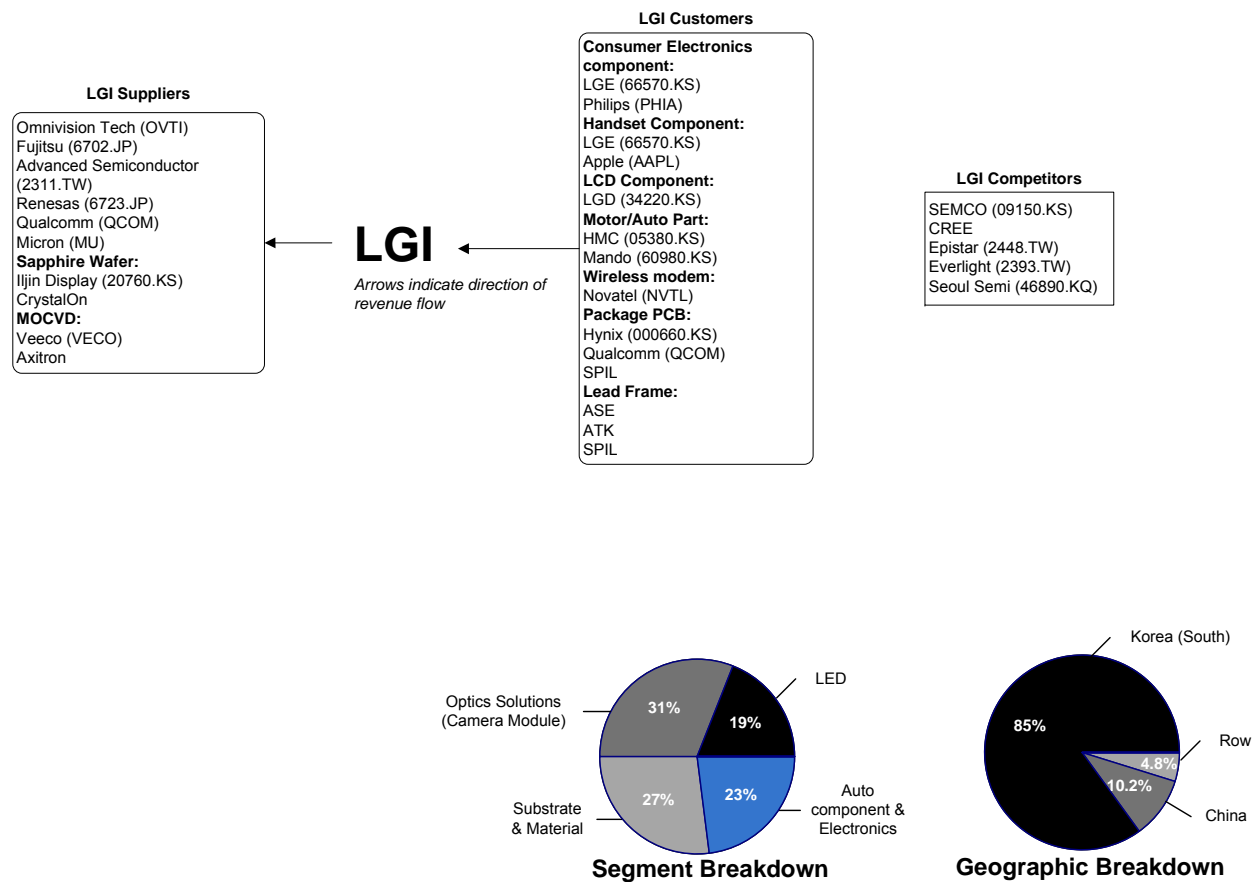
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 444. LG Innotek (011070.KS)

Sector: EMS

LG Innotek (011070.KS)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Terence Whalen

Linear Technology

Linear Technology Corp. (LLTC) manufactures analog products across a range of horizontal and vertical markets including industrial (38%), networking (11% orders), automotive (12%), computing (15%), telecom (11%), handset (2%), consumer (6%), and satellite/military (6%). Linear's product portfolio is anchored in power management 60%+ but is diversified across other device types like operational amplifiers, interface, data converters, and radio frequency. LLTC's extraordinary margin structure means its 50.5% cross-cycle operating margin roughly equals the group's 50.8% gross margin. Linear's margins structure is helped by market savvy management, proprietary products, price discipline, long revenue life products, horizontal market penetration, and efficient manufacturing. LLTC's revenue growth through the last cycle was strong (11% CAGR 2002-2008 versus 5% group) with 2003/2004 standing out at 22% and 40% growth, respectively. LLTC produces 90%+ of its products internally and assembles and tests the bulk (80%-85%) of them as well. Manufacturing facilities are located in Sunnyvale, CA and Camas, WA. The company also uses third party fabs such as TSMC. Competitors include Maxim Integrated Products, Analog Devices, and National Semiconductor. LLTC derives 50% of sales from third party distributors recognizing distributor revenue sell-through domestically and sell-in internationally. Linear's fiscal year ends in June.

Figure 445. Linear Technology (LLTC) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	1175.2	968.5	1170.0	1484.0	1266.6	1277.4	1278.4	1350.4	1398.3
- y/y growth	8.5%	-17.6%	20.8%	26.8%	-14.6%	0.8%	0.9%	5.7%	9.4%
Gross Margins	77.3%	75.4%	77.0%	78.1%	75.3%	74.9%		76.0%	
Operating Margins	48.4%	43.0%	48.2%	52.1%	46.0%	44.5%		45.7%	
EPS	1.71	1.34	1.61	2.43	1.71	1.70	1.77	1.80	1.95
- y/y growth	23.4%	-22.0%	20.6%	50.7%	-29.6%	-0.5%	3.7%	5.8%	9.9%
Cash	966.7	868.7	958.1	922.5	1203.1	1504.0		879.2	
Debt	1700.0	1405.6	767.0	785.7	805.6	826.4		0.0	
Net Cash/Shr	-3.2	-2.4	0.8	0.6	1.7	2.9		3.7	
Tangible Book Value/Shr	-2.3	-1.5	-0.1	2.1	3.3	4.5		5.4	

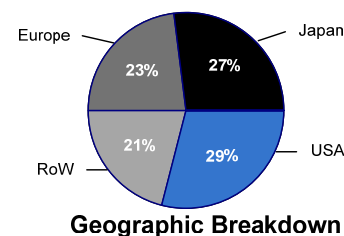
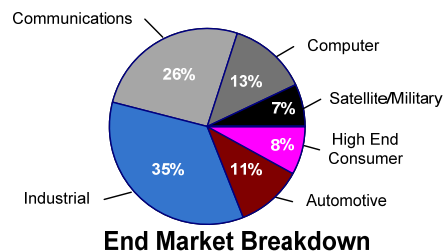
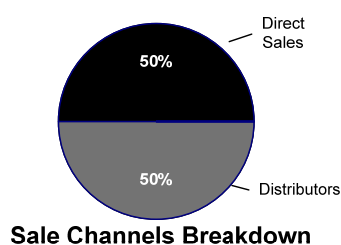
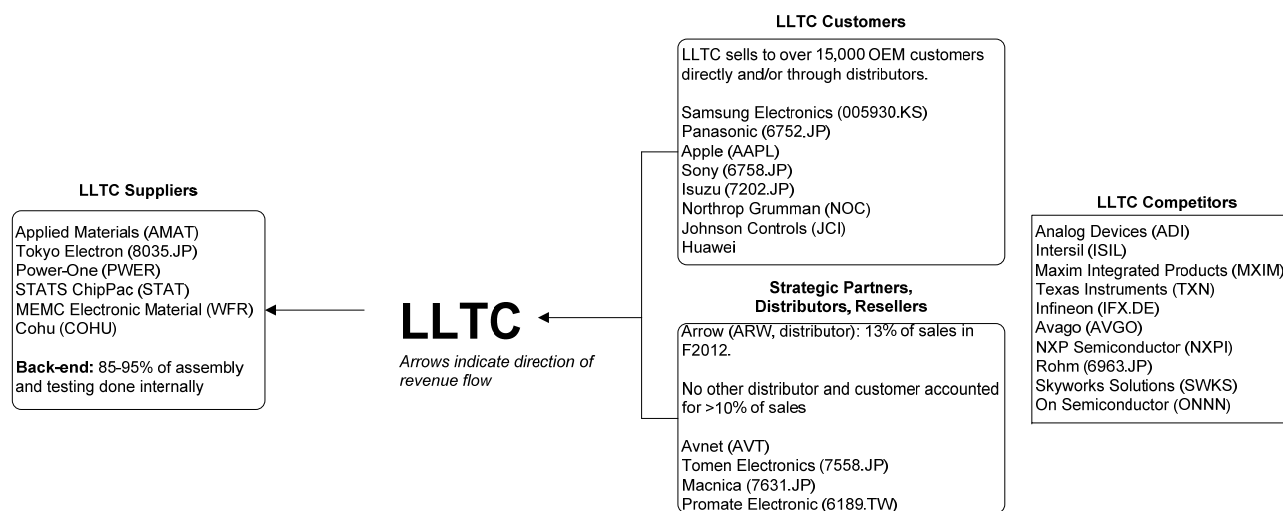
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 446. Linear Technology (LLTC)

Sector: Semiconductors

Linear Technology (LLTC)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Logitech International S A

Logitech International SA engages in peripherals businesses. It operates through segments which are peripherals and video conferencing. The peripherals segment is the design, manufacturing and distribution of peripheral products for personal computers (PC), tablets and for other digital platforms. Video conferencing segment covers the design, production and sale of video conferencing products, infrastructure and services use among enterprise, public sector and other businesses. Products includes pointing devices, keyboards, desktops and gaming products. The company was founded by Daniel Borel, Pierluigi Zappacosta and Giacomo Marini on October 2, 1981 and is headquartered in Morges, Switzerland.

Figure 447. Logitech (LOGN) Results and Forecasts

	2008	2009	2010	2011	2012	Street 2013E	Street 2014E
Revenues	2434.5	2091.3	2394.7	2042.1	1974.9	1879.14	1882.3
- <i>y/y growth</i>	-11.4%	-14.1%	14.5%	-14.7%	-3.3%	-4.8%	0.2%
Gross Margins	31.3%	31.9%	35.4%	33.5%	33.7%		
Operating Margins	5.9%	4.1%	6.0%	3.1%	0.4%		
EPS	0.65	0.34	0.62	0.35	0.05	0.28	0.39
- <i>y/y growth</i>	-49.1%	-47.5%	80.3%	-42.9%	-86.9%	508.2%	38.3%
Cash	562.15	336.76	437.24	432.37	316.10		
Debt	0.00	0.00	0.00	0.00	0.00		
Net Cash/Shr	1.21	2.17	0.89	0.98	0.69		
Tangible Book Value/Shr	4.58	2.11	2.98	2.95	2.01		

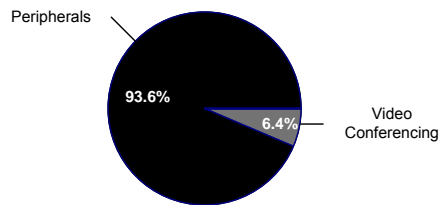
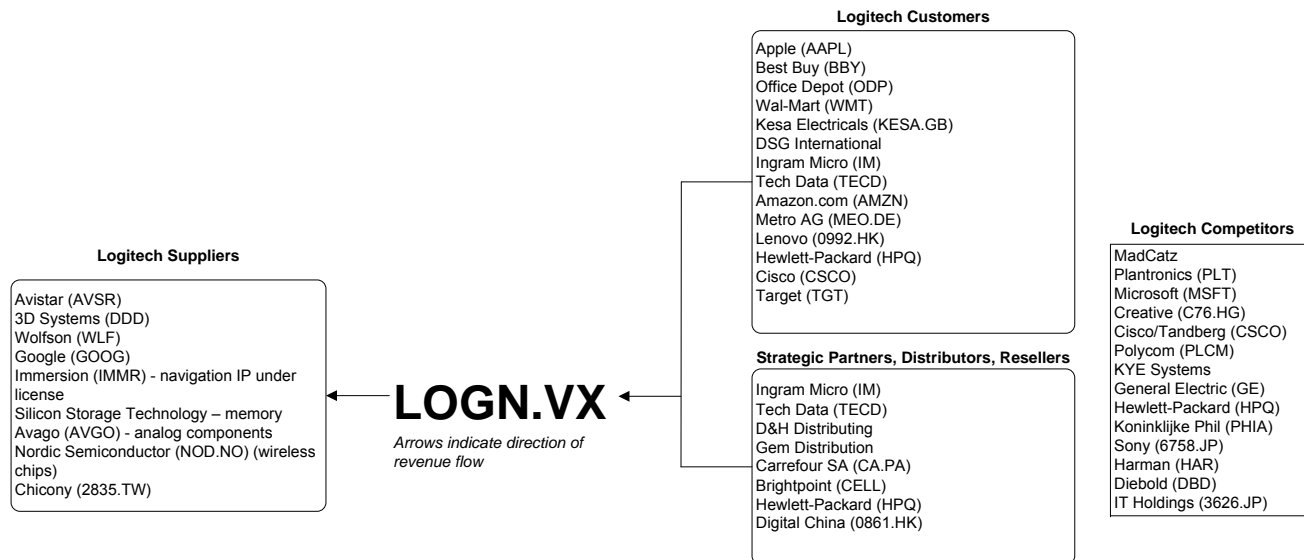
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, FactSet

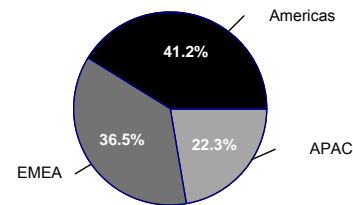
Figure 448. Logitech (LOGN.VX)

Sector: Semiconductors

Logitech International (LOGN.VX)



Segment Breakdown



Geographic Breakdown

Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Yuta Fukasawa

Mabuchi Motor

Mabuchi Motor Co., Ltd. engages in the manufacture and sale of electric motors, parts, equipment. It operates through the following divisions: Automotive Products, Audio and Visual, Optical and Precision, and Home and Industrial. The Automotive Products division provides power window lifter, car mirror, door lock actuator, headlight, steering lock, power seats and seat belts, and electric brakes. The Audio and Visual division offers digital versatile discs (DVD), car compact discs (CD), car navigation systems, and video games. The Optical and Precision division deals with printers, copy machines, digital cameras, and CD, DVD, and read-only-memory drive. The Home and Industrial division produces hair dryers, electric shavers, toothbrush, vacuum cleaners, drills and screw drivers, circular saws, and radio control models. The company was founded by Kenichi Mabuchi on January 18, 1954 and is headquartered in Matsudo, Japan.

Figure 449. Mabuchi Motor (6592.JP)

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	92602.0	70369.0	82752.0	78886.0	85254.0	99500.0	100432.0	110000.0	106376.0
- y/y growth	-14.0%	-24.0%	17.6%	-4.7%	8.1%	16.7%	17.8%	10.6%	5.9%
Gross Margins	25.7%	26.4%	27.4%	24.1%	24.7%	24.7%		24.6%	
Operating Margins	6.1%	4.3%	8.0%	3.9%	5.9%	8.1%		9.6%	
EPS	94.85	155.54	150.25	-13.28	182.31	199.80	217.83	254.04	247.85
- y/y growth	-66.2%	64.0%	-3.4%	-108.8%	1472.6%	9.6%	19.5%	27.1%	13.8%
Cash	71823.0	85554.0	85253.0	77998.0	91746.0	88189.7		87288.9	
Debt	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Net Cash/Shr	1909.3	2441.7	2433.4	2227.8	2618.7	2517.2		2491.5	
Tangible Book Value/Shr	3876.3	4099.4	4157.2	4210.0	4530.1	4834.1		4959.1	

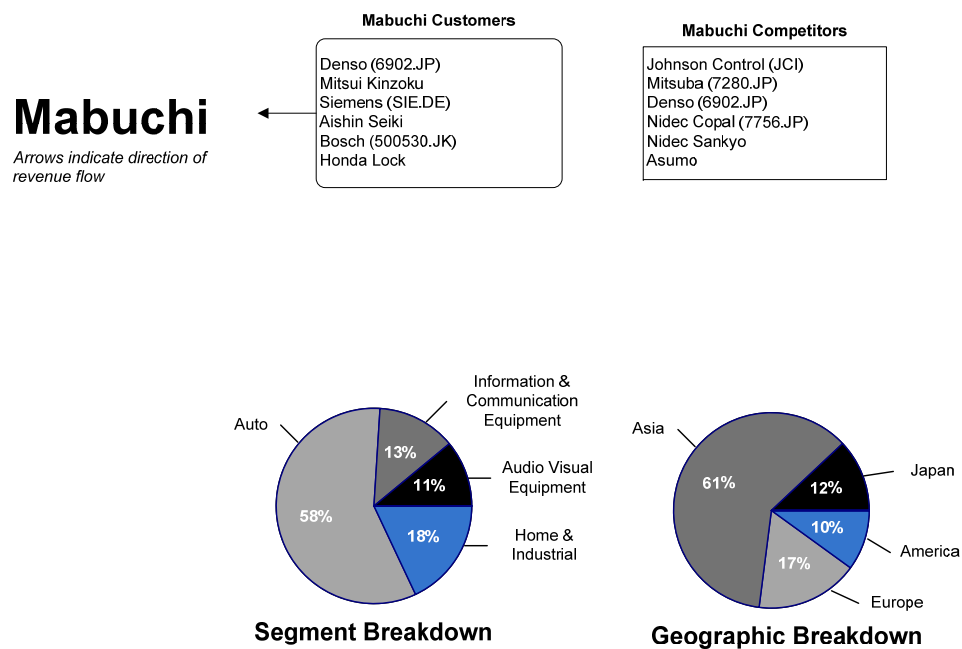
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 450. Mabuchi Motor (6592.JP)

Sector: Electronic Components & Equipment

Mabuchi Motor (6592.JP)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Terence Whalen

MagnaChip Semiconductor

Magnachip is a Korean-based analog and mixed-signal vendor of display products (37% sales), power products (15% sales), and foundry services (48% sales). The company focuses on high-volume consumer products including consumer electronics, TVs, cell phones, notebooks and tablets. Magnachip operates on a hybrid model with a traditional semiconductor business that designs, manufactures, and sells merchant chips and a foundry service business that fabricates chips for other fabless companies. Magnachip originated as part of LG Electronics' semiconductor division and evolved Hynix's analog mixed-signal division before it spun off in 2004. Magnachip completed its initial public offering in March 2011. Magnachip's top five customers in 2011 include LG Display, Cirrus Logic, SiliconWorks, Sitronix, and Elan. Magnachip is headquartered in Seoul, Korea, and has domestic offices based on Sunnyvale, California. The company has three manufacturing facilities in Korea where it fabricates majority of its products. Magnachip's fiscal year ends 12/31.

Figure 451. MagnaChip (MX) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	601.7	560.1	770.4	772.8	819.6	878.5	882.7	920.1	962.3
- y/y growth		-6.9%	37.6%	0.3%	6.1%	7.2%	7.7%	4.7%	9.0%
Gross Margins	26.0%	28.3%	31.6%	30.3%	32.2%	33.2%		34.3%	
Operating Margins	2.6%	11.1%	15.0%	12.6%	13.9%	14.7%		15.7%	
EPS	-1.36	0.53	2.17	1.62	2.09	2.55	2.51	3.03	2.88
- y/y growth		138.8%	311.2%	-25.6%	28.8%	22.4%	20.2%	18.7%	14.9%
Cash	15.8	64.9	172.2	168.9	182.4	238.9		322.5	
Debt	845.0	61.1	246.9	201.4	201.7	201.7		201.7	
Net Cash/Shr	0.3	0.1	-1.9	-0.8	-0.5	1.0		3.3	
Tangible Book Value/Shr	-21.4	4.3	3.6	3.9	8.2	10.1		13.3	

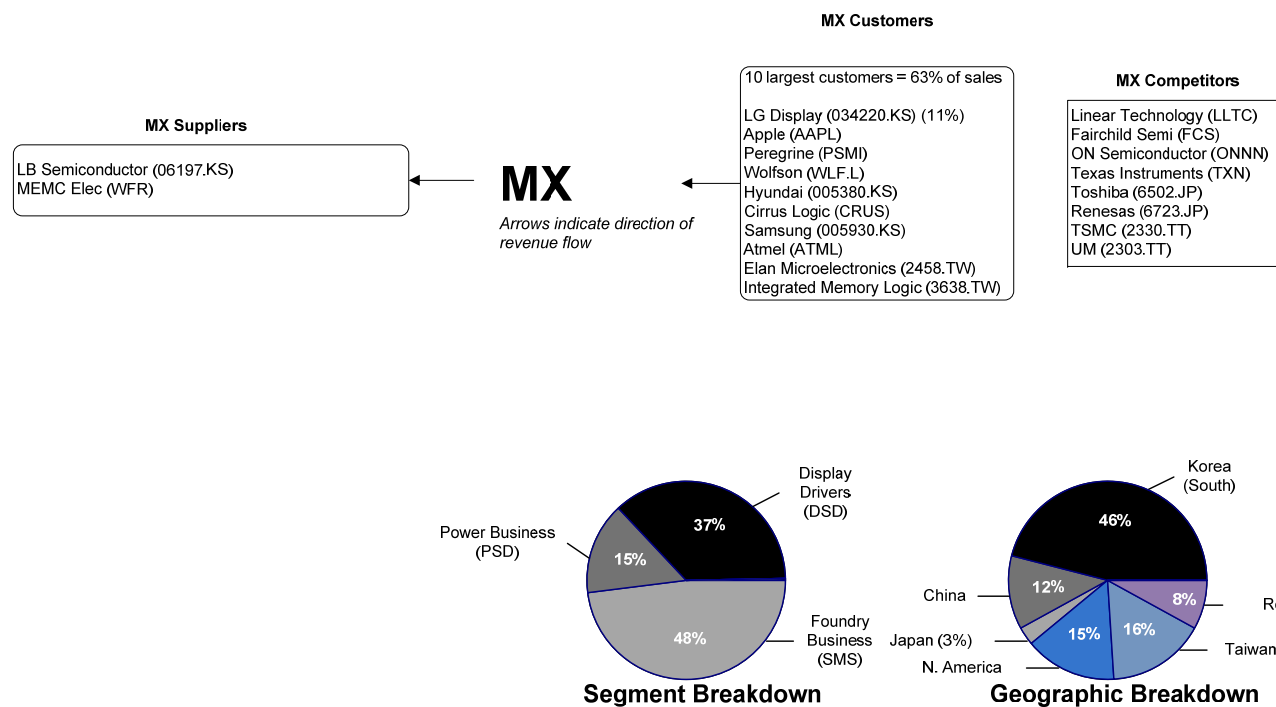
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 452. MagnaChip (MX)

Sector: Semiconductor

MagnaChip Semiconductor Corp. (MX)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jason Channell

Manz Automation

Manz AG supplies equipment to manufacturers in hi-tech industries. It has expanded its product range from its previous focus on solar to include products for flat panel displays (e.g. smart phones, tablets, LCD TV's), and automation equipment for the manufacture of lithium ion batteries for the automotive industry.

Figure 453. Manz Automations (M5ZG.DE) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	234.8	101.1	205.0	266.8	206.3	248.2	243.2	332.9	271.0
- <i>y/y growth</i>	188.3%	-57.0%	102.8%	30.1%	-22.7%	20.3%	17.9%	34.1%	11.4%
Gross Margins	44.5%	40.3%	40.7%	40.6%	52.4%	53.6%		52.1%	
Operating Margins	12.2%	-15.7%	0.3%	1.2%	-2.6%	1.5%		4.4%	
EPS	5.04	-2.15	0.35	0.19	-2.19	0.42	0.71	2.21	1.68
- <i>y/y growth</i>	109.7%	-142.6%	116.2%	-45.3%	-1251.3%	119.3%	132.5%	421.5%	135.4%
Cash	68.6	88.2	39.0	33.4	34.1	40.7		44.3	
Debt	17.9	9.6	14.6	50.7	69.2	79.2		89.2	
Net Cash/Shr	15.7	19.4	7.6	6.3	2.4	1.6		0.2	
Tangible Book Value/Shr	31.0	29.1	21.5	20.6	18.5	18.9		21.1	

(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 454. Manz AG (M5Z.DE)

Sector: Alternative Energy

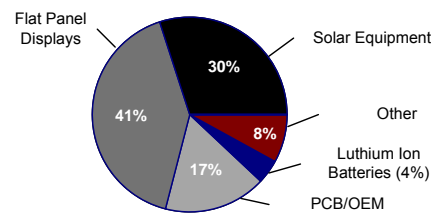
Manz AG (M5Z.DE)

M5Z.DE

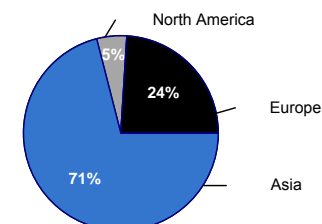
Arrows indicate direction of revenue flow

Manz Competitors

Applied Materials (AMAT)
GT Solar
Centrotherm (CTN.DE)
Meyer Burger (MBT.DE)
Roth & Rau (R8R.DE)



Segment Breakdown



Geographic Breakdown

Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Glen Yeung

Marvell Technology Group Ltd.

Marvell is a fabless semiconductor provider of high-performance application-specific standard products. Its core strength is the design and development of complex system-on-a-chip (SoC) solutions, leveraging its technology portfolio of intellectual property in the area of analog, mixed-signal, digital signal processing, and embedded ARM-based microprocessor integrated circuits. Nearly half of Marvell's revenues come from the storage market, where they maintain a leading share at top storage OEMs. Approximately a quarter of Marvell's sales comes from Networking (PON, Ethernet, Embedded), where Marvell participates in the data center market. Marvell's mobile and wireless segment (approx. a quarter of sales) came via their acquisition in 2006 of Intel's x-Scale processor division and was the primary driver of growth, namely benefiting from RIMM, who was a major customer of Marvell's communications processor business. Marvell is one of the largest fabless semiconductor companies in the world behind Qualcomm, Broadcom and Nvidia. Marvell has about 5,000 employees globally and is incorporated in Bermuda with a U.S. operating office in Santa Clara, California.

Figure 455. Marvell (MRVL) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	2894.7	2950.6	2807.7	3611.9	3393.0	3168.6	3168.6 r this dC item.	3154.5	3126.4
- y/y growth	29.4%	1.9%	-4.8%	28.6%	-6.1%	-6.6%	#VALUE!	-0.4%	#VALUE!
Gross Margins	48.3%	51.6%	56.3%	59.2%	56.8%	52.9%		52.1%	
Operating Margins	-3.6%	5.6%	14.5%	25.0%	17.8%	9.3%		8.1%	
EPS	0.44	0.76	0.99	1.64	1.27	0.86	0.86 r this dC item.	0.76	0.78
- y/y growth	-37.5%	71.8%	29.5%	65.6%	-22.5%	-32.1%	#VALUE!	-11.1%	#VALUE!
Cash	630.9	951.9	1796.7	2930.0	2246.5	1919.0		2019.2	
Debt	397.5	4.2	2.5	0.0	0.0	0.0		0.0	
Net Cash/Shr	0.4	1.5	2.7	4.3	3.6	3.3		3.7	
Tangible Book Value/Shr	1.6	2.5	3.5	5.2	4.9	4.5		5.0	

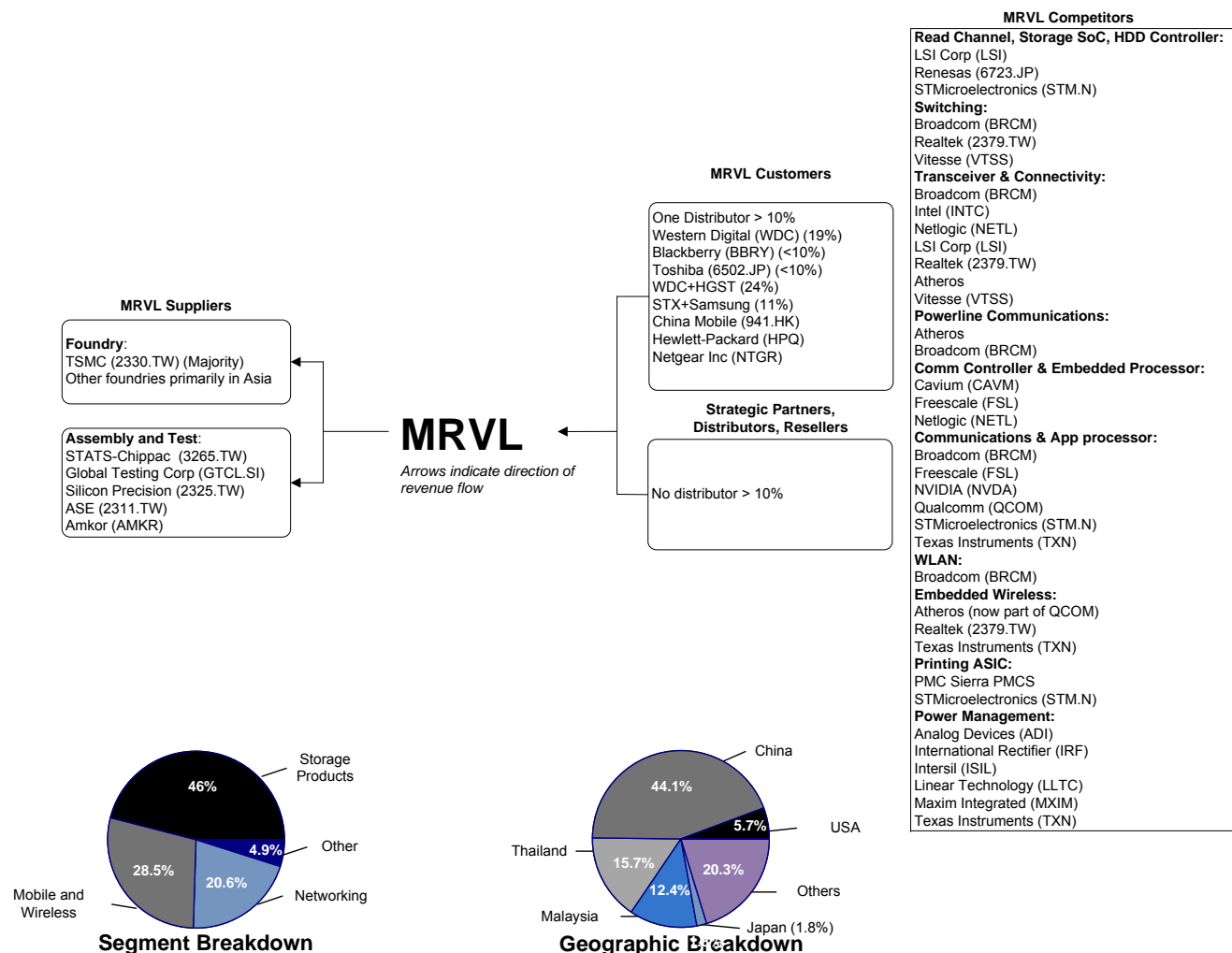
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 456. Marvell (MRVL)

Sector: Semiconductors

Marvell (MRVL)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Terence Whalen

Maxim Integrated

Maxim Integrated Products (MXIM) manufactures analog mixed-signal circuits for a wide range of markets, including industrial, automotive, computing, wireless, and wireline applications. Sales are spread across consumer (41%), industrial (26%), computing (16%) and communications (19%). Maxim has a broad base of customers and a diversified product portfolio that leverages precision analog and digital capabilities together into proprietary mixed-signal parts. Manufacturing facilities are located in San Jose, California; Beaverton, Oregon; and San Antonio, Texas. Maxim's fiscal year ends 6/30.

Figure 457. Maxim (MXIM) Results and Forecasts

	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	1646.0	1997.6	2472.3	2403.5	2458.2	2463.0	2729.8	2658.1
- <i>y/y growth</i>	-19.8%	21.4%	23.8%	-2.8%	2.3%	2.5%	11.1%	7.9%
Gross Margins	51.6%	59.7%	61.9%	60.4%	61.4%		61.7%	
Operating Margins	14.6%	24.7%	30.3%	25.6%	27.6%		29.4%	
EPS	0.56	1.07	1.72	1.59	1.79	1.80	2.02	2.06
- <i>y/y growth</i>	-49.3%	90.3%	60.8%	-7.5%	12.7%	13.7%	13.1%	14.2%
Cash	913.4	826.5	1012.9	956.4	1296.8		1469.6	
Debt	0.0	300.0	300.0	309.1	503.6		503.6	
Net Cash/Shr	2.9	1.7	2.4	3.2	2.6		3.2	
Tangible Book Value/Shr	8.5	6.6	6.6	6.1	6.6		7.2	

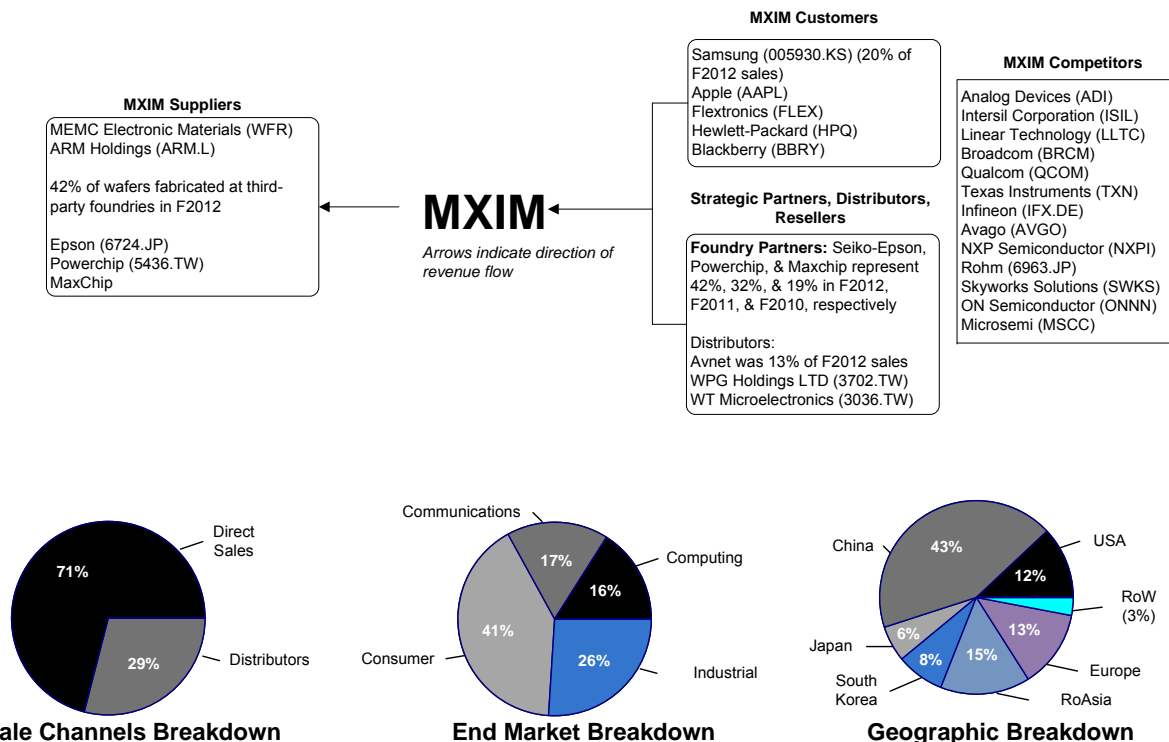
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 458. Maxim Integrated (MXIM)

Sector: Semiconductors

Maxim Integrated Products, Inc. (MXIM)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Kevin Chang

MediaTek

MediaTek, Inc. engages in the wireless communications and digital multimedia solutions industry. Its products include peripherals for Mobile Communications, Digital Home, PC Optical Storage Devices, Wireless, and Broadband Connectivity. The company was founded on May 28, 1997 and is headquartered in Hsinchu, Taiwan.

Figure 459. MediaTek (2454.TW) Results and Forecasts

	2008	2009	2010	2011	2012	Street 2013E	Street 2014E
Revenues	90402.0	115511.6	113522.0	86857.5	99263.2	133844.10	142959.9
- <i>y/y growth</i>	12.1%	27.8%	-1.7%	-23.5%	14.3%	34.8%	6.8%
Gross Margins	50.1%	55.9%	51.0%	42.2%	37.6%		
Operating Margins	24.7%	31.5%	27.4%	14.2%	12.6%		
EPS	17.96	33.62	28.39	12.12	12.82	18.06	22.15
- <i>y/y growth</i>	-44.2%	87.2%	-15.6%	-57.3%	5.7%	40.9%	22.7%
Cash	57589.82	96861.16	92086.07	91045.45	90389.73		
Debt	4.35	0.00	0.00	4254.89	8880.43		
Net Cash/Shr	31.80	49.19	28.02	15.49	8.32		
Tangible Book Value/Shr	65.18	90.77	93.52	87.85	119.19		

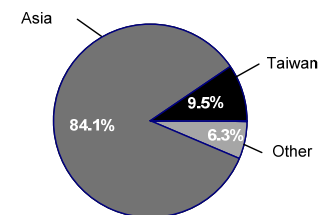
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, FactSet

Figure 460. MediaTek (2454.TW)

Sector: Semiconductors

MediaTek (2454.TW)



Geographic Breakdown

Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Shahriar Pourreza, CFA

MEMC Electronic Materials Inc.

MEMC Electronic Materials, Inc. has essentially two operating segments: Semiconductor Materials and Solar Energy. The Solar Energy segment is WFR's technology agnostic, solar project development business that designs, installs, finances and monitors solar energy projects at the commercial and utility scale level through SunEdison. SunEdison also provides operations and maintenance services. The Semiconductor Materials segment is a leading supplier of raw silicon wafers to the semiconductor industry. MEMC's Semi Materials segment includes virtually all major chipmakers in its customer base, with a #3 leading market share – essentially tied with Wacker. The company's products include 100mm, 125mm, 150mm, 200mm and 300mm prime polished wafers, epitaxial wafers, and test and monitor wafers for semiconductor devices including memory, logic and microprocessors. The company was founded in 1959 and located in St. Peters, MO.

Figure 461. MEMC (WFR) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	2004.5	1163.6	2239.2	3243.3	2870.4	2688.1	2790.6	2949.1	3156.8
- y/y growth	4.3%	-42.0%	92.4%	44.8%	-11.5%	-6.4%	-2.8%	9.7%	13.1%
Gross Margins	50.5%	11.6%	16.1%	17.7%	14.8%	20.9%		23.2%	
Operating Margins	44.3%	-3.2%	4.1%	5.3%	6.5%	9.6%		12.2%	
EPS	3.27	-0.11	0.12	0.20	0.28	0.31	0.21	0.58	0.45
- y/y growth	0.7%	-103.5%	203.1%	67.2%	41.5%	13.8%	-23.6%	83.0%	111.8%
Cash	1136.7	718.6	707.4	585.8	572.6	359.8		939.2	
Debt	32.2	416.6	682.7	1926.8	2368.3	2691.6		3034.7	
Net Cash/Shr	4.9	1.5	0.4	-5.2	-7.2	-9.3		-8.2	
Tangible Book Value/Shr	9.1	8.2	8.1	2.6	2.0	2.3		3.0	

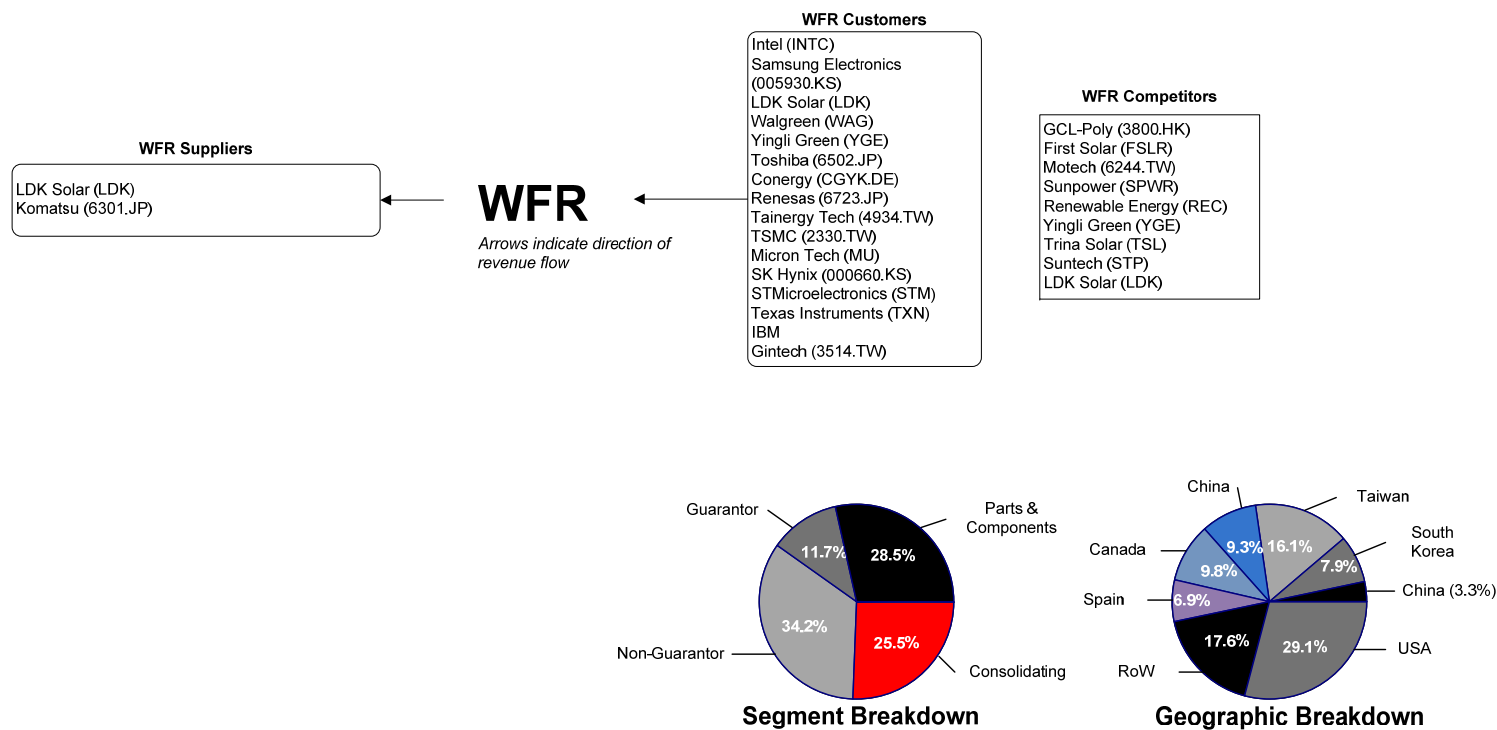
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 462. MEMC Electronic Materials (WFR)

Sector: Alternative Energy

MEMC Electronic Materials Inc. (WFR)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jason Channell

Meyer Burger

Meyer Burger is a leading supplier of equipment to the solar manufacturing industry specialising in precision wire saws to cut silicon into ingots and wafers, having over 50% market share. The acquisition of Roth & Rau has broadened its product offering to cover cell and module manufacturing equipment.

Figure 463. Meyer Burger (MBTN.S) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	455.4	420.9	826.0	1315.0	618.1	834.4	488.7	959.6	678.8
- <i>y/y growth</i>	119.0%	-7.6%	96.2%	59.2%	-53.0%	35.0%	-20.9%	15.0%	38.9%
Gross Margins	12.6%	9.8%	15.5%	8.9%	-19.3%	-2.5%		-0.4%	
Operating Margins	12.9%	9.9%	15.6%	15.1%	-19.3%	-2.5%		-0.4%	
EPS	1.08	0.79	1.82	2.14	-1.47	-0.35	-1.45	-0.14	-0.14
- <i>y/y growth</i>	102.0%	-26.9%	130.8%	17.6%	-168.3%	75.8%	1.0%	61.1%	90.1%
Cash	43.7	96.6	393.5	260.2	266.0	238.4		248.7	
Debt	40.3	82.9	0.9	9.9	134.7	134.7		134.7	
Net Cash/Shr	0.2	1.0	7.3	4.4	2.3	1.8		2.0	
Tangible Book Value/Shr	1.0	1.3	4.5	3.4	3.2	3.9		4.8	

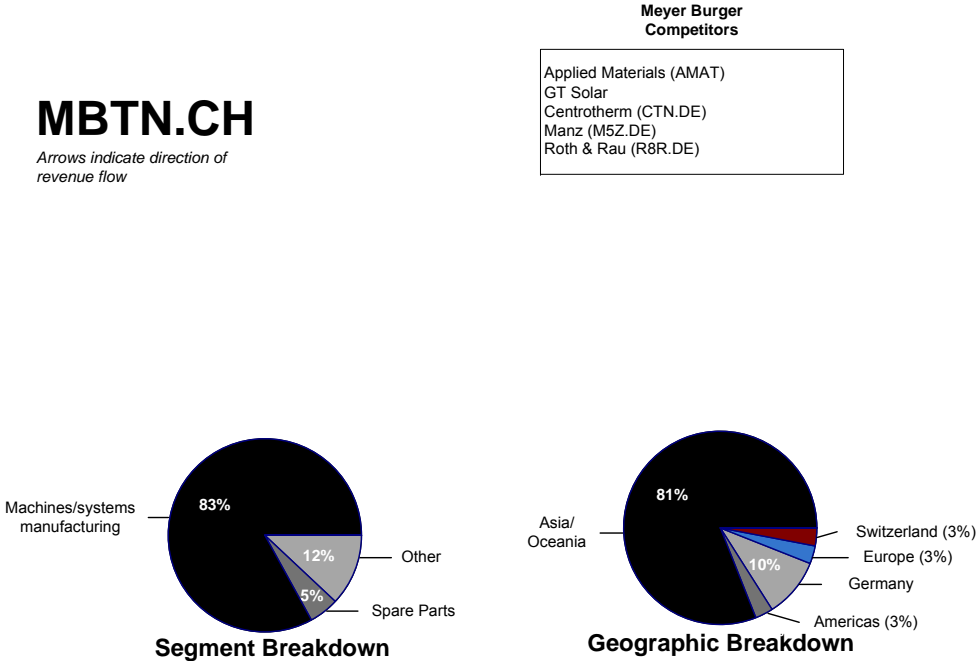
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 464. Meyer Burger (MBTN.CH)

Sector: Alternative Energy

Meyer Burger Technology AG (MBTN.CH)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Terence Whalen

Microchip Technology

Microchip Technology (MCHP) designs and manufactures semiconductors for a variety of horizontal (industrial, medical, consumer appliance) and vertical (automotive, consumer electronic) markets. Eighty percent of sales are microcontrollers, embedded devices that combine analog circuitry with basic memory and processing capability. The bulk of controllers are 8-bit (59% sales estimated) with a faster growing 16-bit business (8.5% sales estimated) and a nascent 32-bit lineup. Microchip spun out of electronics conglomerate General Instruments and initially offered shares to the public in 1993. Microchip acquired analog TelCom Semiconductor in 2001, microcontroller PowerSmart in 2002, touch screen controller Hampshire Company in 2008, bid unsuccessfully for Atmel Semiconductor in 2008, and recently acquired SST. Outside of controllers, Microchip has ancillary businesses in EEPROM & Flash memory (13%), and analog and mixed signal interface circuits (12.4%). Microchip manufactures 95%+ of its products internally and recognizes 65% of sales through distributors using conservative sell-through recognition. Microchip's fiscal year ends in March.

Figure 465. Microchip Tech (MCHP) Results and Forecasts

	2009	2010	2011	2012	2013	CIR 2014E	Street 2014E	CIR 2015E	Street 2015E
Revenues	903.3	947.7	1450.9	1383.2	1606.1	1837.2	1845.5	1991.9	1997.0
- y/y growth		4.9%	53.1%	-4.7%	16.1%	14.4%	14.9%	8.4%	8.2%
Gross Margins	57.2%	56.4%	59.7%	57.3%	53.1%	56.9%		59.0%	
Operating Margins	26.6%	26.4%	33.9%	29.6%	24.9%	26.9%		30.2%	
EPS	1.11	1.13	2.18	1.72	1.63	2.06	2.15	2.51	2.54
- y/y growth		2.1%	92.9%	-20.9%	-5.3%	26.2%	31.9%	22.0%	18.0%
Cash	1389.9	1214.3	1243.5	1459.0	1578.6	1690.8		1867.5	
Debt	1149.2	340.7	347.3	355.1	983.4	983.4		983.4	
Net Cash/Shr	1.3	4.7	4.6	5.4	2.9	3.3		4.1	
Tangible Book Value/Shr	5.1	8.0	9.1	9.9	6.0	6.5		7.4	

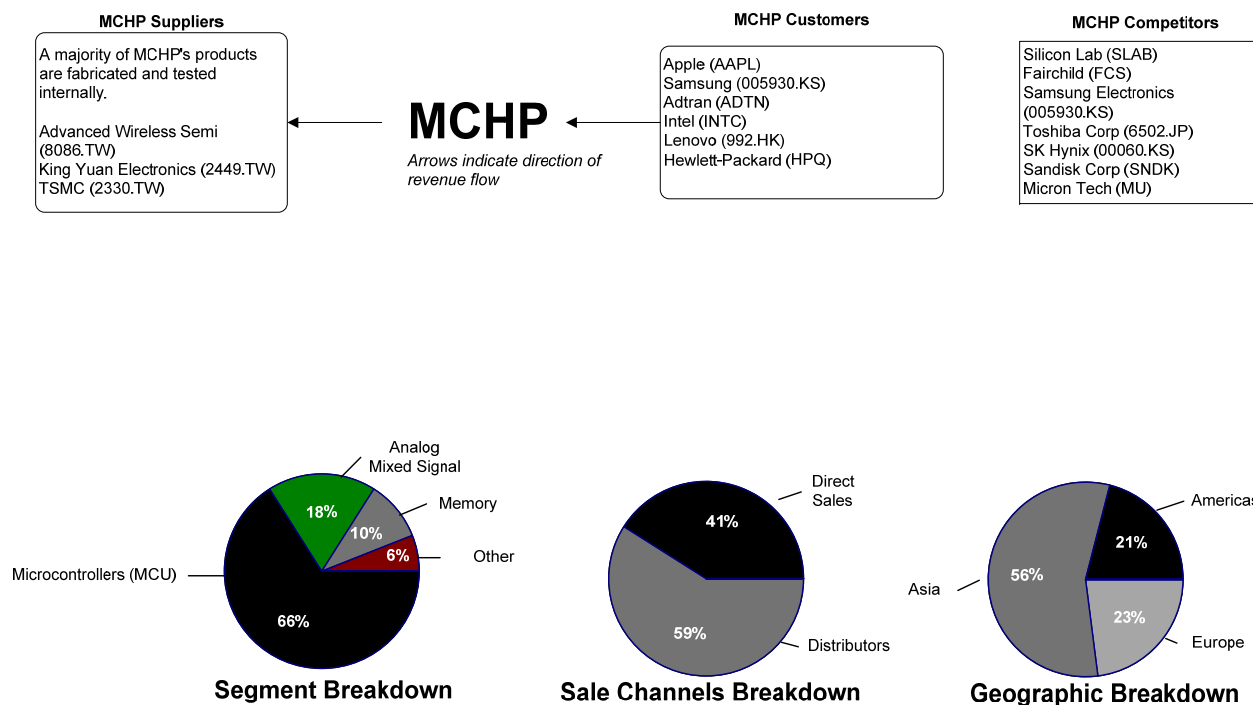
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 466. Microchip Technology (MCHP)

Sector: Semiconductors

Microchip Technology (MCHP)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Glen Yeung

Micron Technology Inc

Micron Technology (MU) is the fourth-largest WW manufacturer of Dynamic Random Access Memory (DRAM) with ~13% market share. Approximately 38% of Micron's revenues are from DRAM sales (PC DRAM & Specialty DRAM). Micron is the third-largest manufacturer of NAND Flash (~45% of sales), with NOR flash accounting for ~11% of sales from its acquisition of Numonyx. Micron also manufactures CMOS image sensors for Aptina under a wafer supply agreement (~6% of sales), and is a ~30% owner of Inotera (although taking more than 50% of wafers due to additional equity investment), and 50% owner of both MeiYa and Transform. Micron partnered with Intel in Jan 2006 to form a NAND Flash manufacturing joint venture, IM Flash Technologies (IMFT). Under the updated agreement with Intel, Micron will own Intel's prior portion of the fab in Manassas, and IM Flash Singapore, with continued shared ownership of the Lehi, Utah fab (Micron 51% ownership). In June 2006, Micron acquired Lexar Media, a manufacturer of Flash memory products. DRAM, NAND, and NOR prices are a function of supply and demand, and are subject to extreme volatility, impacting revenues and operating profitability.

Figure 467. Micron Tech (MU) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	5841.0	4803.0	8482.0	8788.0	8233.6	8681.8	8595.5	10454.4	10031.3
- y/y growth	2.7%	-17.8%	76.6%	3.6%	-6.3%	5.4%	4.4%	20.4%	16.7%
Gross Margins	-0.9%	-9.1%	32.0%	20.0%	11.8%	21.3%		34.7%	
Operating Margins	-19.0%	-32.5%	18.7%	4.2%	-7.5%	2.9%		16.7%	
EPS	-2.10	-2.32	1.76	0.16	-1.04	-0.42	-0.44	1.24	0.65
- y/y growth	-386.3%	-10.8%	175.9%	-90.8%	-739.7%	59.8%	58.2%	395.7%	250.1%
Cash	1362.0	1485.0	2913.0	2160.0	2559.0	2003.2		2863.3	
Debt	2726.0	2803.0	2360.0	2001.0	3262.0	3651.0		2803.0	
Net Cash/Shr	-1.4	-1.1	1.2	0.3	-0.5	-0.4		0.4	
Tangible Book Value/Shr	7.5	5.8	8.7	8.2	7.4	6.9		8.2	

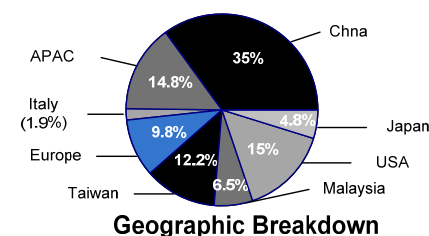
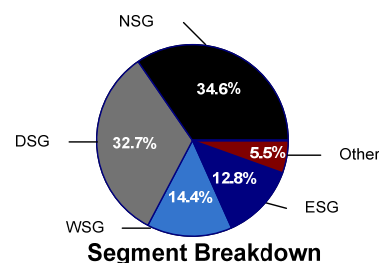
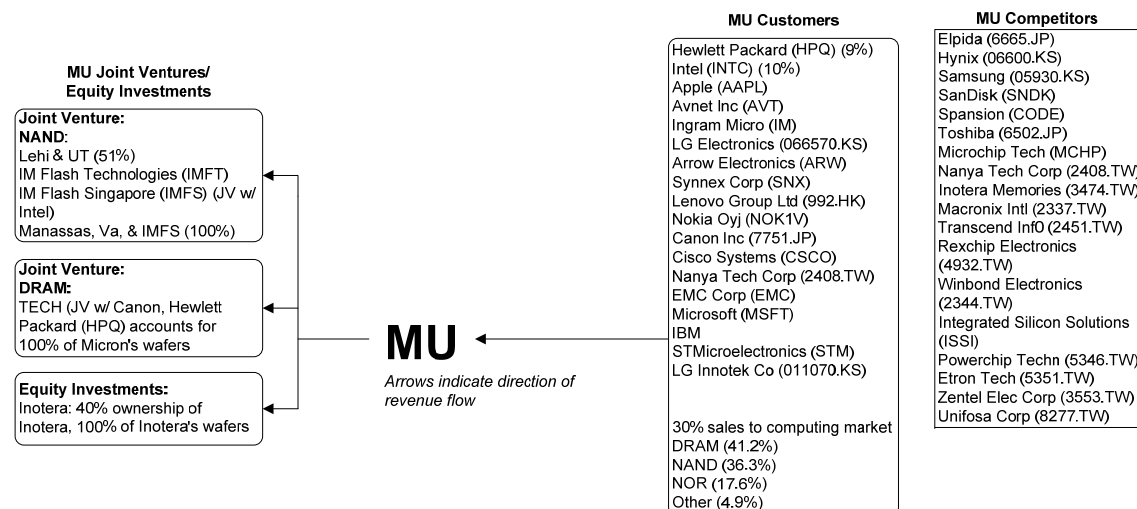
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 468. Micron (MU)

Sector: Semiconductors

Micron (MU)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Kota Ezawa

Mitsubishi Electric

Mitsubishi Electric Corp. engages in the manufacture, development, and sale of electric and electronic equipment. It operates in the following business segments: Energy and Electric Systems, Industrial Automation Systems, Information and Communication Systems, Electronic Devices, Home Appliances, and Others. The Energy and Electric Systems segment offers power and transportation systems, elevators, escalators, and supervisory control systems. The Industrial Automation Systems segment covers industrial automation products and systems, measurement and control systems, automotive and electronic products, and car multimedia systems. The Information and Communication Systems segment includes wireless, closed circuit television, space, and satellite communication systems, antennas, radar devices, and information communications network systems. The Electronic Devices segment offers power, high frequency, and optical devices; and liquid crystal displays. The Home Appliances segment covers air-conditioning and photovoltaic power generation systems, televisions, recorders, and players. The Other segment provides material procurement, logistics, real estate, advertising, and financial services. The company was founded on January 15, 1921 and is headquartered in Tokyo, Japan.

Figure 469. Mitsubishi Electric (6503.JP) Results and Forecasts

	2009	2010	2011	2012	2013	CIR 2014E	Street 2014E	CIR 2015E	Street 2015E
Revenues	3665119.0	3353298.0	3645331.0	3639468.0	3523000.0	3591000.0	3698827.0	3693000.0	3832790.0
- y/y growth	-9.5%	-8.5%	8.7%	-0.2%	-3.2%	1.9%	5.0%	2.8%	3.6%
Gross Margins	26.0%	25.3%	28.0%	27.8%	27.5%	27.9%		28.3%	
Operating Margins	3.8%	2.8%	6.4%	6.2%	4.7%	5.3%		6.0%	
EPS	5.67	13.18	58.00	52.20	31.86	60.83	59.56	69.17	68.55
- y/y growth	-92.3%	132.5%	340.0%	-10.0%	-39.0%	90.9%	86.9%	13.7%	15.1%
Cash	358616.0	391118.0	472067.0	392181.0	432000.0	515000.0		592000.0	
Debt	677864.0	537500.0	484352.0	542291.0	630000.0	630000.0		630000.0	
Net Cash/Shr	-3.9	-8.1	88.7	23.5	47.5	86.2		122.0	
Tangible Book Value/Shr	223.4	308.5	358.3	426.5	469.0	518.0		574.8	

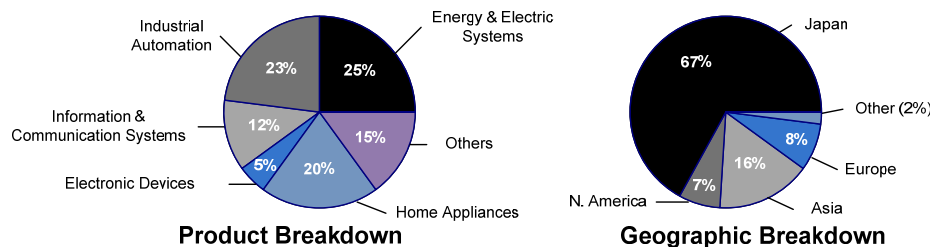
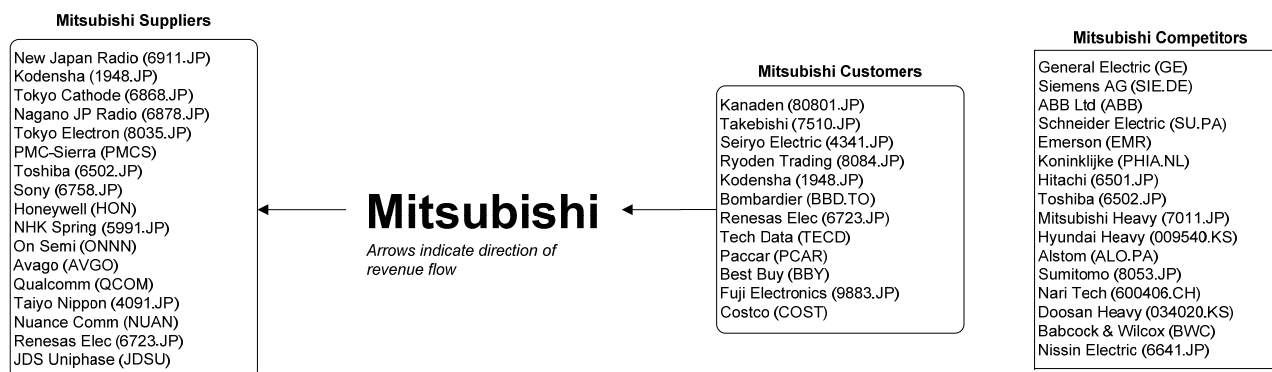
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 470. Mitsubishi Electric (6503.JP)

Sector: Technology - General

Mitsubishi Electric (6503.JP)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Yuta Fukasawa

Mitsumi Electric

Mitsumi Electric Co., Ltd. engages in the manufacture and sale of electrical components and telecommunications equipment. Its products include electronic parts, semiconductor devices, mechanical parts, measurement equipment, optical products, medical and hygienic equipment, metals, and ceramics. The company was founded on April 16, 1949 and is headquartered in Tama, Japan.

Figure 471. Mitsumi Electric (6767.JP) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	301944.0	247734.0	207536.0	187418.0	167207.0	153492.0	150123.0	155800.0	161517.0
- y/y growth	7.1%	-18.0%	-16.2%	-9.7%	-10.8%	-8.2%	-10.2%	1.5%	7.6%
Gross Margins	16.1%	14.4%	11.4%	4.0%	1.8%	4.3%		6.7%	
Operating Margins	11.0%	8.4%	4.5%	-2.7%	-5.0%	-2.6%		0.0%	
EPS	278.96	127.57	67.50	-40.50	-324.01	-116.57	-124.72	-13.72	-2.86
- y/y growth	115.0%	-54.3%	-47.1%	-160.0%	-700.0%	64.0%	61.5%	88.2%	97.7%
Cash	32752.0	38955.0	57247.0	45115.0	58178.0	54615.2		52891.3	
Debt	9941.0	7242.0	5675.0	5072.0	5013.0	5281.0		5281.0	
Net Cash/Shr	360.2	445.4	654.6	515.9	665.3	624.5		604.8	
Tangible Book Value/Shr	1619.3	1673.8	1698.5	1596.1	1246.8	1150.5		1136.8	

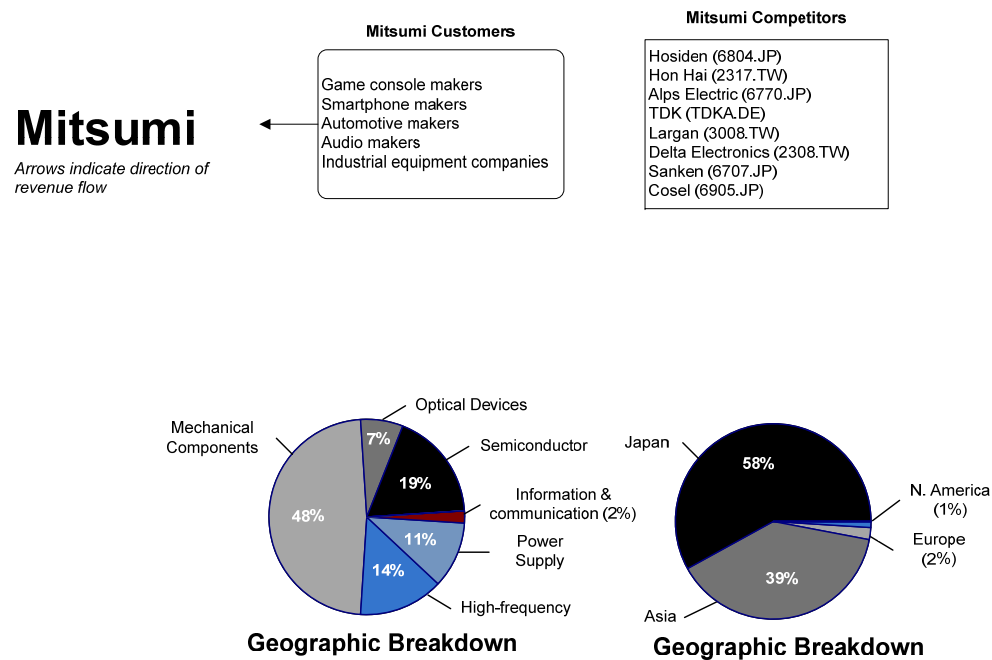
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 472. Mitsumi (6767.JP)

Sector: Electronic Components

Mitsumi Electric (6767.JP)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jim Suva, CPA

Molex Inc

Molex Inc (MOLX included in the S&P 500 with voting rights and MOLXA not included in the S&P 500 and does not have voting rights but both classes of stock receive the same dividend payment) is the third-largest global connector company, behind Tyco and Amphenol, with 8% market share. It manufactures electronic, electrical and fiber optic interconnection systems, ribbon cable, switches, and application tooling. It sells to greater than 7,500 customers (i.e., OEMs, EMS, and distributors). Large customers include Cisco, Ford, Hewlett-Packard, IBM, Matsushita, Motorola, Nokia, Samsung, Siemens, Sony, and Toyota. It is the market leader in the consumer electronics segment (13% of revenues) and is ranked No. 3 in the computer and peripheral segment, according to Bishop Report. Other end-market exposure includes 27% telecom, 28% data, 16% automotive, 11% industrial, and 4% medical. It designs, manufactures and sells over 100,000 products, and only has one customer accounts for more than 10% of sales. Competitors include Tyco, FCI, Amphenol, Delphi, JST, and Hon Hai.

Figure 473. Molex (MOLX) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	3328.3	2581.8	3007.2	3587.3	3489.2	3628.8	3625.3	3780.0	3819.6
- y/y growth	1.9%	-22.4%	16.5%	19.3%	-2.7%	4.0%	3.9%	4.2%	5.4%
Gross Margins	30.5%	25.4%	29.7%	30.3%	30.6%	29.5%		29.8%	
Operating Margins	10.5%	2.7%	9.4%	12.4%	11.8%	10.7%		11.6%	
EPS	1.43	0.29	1.12	1.76	1.61	1.51	1.46	1.64	1.67
- y/y growth	0.7%	-79.7%	286.2%	57.1%	-8.5%	-6.2%	-9.1%	8.6%	13.9%
Cash	509.8	467.9	394.9	546.5	652.2	679.7		715.5	
Debt	213.0	254.7	293.5	342.6	255.0	403.7		403.7	
Net Cash/Shr	2.0	2.5	1.2	1.8	2.8	2.0		2.2	
Tangible Book Value/Shr	12.8	11.1	10.7	12.7	13.0	13.3		13.8	

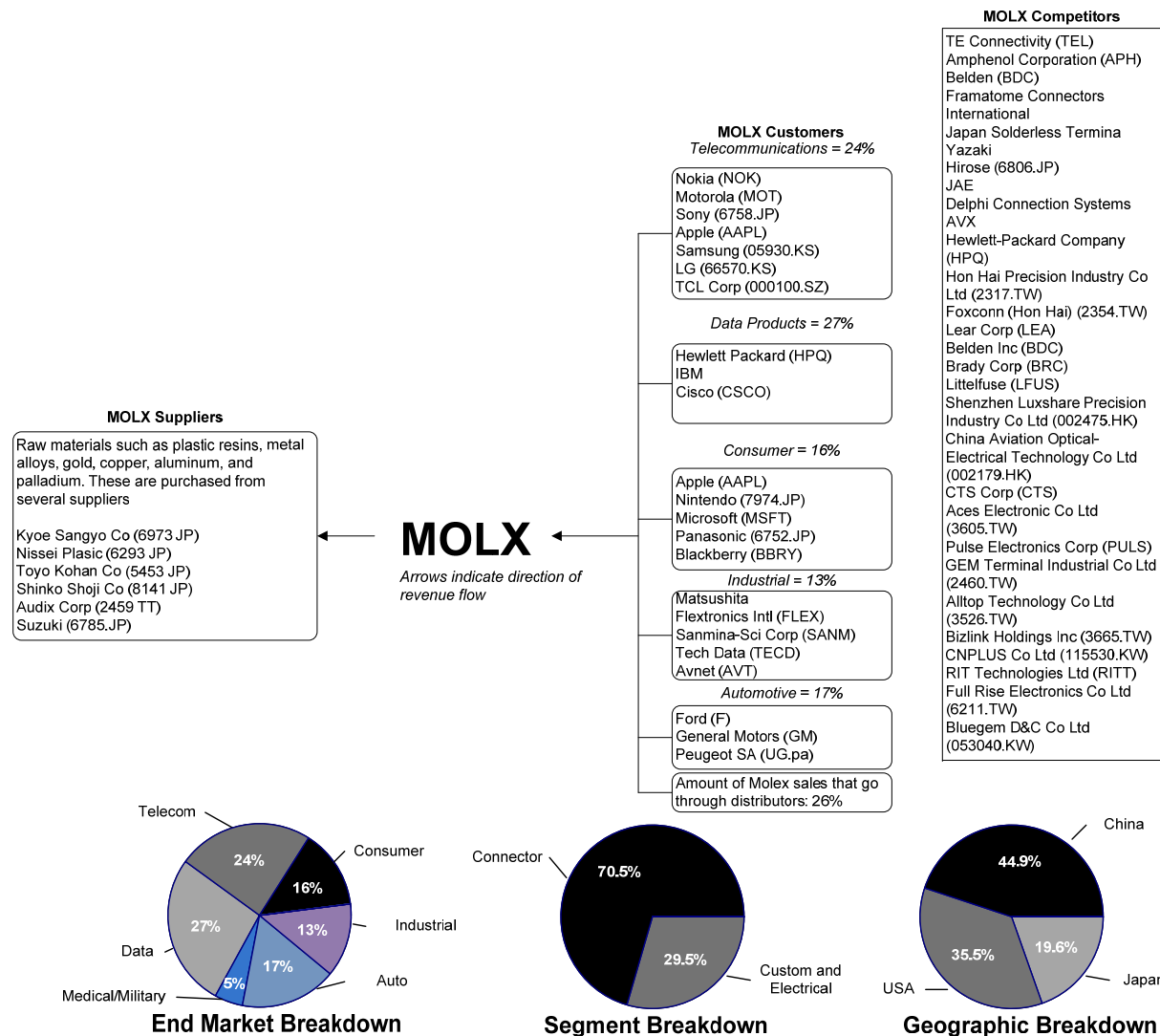
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 474. Molex (MOLX)

Sector: Technology Supply Chain - Connectors

Molex (MOLX)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jim Suva, CPA

Motorola Solutions Inc

Motorola Solutions, Inc. provides mission-critical communication infrastructure, devices, software and services. It operates under two segments: Government segment and Enterprise segment. The Government segment (~70% of revenues) designs, manufactures, sells, and provides services around voice and data communications systems, devices, security products and applications. This segment sells public safety communications systems, commercial two-way radio systems, devices, and software. The Enterprise segment (~30% of revenues) designs, manufactures, sells and provides services around rugged and enterprise-grade mobile computers, including tablets, data capture devices, security products and applications, and wireless local area network and integrated digital enhanced network infrastructure. The company was founded on September 25, 1928 and is headquartered in Schaumburg, IL. It has about 22,000 employees

From a regional perspective, North America represented 58% of total revenues, followed by EMEA at 21%, APAC at 13% and Latin America and 9%. Major competitors include Alcatel Lucent, Cassidian, Harris, Hytera, Sepura, Tait, Apple, Hewlett Packard, Aruba Networks, EADS, Kenwood, EF Johnson, Intermec, Honeywell and Cisco.

The company targets a long-term growth rate of 5-8% comprised of 5%+ CAGR in the core markets (radio products and systems, mobile computing, data capture products, system integration and lifecycle services) and 15%+ CAGR in the growth markets (next generation public safety, integrated command and control, mobile broadband devices, networking and converged communications and advanced services).

Figure 475. Motorola Solutions (MSI) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	8140.0	6947.0	7617.0	8203.0	8698.0	8965.5	8948.0	9411.2	9405.6
- y/y growth		-14.7%	9.6%	7.7%	6.0%	3.1%	2.9%	5.0%	5.1%
Gross Margins	50.2%	51.2%	50.0%	50.5%	50.8%	51.7%		53.8%	
Operating Margins	15.7%	14.0%	14.0%	16.7%	17.3%	18.1%		19.0%	
EPS	2.46	1.37	1.84	2.61	3.20	3.74	3.62	4.33	4.19
- y/y growth		-44.3%	34.5%	41.7%	22.7%	16.6%	13.1%	15.9%	15.6%
Cash	6950.0	7963.0	8863.0	5091.0	3603.0	4251.3		4240.9	
Debt	4184.0	3901.0	4656.0	1535.0	1863.0	2454.0		2450.0	
Net Cash/Shr	8.8	13.9	19.7	11.6	5.9	6.6		7.0	
Tangible Book Value/Shr	19.6	16.7	24.5	11.3	6.0	5.6		6.5	

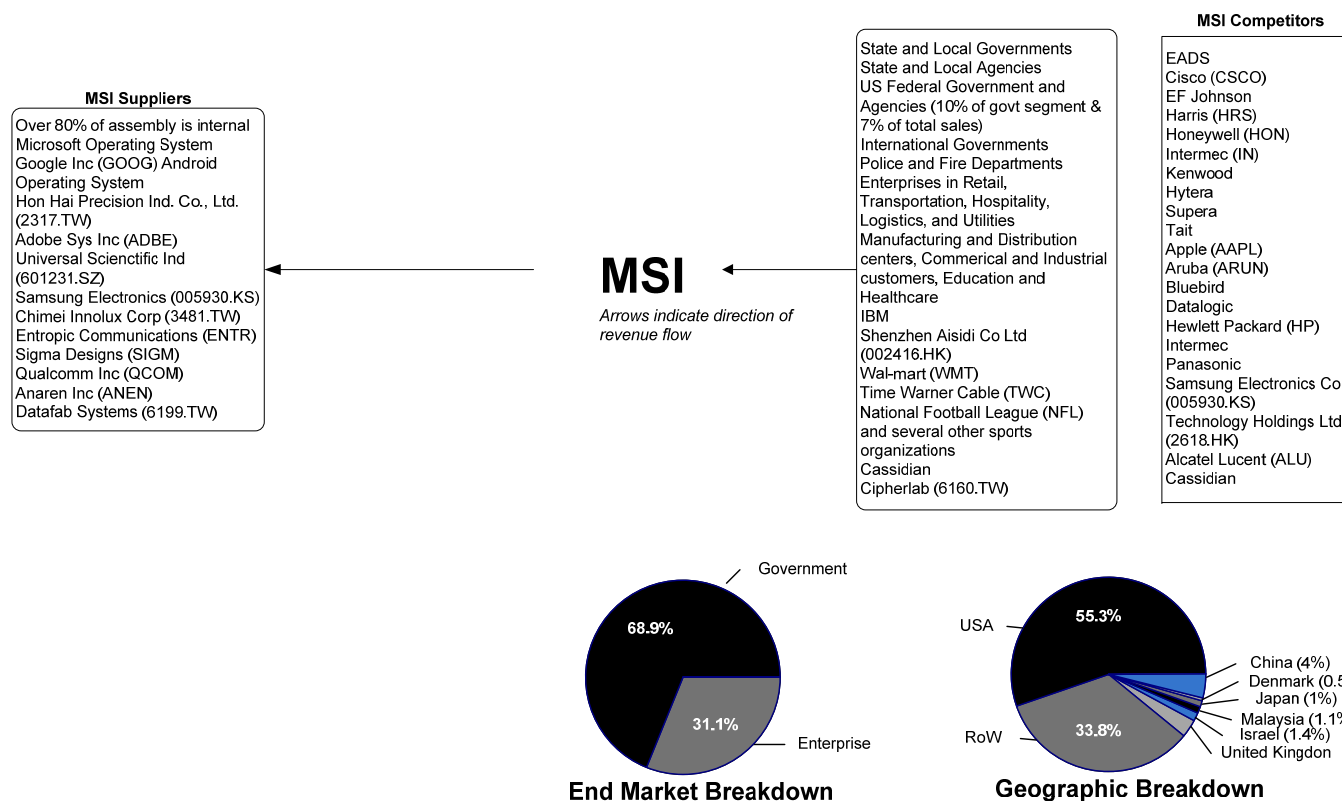
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 476. Motorola Solutions (MSI)

Sector: Communications Equipment

Motorola Solutions (MSI)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Yuta Fukasawa

Murata

Murata Manufacturing Co., Ltd. engages in research, development, manufacture, and sale of electronic components and devices made from fine ceramics. It operates through the following divisions: Components, Modules, and Other. The Components division offers capacitors and piezoelectric products. The Modules segment provides communication modules and power supplies. The Other segment handles employee welfares, staffing, education and training, and facility maintenance services, including operational software for affiliates. The company was founded in October 1944 and is headquartered in Nagaokakyo, Japan.

Figure 477. Murata (6981.JP)

	2009	2010	2011	2012	2013	CIR 2014E	Street 2014E	CIR 2015E	Street 2015E
Revenues	523946.0	530819.0	617954.0	584662.0	678352.0	780500.0	782076.0	828600.0	835068.0
- y/y growth	-17.1%	1.3%	16.4%	-5.4%	16.0%	15.1%	15.3%	6.2%	6.8%
Gross Margins	24.0%	27.9%	32.8%	29.2%	28.5%	30.0%		26.1%	
Operating Margins	-3.1%	5.0%	12.5%	7.7%	7.7%	10.9%		10.6%	
EPS	16.48	115.35	249.23	144.35	173.88	284.23	334.59	275.99	392.66
- y/y growth	-95.3%	599.9%	116.1%	-42.1%	20.5%	63.5%	92.4%	-2.9%	17.4%
Cash	223428.0	163467.0	150446.0	144066.0	189605.3	213439.1		233496.4	
Debt	9259.0	5489.0	8889.0	37196.0	56880.0	56880.0		56880.0	
Net Cash/Shr	1026.1	761.6	696.1	643.2	857.8	969.5		1063.5	
Tangible Book Value/Shr	3372.6	3417.2	3528.7	3392.2	3642.1	3811.3		3972.8	

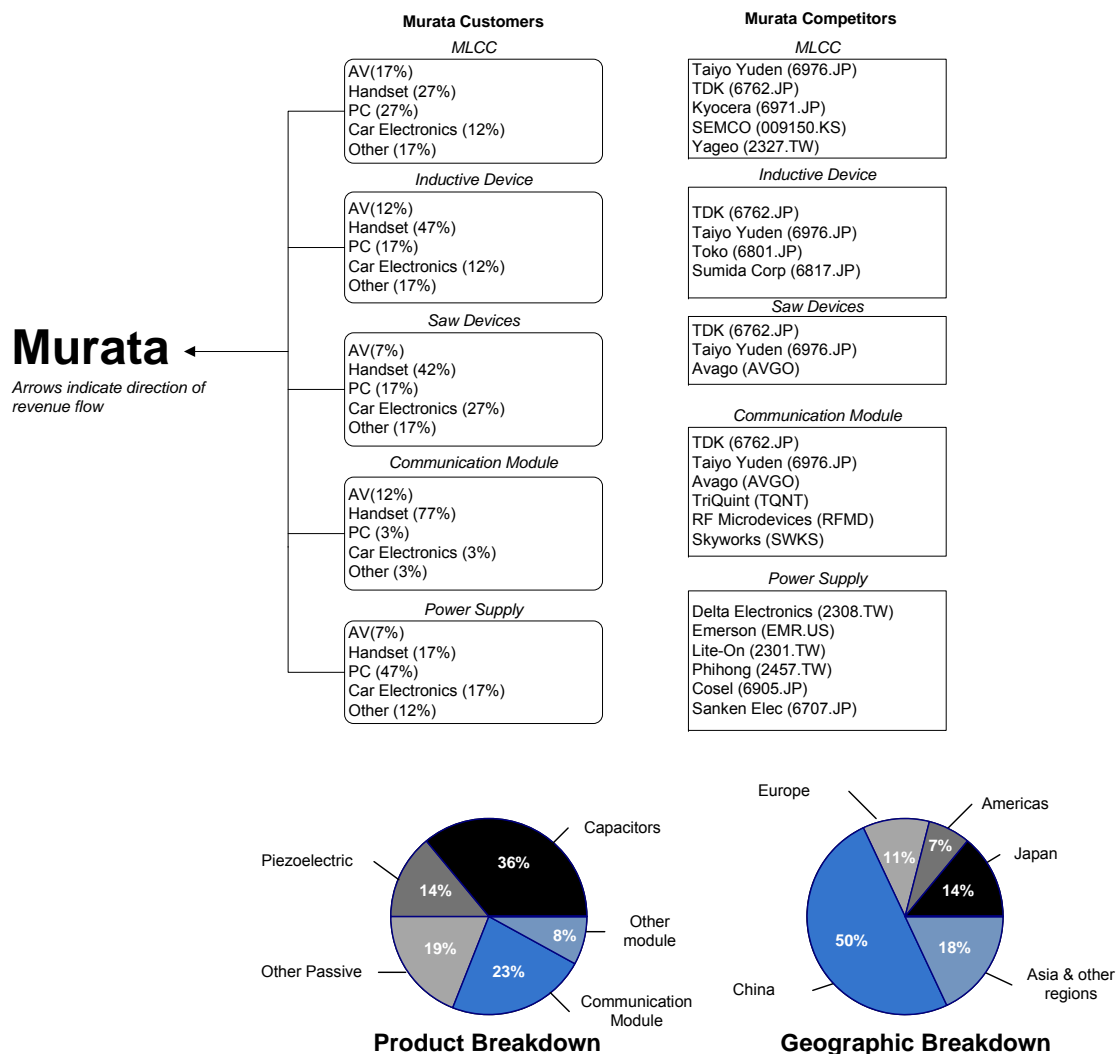
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 478. Murata (6981.JP)

Sector: Electronic Components

Murata (6981.JP)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Nan Ya PCB

Established in 1997, Nan Ya PCB is a technology subsidiary of the Formosa Plastics Group. Nan Ya PCB's main products include conventional PCB, HDI, Flip Chip substrate (specializing in FC BGA), Wire Bond Substrate, etc. The company has manufacturing sites in Taiwan and Kunshan, China.

Figure 479. Nan Ya PCB (8046.TW) Results and Forecasts

	2008	2009	2010	2011	2012	Street 2013E	Street 2014E
Revenues	38318.7	27563.8	36462.1	38784.5	29723.0	30702.37	34967.2
- <i>y/y growth</i>	-4.6%	-28.1%	32.3%	6.4%	-23.4%	3.3%	13.9%
Gross Margins	23.1%	12.4%	11.5%	12.7%	-3.7%		
Operating Margins	18.9%	7.8%	6.3%	7.6%	-9.6%		
EPS	10.24	3.24	3.20	4.90	-3.19	0.40	1.83
- <i>y/y growth</i>	-22.1%	-68.3%	-1.3%	53.1%	-165.1%	112.7%	352.6%
Cash	7977.33	3200.59	9412.96	11890.36	9802.41		
Debt	3977.82	3512.68	3240.66	3144.35	2946.20		
Net Cash/Shr	18.01	7.71	5.33	11.71	2.42		
Tangible Book Value/Shr	55.05	54.33	50.86	53.75	47.72		

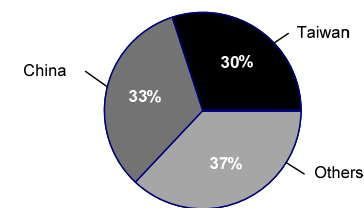
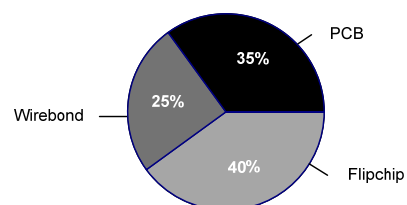
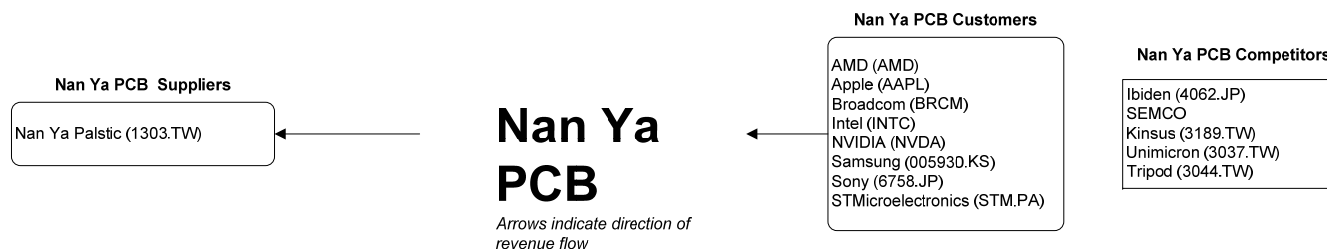
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 480. Nan Ya PCB (8046.TW)

Sector: Electronic Components

Nan Ya PCB (8046.TW)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Kota Ezawa

NEC

NEC Corp. engages in the provision of systems, components, services, and integrated solutions for computing and communications applications. It operates through the following segments: Information Technology (IT) Services, Platform, Carrier Network, Social Infrastructure, Personal Solutions, and Other. The IT Services segment provides systems integration, maintenance and support, cloud, and outsourcing services. The Platform segment manufactures and sells IT and internet protocol telephony systems, and enterprise network systems implementation products such as servers, supercomputers, storage equipment, software, and softphones. The Carrier Network segment produces and merchandises network infrastructure, and provides services and management to telecommunications carriers. The Social Infrastructure segment manufactures and sells systems for broadcasting and video distribution, control, transportation and public networks, fire and disaster prevention, aerospace, and defense. The Personal Solutions segment supplies mobile handsets, personal computers, internet services, and monitors; and creates new devices and services for cloud computing. The Other segment manufactures and sells lithium-ion rechargeable batteries, electronic components, liquid crystal display panels, and lighting equipment. The company was founded on July 17, 1899 by Kunihiko Iwadare and is headquartered in Tokyo, Japan

Figure 481. NEC (6701.JP) Results and Forecasts

	2009	2010	2011	2012	2013	CIR 2014E	Street 2014E	CIR 2015E	Street 2015E
Revenues	4215603.0	3583148.0	3115424.0	3036836.0	3150500.0	3124400.0	3158749.0	3129565.0	3192122.0
- y/y growth	-8.7%	-15.0%	-13.1%	-2.5%	3.7%	-0.8%	0.3%	0.2%	1.1%
Gross Margins	30.5%	30.4%	29.4%	29.9%	30.5%	31.0%		31.2%	
Operating Margins	-0.1%	1.4%	1.9%	2.4%	4.2%	4.1%		4.2%	
EPS	-137.48	4.30	-4.82	-42.44	13.85	17.51	19.11	17.51	20.47
- y/y growth	-1408.5%	103.1%	-212.1%	-780.9%	132.6%	26.4%	37.9%	0.0%	7.1%
Cash	318035.0	331842.0	205419.0	253850.0	254819.1	282088.7		307886.1	
Debt	897137.0	697048.0	661518.0	684934.0	655014.0	604934.0		554934.0	
Net Cash/Shr	-127.6	-31.9	-51.0	-92.1	-79.0	-58.9		-39.3	
Tangible Book Value/Shr	206.4	220.2	211.2	175.2	183.7	204.8		225.4	

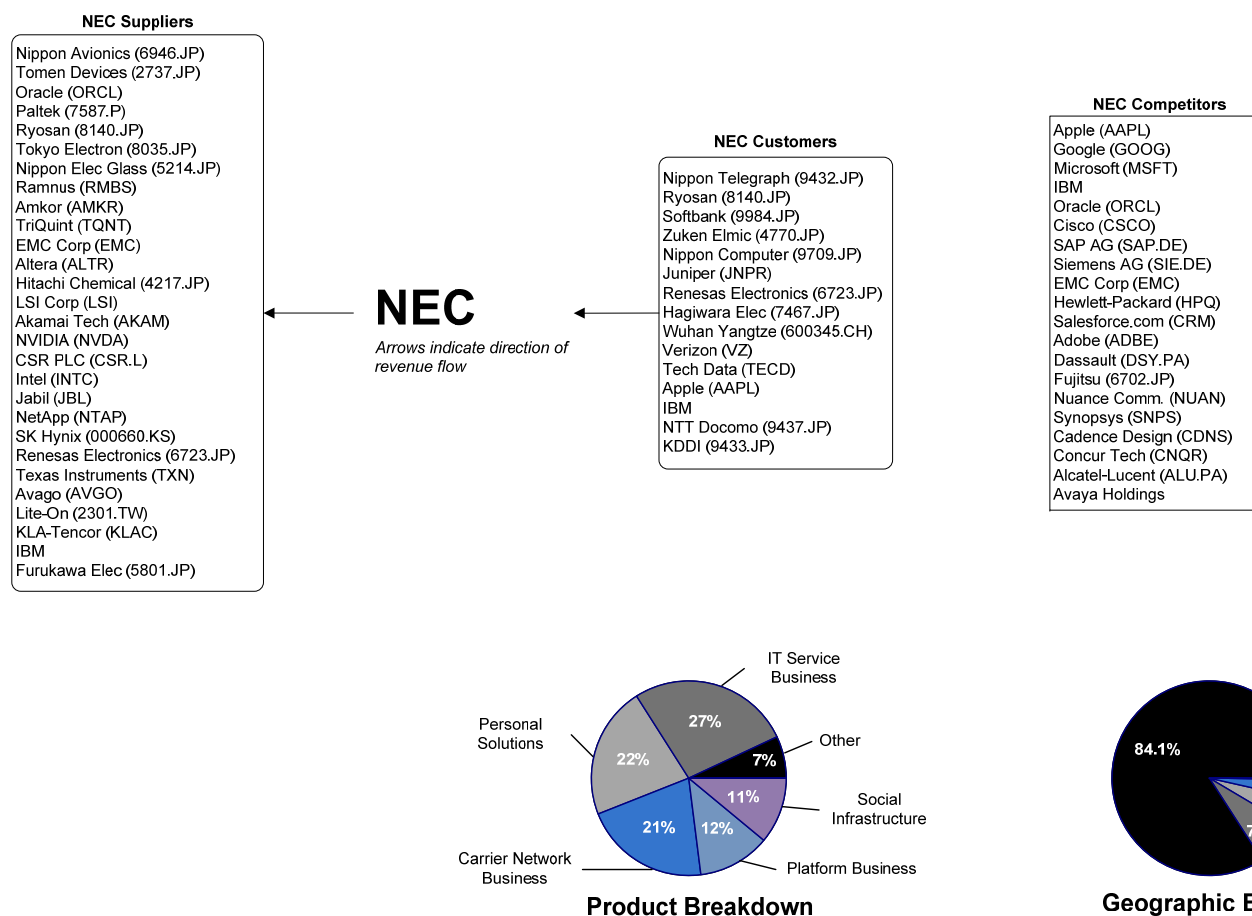
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 482. NEC (6701.JP)

Sector: Technology - General

NEC (6701.JP)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jim Suva, CPA

NetApp Inc

Founded in 1992, NetApp is a leading provider of networked storage and data management solutions addressing both the SAN and NAS markets, providing unified storage systems that support both FC/iSCSI SAN protocols as well as file-based storage protocols (NFS, CIFS). It provides a broad portfolio of application, cloud, and service provider solutions that help customers streamline operations and lower the costs associated with storing and managing their data. The company pioneered the network attached storage, or NAS, appliance market. The company's products are largely comprised of industry standard hardware components, but leverage a unique operating system and file system (ONTAP), a highly scalable and flexible operating system that concurrently supports any mix of storage area network and network-attached storage environments. NetApp's Data ONTAP operating system provides the foundation to build a shared storage infrastructure and an enterprise-wide data fabric for the full breadth of business applications and data storage and protection requirements. The company's portfolio of efficiency technologies helps its customers reduce their storage spending and get more from the storage assets they already own. Product sales comprised 67% of total revenues in FY2012 while software and services 13% and 20% respectively of total revenues in FY 2012. Based in Sunnyvale CA, NetApp has approximately 12,150 employees globally.

Figure 483. NetApp (NTAP) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	3303.2	3535.1	3931.4	5041.6	6233.2	6375.7	6370.7	6798.0	6924.4
- y/y growth		7.0%	11.2%	28.2%	23.6%	2.3%	2.2%	6.6%	8.7%
Gross Margins	62.1%	61.1%	65.0%	65.6%	60.9%	60.4%		60.2%	
Operating Margins	15.0%	11.6%	16.1%	19.3%	17.8%	15.3%		15.5%	
EPS	1.26	1.09	1.51	2.11	2.41	2.27	2.28	2.48	2.54
- y/y growth		-13.5%	38.4%	40.1%	14.1%	-6.0%	-5.5%	9.6%	11.4%
Cash	1164.4	2604.2	3724.0	5174.7	5398.5	6811.4		7143.6	
Debt	318.7	1429.5	1273.4	1343.3	1471.8	2464.5		2464.5	
Net Cash/Shr	2.3	3.5	6.9	12.6	13.3	15.1		16.5	
Tangible Book Value/Shr	2.7	2.8	5.3	8.2	8.7	10.1		11.0	

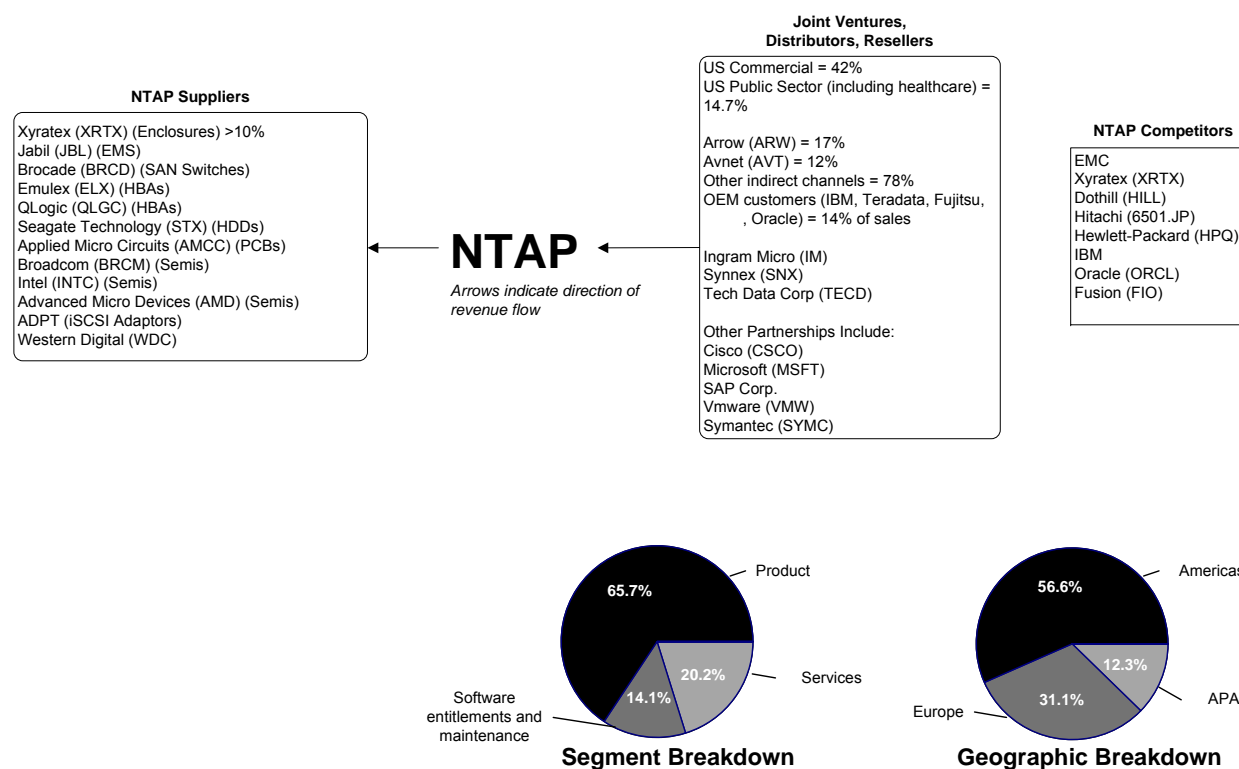
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 484. NetApp (NTAP)

Sector: Storage

NetApp, Inc. (NTAP)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Yuta Fukasawa

Nidec

NIDEC CORP. engages in the design, development, manufacture, and sale of electric motor drives and related components. It operates in the following divisions: Small Precision Motors, General Motors, Machinery, Electronic and Optical Components, and Other. The Small Precision Motors division includes spindle motors for hard disk drives, brushless direct-current motors and fans for optical disk drives, computers, and game machines, and other small precision motors for mobile phones and other products. The General Motors division consists of motors for automobiles, electric household appliances, and industrial equipment. The Machinery division comprises of test systems, measuring devices, power transmission equipment, factory automation systems, card readers, and industrial robots. The Electronic and Optical Components division offers camera shutters, lens units, switches, trimmer potentiometers, motor-driven actuator units, and precision plastic mold products. The Other division provides auto parts, pivot assemblies, and other services. The company was founded by Shigenobu Nagamori on July 23, 1973 and is headquartered in Kyoto, Japan

Figure 485. Nidec (6594.JP) Results and Forecasts

	2009	2010	2011	2012	2013	CIR 2014E	Street 2014E	CIR 2015E	Street 2015E
Revenues	610803.0	586029.0	675988.0	682320.0	700260.0	796300.0	773725.0	831600.0	828971.0
- y/y growth	-16.2%	-4.1%	15.4%	0.9%	2.6%	13.7%	10.5%	4.4%	7.1%
Gross Margins	21.3%	25.8%	26.0%	23.2%	14.6%	18.1%		18.9%	
Operating Margins	8.5%	13.4%	13.7%	10.7%	2.9%	7.7%		8.8%	
EPS	194.12	373.04	362.80	276.89	26.73	299.99	360.86	358.82	453.34
- y/y growth	-29.7%	92.2%	-2.7%	-23.7%	-90.3%	1022.1%	1249.8%	19.6%	25.6%
Cash	203898.0	127200.0	97066.0	138100.0	176943.0	176999.7		199529.1	
Debt	225803.0	118709.0	154961.0	188518.0	313263.0	313263.0		313263.0	
Net Cash/Shr	1378.3	900.7	-33.0	250.6	202.2	202.6		356.7	
Tangible Book Value/Shr	1482.9	1771.1	1715.3	1835.8	1632.4	1850.6		2118.7	

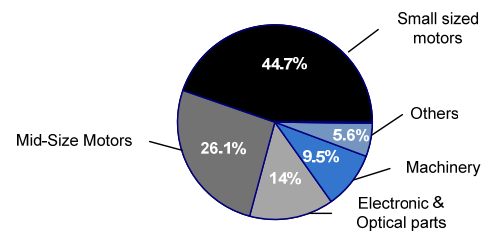
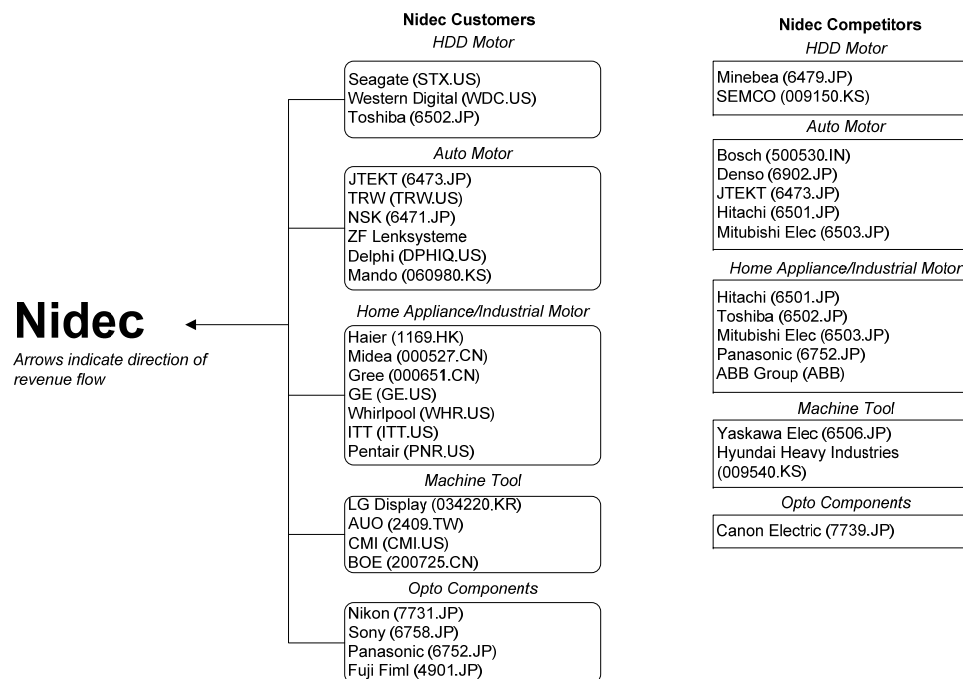
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

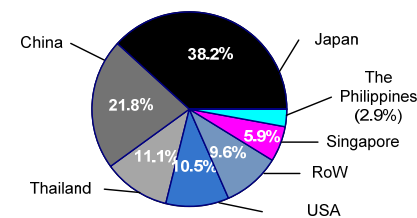
Figure 486. Nidec (6594.JP)

Sector: Electronic Components

Nidec (6594.JP)



Product Breakdown



Geographic Breakdown

Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Masahiro Shibano

Nikon

Nikon Corp. engages in the manufacture and sale of optical instruments. It operates through the following segments: Precision Equipment, Imaging Products, Instruments, and Other. The Precision Equipment segment covers products and services related to integrated circuit and liquid crystal display steppers. The Imaging Products segment manufactures and sells imaging products and peripherals such as digital single-lens reflex cameras, compact digital cameras, and interchangeable camera lenses. The Instruments segment offers microscopes, measuring, and inspection equipment. The Other segment includes glass, sport optics, and customized products business. The company was founded on July 25, 1917 and is headquartered in Tokyo, Japan.

Figure 487. Nikon (7731.JP) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	955791.0	879719.0	785498.0	887512.0	918651.0	989310.0	991537.0	1063800.0	1077547.0
- y/y growth	16.2%	-8.0%	-10.7%	13.0%	3.5%	7.7%	7.9%	7.5%	8.7%
Gross Margins	42.3%	36.2%	29.7%	35.2%	38.3%	33.2%		34.4%	
Operating Margins	14.1%	5.5%	-1.8%	6.1%	8.7%	5.1%		8.3%	
EPS	188.99	70.51	-31.82	68.89	149.57	109.45	95.53	162.41	145.07
- y/y growth	32.5%	-62.7%	-145.1%	316.5%	117.1%	-26.8%	-36.1%	48.4%	51.9%
Cash	113973.0	80350.0	107680.0	181077.0	132404.0	125986.0		143786.0	
Debt	76533.0	106029.0	94801.0	81432.0	81250.0	81000.0		75000.0	
Net Cash/Shr	134.6	52.0	179.7	293.6	175.3	158.8		211.3	
Tangible Book Value/Shr	982.6	945.6	928.1	970.9	1081.7	1172.9		1287.1	

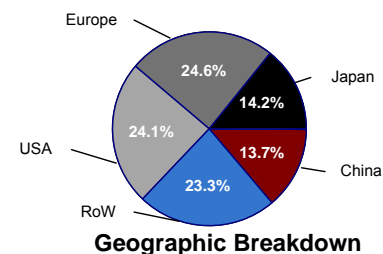
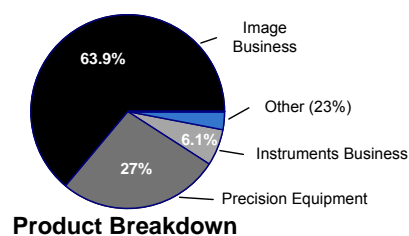
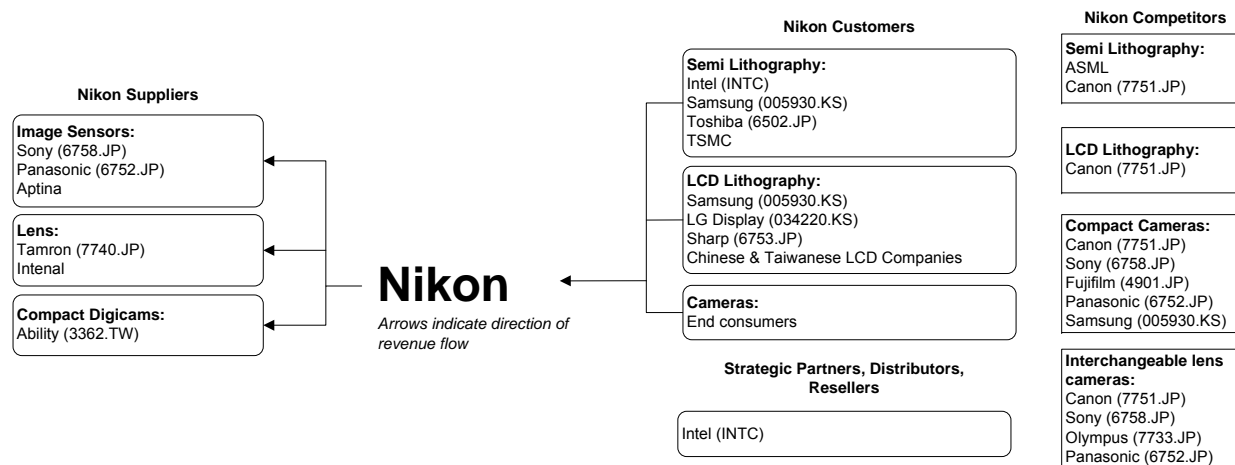
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 488. Nikon (7731.JP)

Sector: Imaging

Nikon Corp. (7731.JP)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Atsushi Ikeda

Nippon Electric Glass

Nippon Electric Glass Co., Ltd. engages in the production and sale of specialty glass products and glassmaking machinery. It operates through the Glass for Electronic and Information Devices and Glass for Others segments. The Glass for Electronic and Information Devices segment includes glass for display, electronic, and optical devices. The Glass for Others segment includes building materials, heat-resistant glass, and glass for lighting, medical and laboratory applications. The company was founded on October 31, 1944 and is headquartered in Otsu, Japan.

Figure 489. NEG (5214.JP) Results and Forecasts

	2009	2010	2011	2012	2013	CIR 2014E	Street 2014E	CIR 2015E	Street 2015E
Revenues	335662.0	332387.0	390195.0	338214.0	287400.0	267700.0	270355.0	257800.0	266476.0
- y/y growth	-8.9%	-1.0%	17.4%	-13.3%	-15.0%	-6.9%	-5.9%	-3.7%	-1.4%
Gross Margins	30.1%	35.8%	36.7%	26.5%	17.0%	13.1%		9.3%	
Operating Margins	22.8%	29.6%	30.1%	18.2%	7.7%	3.0%		-1.2%	
EPS	43.89	110.41	137.91	39.02	15.08	-2.81	13.18	-14.07	9.44
- y/y growth	-58.3%	151.6%	24.9%	-71.7%	-61.4%	-118.7%	-12.6%	-400.0%	-28.4%
Cash	96693.0	98081.0	118808.0	105827.0	109561.1	109622.8		102571.8	
Debt	109882.0	96826.0	91272.0	83811.0	85000.0	85000.0		85000.0	
Net Cash/Shr	103.9	82.0	138.8	131.5	139.9	140.0		125.8	
Tangible Book Value/Shr	701.6	808.7	932.1	945.5	948.4	929.3		905.0	

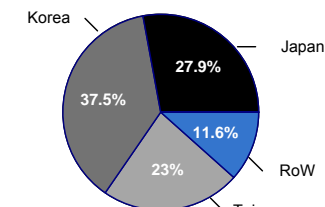
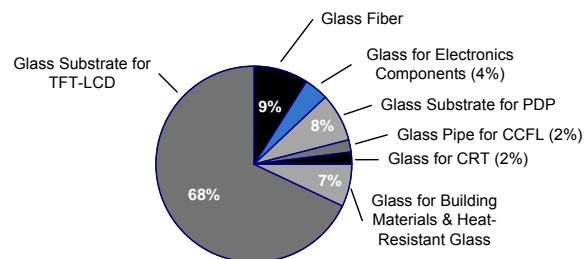
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 490. NEG (5214.JP)

Sector: Technology General

Nippon Electric Glass (5214.JP)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jim Suva, CPA

Nokia Oyj

Nokia is the second largest global market leader in mobile phones with approximately 20% market share and a ~5% global smart phone market share. The company has experience several competitive challenges from Samsung and Apple in recent years resulting in Nokia losing its position as the world's largest handset company when the company captured nearly 40% of the market in 2008. In 2011 Nokia made a key strategic decision to fully embrace Microsoft Windows phone operating system going ahead versus Nokia's previous Symbian operating system. As a result Nokia is in the midst of a major restructuring in both product and strategy. Nokia employs 97,000 staff globally with headquarters in Espoo, Finland. Nokia operates through the following segments: Devices and Services, Location and Commerce and Nokia Siemens Network. The Device and Services division accounts for ~52% of group revenues and is focused on developing smart phone, mass market phones and related services and applications. The Nokia Siemens Networks segment (~46% of revenues) provides a portfolio of mobile, fixed and converged network technology, as well as professional services including managed services, consultancy and systems integration, and deployment and maintenance services to operators and services providers. The Location & Commerce segment (~2% of revenues) includes the development of location-based products and services for consumers, as well as platform and local commerce services for feature phones and smart phones, device manufacturers, application developers, internet service providers, merchants, and advertisers.

Figure 491. Nokia (NOK1V) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	50710.0	40984.0	42448.0	38659.0	30175.6	25749.4	27110.2	28050.1	27917.2
- y/y growth	-0.7%	-19.2%	3.6%	-8.9%	-21.9%	-14.7%	-10.2%	8.9%	3.0%
Gross Margins	34.3%	32.4%	30.2%	29.3%	27.8%	30.3%		30.7%	
Operating Margins	13.9%	8.5%	7.6%	4.7%	0.4%	3.1%		5.7%	
EPS	1.34	0.66	0.61	0.29	-0.18	-0.05	0.01	0.15	0.14
- y/y growth	-9.8%	-50.9%	-7.6%	-52.3%	-161.0%	70.7%	104.5%	390.2%	1700.0%
Cash	6820.0	8873.0	12275.0	10902.0	9909.0	9986.9		10356.7	
Debt	4452.0	5203.0	5279.0	5321.0	5549.0	5622.0		5622.0	
Net Cash/Shr	1.6	1.2	2.2	1.9	1.3	1.8		1.9	
Tangible Book Value/Shr	1.0	1.3	1.8	1.5	0.7	0.7		0.8	

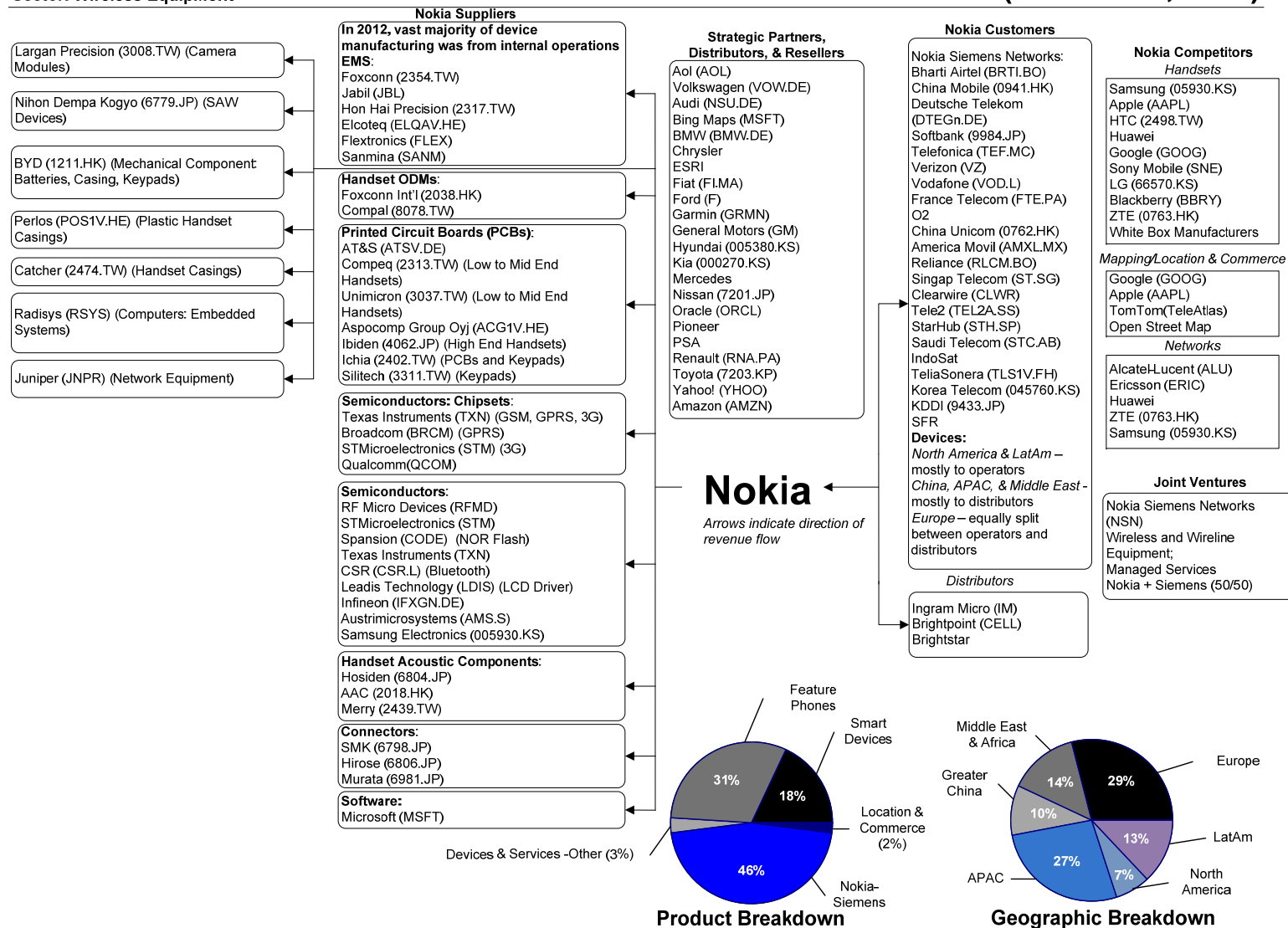
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 492. Nokia (NOK1V)

Sector: Wireless Equipment

Nokia (NOK1V.HE; NOK)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Roland Shu

Novatek

Novatek Microelectronics Corp., Ltd. designs, manufactures, and markets integrated circuits (ICs). The company's products are used in telecommunication, computer peripherals, consumer electronics, and LCD (liquid crystal display) drivers.

Figure 493. Novatek (3034.TW) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	26176.2	26996.8	36261.4	35034.3	37010.9	40011.6	43566.7	42411.3	48876.5
- <i>y/y growth</i>	-27.5%	3.1%	34.3%	-3.4%	5.6%	8.1%	17.7%	6.0%	12.2%
Gross Margins	29.2%	30.4%	26.9%	25.4%	28.0%	27.9%		27.3%	
Operating Margins	13.9%	15.0%	14.4%	12.1%	14.4%	14.5%		13.9%	
EPS	6.17	6.79	7.69	6.16	7.36	7.99	9.38	8.24	10.91
- <i>y/y growth</i>	-55.8%	10.0%	13.3%	-19.9%	19.5%	8.6%	27.6%	3.1%	16.3%
Cash	9612.0	14637.8	16003.3	16042.8	17835.4	19749.5		21058.4	
Debt	3174.0	6296.8	7897.5	7856.4	7347.1	5725.5		5779.0	
Net Cash/Shr	16.8	24.7	26.9	26.7	29.6	32.6		34.8	
Tangible Book Value/Shr	31.2	34.6	36.9	36.9	39.6	42.0		44.3	

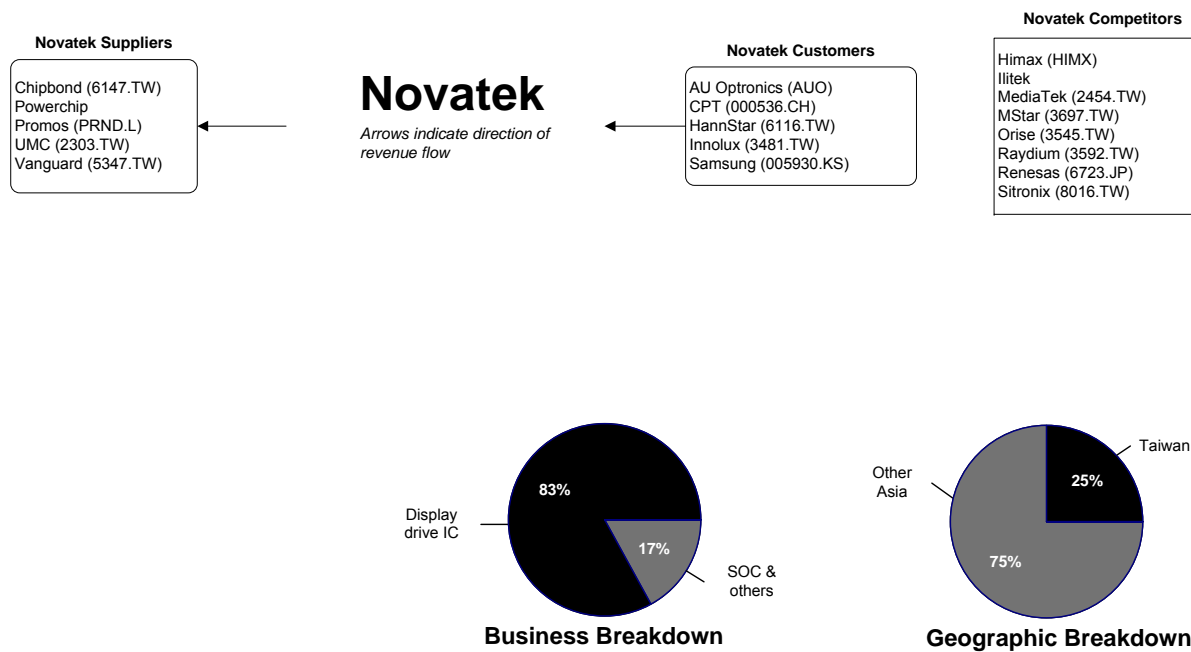
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 494. Novatek (3034.TW)

Sector: Semiconductors

Novatek (3034.TW)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Glen Yeung

NVIDIA Corp

Nvidia Corp (NVDA) is a fabless semiconductor company and a leading vendor of graphics processors predominantly used in PCs (desktop/notebook/servers), but also increasingly deployed in handsets, tablets, and game consoles. Nvidia's strength is in stand-alone (or discrete) graphics processors, and has made notable inroads into the applications processor market with its Tegra processors. Revenues are segmented into graphics processors (GPU), professional solutions (PSB), and consumer products (which includes Nvidia's Tegra family). Nvidia is headquartered in Santa Clara, California.

Figure 495. NVIDIA (NVDA) Results and Forecasts

	2009	2010	2011	2012	2013	CIR 2014E	Street 2014E	CIR 2015E	Street 2015E
Revenues	3424.9	3326.4	3543.3	3997.9	4280.2	4401.9	4226.3	4672.5	4564.6
- y/y growth	-16.4%	-2.9%	6.5%	12.8%	7.1%	2.8%	-1.3%	6.1%	8.0%
Gross Margins	34.4%	35.4%	39.8%	51.4%	52.0%	52.9%		52.6%	
Operating Margins	-1.9%	-3.0%	5.6%	16.2%	15.1%	13.5%		14.0%	
EPS	-0.09	-0.15	0.42	0.94	0.90	0.82	0.70	0.89	0.82
- y/y growth	-106.9%	-69.8%	372.5%	125.7%	-4.5%	-9.3%	-22.2%	9.6%	17.1%
Cash	1255.4	1728.2	2490.6	3129.6	3727.9	4150.7		4613.9	
Debt	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Net Cash/Shr	2.8	3.9	4.1	5.1	6.0	6.7		7.4	
Tangible Book Value/Shr	3.4	4.0	4.4	5.3	6.3	6.8		7.4	

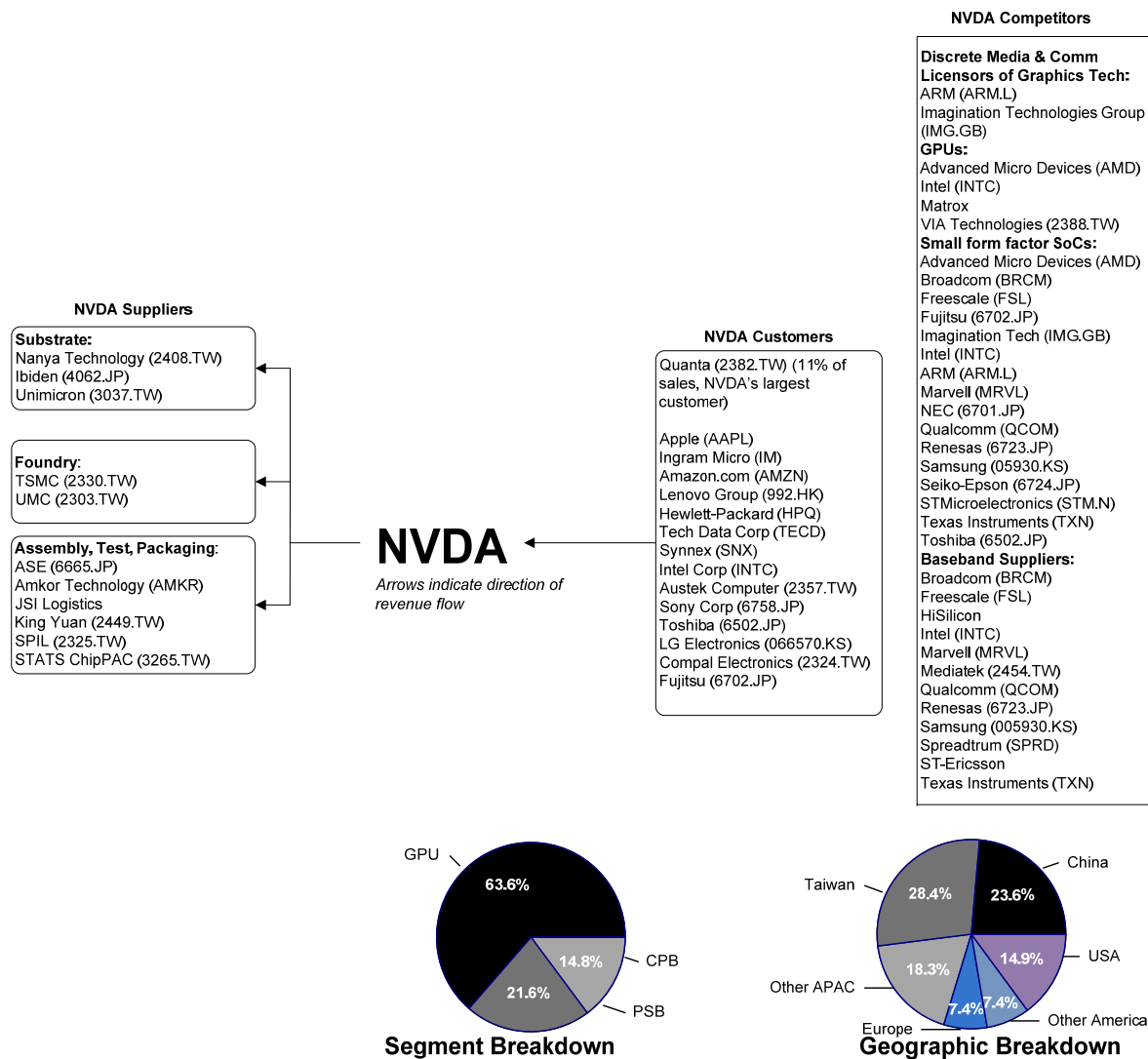
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 496. NVIDIA (NVDA)

Sector: Semiconductors

NVIDIA (NVDA)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Kevin Dennean, CFA

Oclaro Inc.

Oclaro was formed as a result of the April 2009 merger of Bookham and Avanex. The company is a leading provider optical components, subsystems and modules used in telecom equipment through its Telecom segment. Customers for its telecom products include leading OEMs such as Huawei (15% of FY11 sales), Alcatel-Lucent (11% of FY11) and other telecom equipment companies including Ciena, Nokia-Siemens, Ericsson, ZTE, Fujitsu, NEC, Tellabs, Infinera, and others. The company also provides a variety of complex optical components used in non-telecom applications including materials processing, printing, life sciences, biotechnology, and others.

Oclaro is highly vertically integrated, with four semiconductor fabs throughout the world (including three specialty fabs), and in-house package and test in Shenzhen, China. The company also has expertise in firmware and software development, and electronics R&D, all of which are incorporated into their products.

The company is headquartered in San Jose, California and has operations in the United Kingdom, Switzerland, Italy, the United States, and China.

Most Relevant Relationships: First full quarter post Opnext merger, Huawei, Alcatel-Lucent, and Cisco accounted for 10%, 10% and 11% of Oclaro revenue, respectively.

Figure 497. Oclaro (OCLR) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	235.5	230.6	392.5	467.4	385.5	606.1	612.8	675.0	690.1
- y/y growth	16.1%	-2.1%	70.2%	19.1%	-17.5%	57.2%	59.0%	11.4%	12.6%
Gross Margins	23.2%	23.4%	28.0%	26.8%	18.6%	13.2%		21.5%	
Operating Margins	-8.3%	-4.9%	3.8%	0.4%	-13.7%	-18.4%		-7.5%	
EPS	-0.68	-0.04	0.39	-0.10	-1.09	-1.33	-1.28	-0.54	-0.68
- y/y growth	84.1%	94.6%	1173.9%	-126.8%	-942.4%	-22.1%	-17.4%	59.2%	46.9%
Cash	50.7	53.8	107.2	62.8	61.8	72.7		29.0	
Debt	0.0	0.0	0.0	0.0	25.5	92.8		92.8	
Net Cash/Shr	2.7	2.3	2.3	1.3	1.2	0.6		0.1	
Tangible Book Value/Shr	6.6	3.7	4.8	3.9	2.7	1.4		0.7	

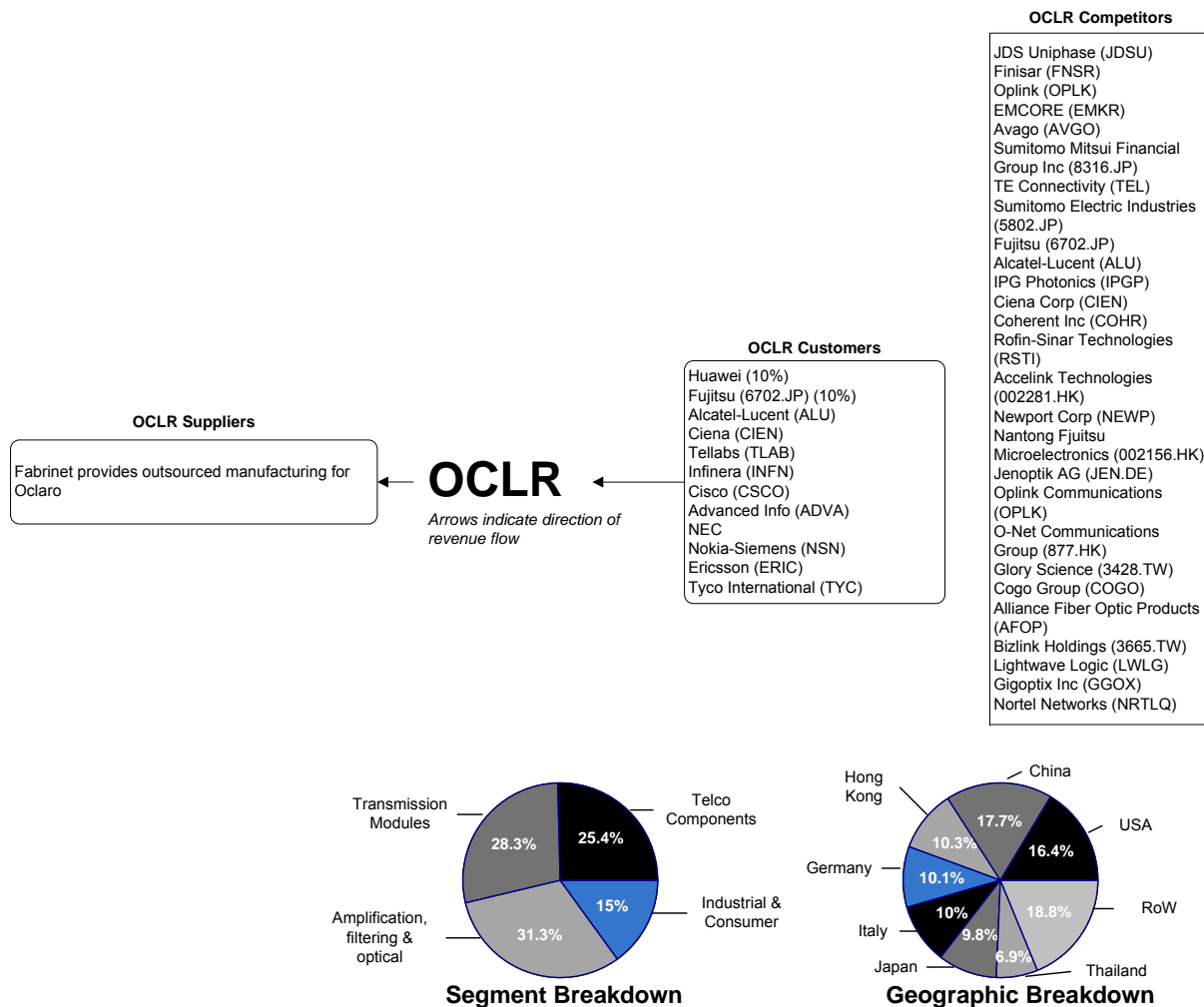
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 498. Oclaro (OCLR)

Sector: Communications Equipment

Oclaro Inc. (OCLR)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Masahiro Shibano

Olympus

Olympus Corp. is engaged in the manufacture and sale of precision machineries and instruments. It operates through the following segments: Medical Systems, Life Science and Industrial, Imaging Systems, Information and Communication, and Others. The Medical Systems segment covers endoscopes, and endoscopic surgery and therapy. The Life Science and Industrial segment manufactures and sells biological and industrial microscopes, industrial endoscopes, non-destructive testing equipment, and printers. The Imaging Systems segment deals with digital cameras and recording devices. The Information and Communication segment sells mobile terminals such as mobile phones. The Others segment includes biomaterial manufacturing and sales, and system development. The company was founded by Takeshi Yamashita on October 12, 1919 and is headquartered in Tokyo, Japan.

Figure 499. Olympus (7733.JP) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	1128875.0	980803.0	883086.0	847105.0	848548.0	736500.0	738585.0	661700.0	690203.0
- y/y growth	6.3%	-13.1%	-10.0%	-4.1%	0.2%	-13.2%	-13.0%	-10.2%	-6.6%
Gross Margins	45.1%	47.0%	46.2%	45.8%	45.2%	50.5%		61.2%	
Operating Margins	10.0%	4.4%	6.9%	4.5%	4.2%	4.8%		11.0%	
EPS	202.10	-188.16	196.20	14.45	-183.53	22.16	23.47	92.16	87.46
- y/y growth	16.4%	-193.1%	204.3%	-92.6%	-1370.3%	112.1%	112.8%	315.8%	272.6%
Cash	123281.0	136877.0	206783.0	213561.0	200088.0	206651.0		209251.0	
Debt	656756.0	642839.0	661481.0	648787.0	642426.0	550000.0		500000.0	
Net Cash/Shr	-590.1	-1446.1	-1272.7	-1149.9	-1237.3	-785.7		-665.5	
Tangible Book Value/Shr	-322.0	-534.6	-197.2	-338.7	-558.8	-158.4		-32.1	

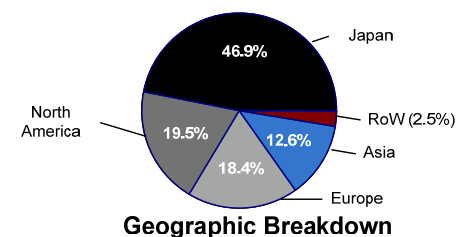
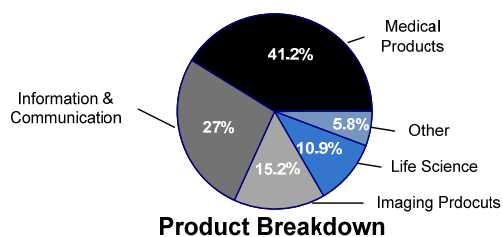
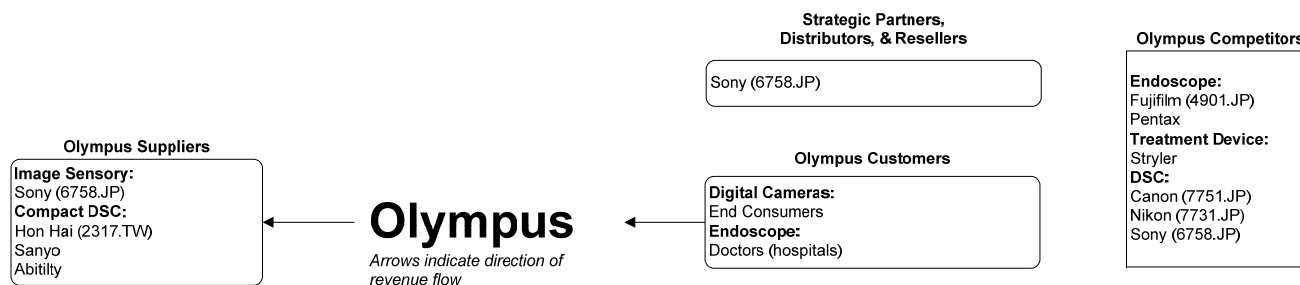
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 500. Olympus (7733.JP)

Sector: Hardware

Olympus (7733.JP)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

OmniVision Technologies Inc

Omnivision Technologies, Inc. designs, develops and markets high performance, highly integrated and cost-efficient semiconductor image sensor devices. Its imaging technology enables superior image quality in many of consumer and commercial applications, including mobile phones, notebooks, tablets and webcams, entertainment devices, security and surveillance systems, digital still and video cameras, automotive and medical imaging systems. The company products are Image Sensors, CameraCube Devices and ASICs. Omnivision was founded by Datong Chen, Shaw Hong & Raymond Wu in May, 1995 and is headquartered in Santa Clara, CA.

Figure 501. OmniVision (OVTI) Results and Forecasts

	2007	2008	2009	2010	2011	Street 2012E	Street 2013E
Revenues	799.6	507.3	603.0	956.5	897.7	1386.00	1502.8
- <i>y/y growth</i>	51.4%	-36.6%	18.9%	58.6%	-6.1%	54.4%	8.4%
Gross Margins	25.8%	23.2%	24.1%	29.0%	26.6%		
Operating Margins	8.1%	-5.8%	1.1%	13.2%	7.1%		
EPS	1.19	-0.74	0.59	2.49	1.60	1.31	1.57
- <i>y/y growth</i>	155.3%	-162.2%	179.7%	322.0%	-35.7%	-17.9%	19.2%
Cash	270.94	277.22	336.26	471.58	331.01		
Debt	33.48	36.42	49.71	46.24	42.48		
Net Cash/Shr	1.23	0.90	0.92	2.32	0.14		
Tangible Book Value/Shr	9.57	9.62	10.14	11.73	13.02		

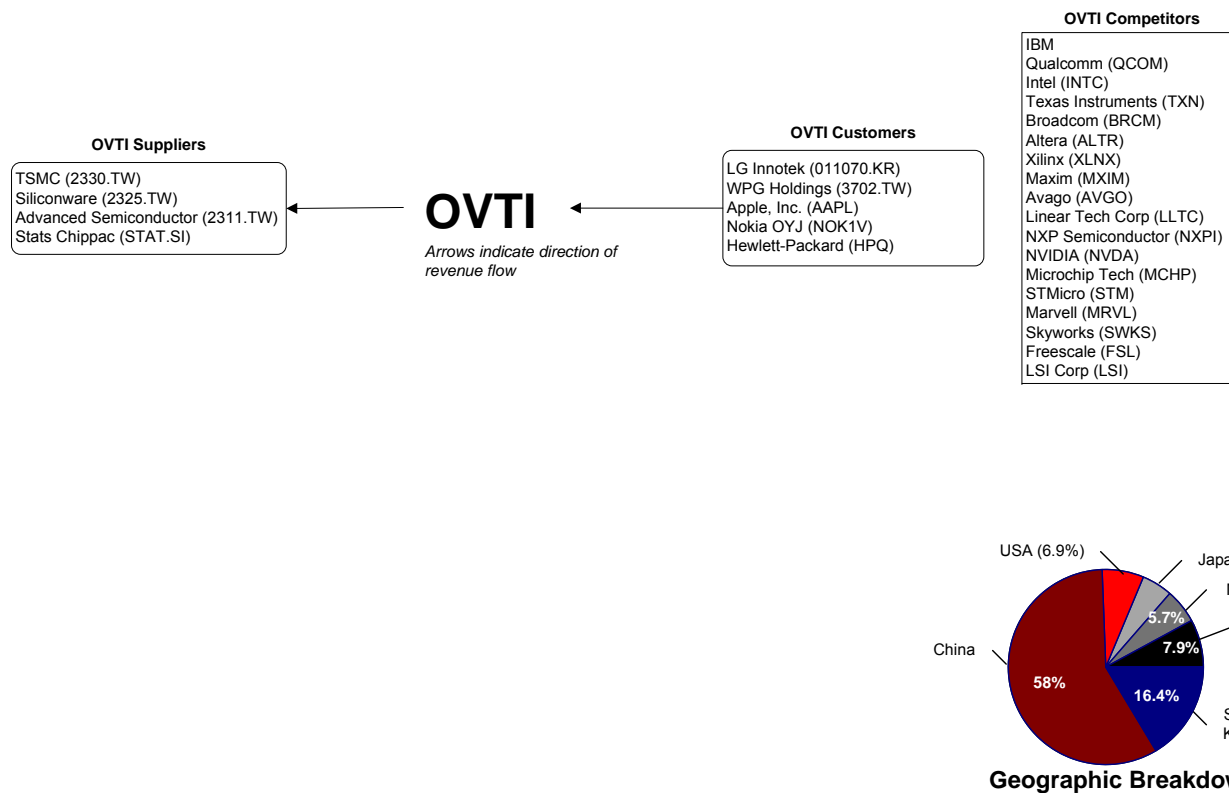
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, FactSet

Figure 502. OmniVision (OVTI)

Sector:

OmniVision (OVTI)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Terence Whalen

ON Semiconductor

ON Semiconductor Corporation designs, manufactures and markets power management, data management and standard semiconductor integrated circuits (ICs). ON is a Motorola / Texas Pacific Group recapitalization brought public in 2000 and partially financed through its approximately \$1B debt. ONNN acquired Sanyo semiconductor business in January 2011. ON's 2012 end-market exposure includes Computing (19%), Consumer (22%), Industrial (16%), Communication (13%), Automotive (26%), and Medical (3%). Gross margins are low compared to other analog IC companies given ON's 45% leverage to commodity discrete/logic. Competitors include Fairchild Semiconductor, Renesas, Rohm, ST Microelectronics, Toshiba, and Texas Instruments. ON recognizes distributor revenue on sell-through, a policy change in January,

Figure 503. ON Semiconductor (ONNN) Results and Forecasts

	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	1768.9	2313.4	3442.3	2894.9	2815.4	2838.4	3013.6	3078.2
- y/y growth		30.8%	48.8%	-15.9%	-2.7%	-2.0%	7.0%	8.5%
Gross Margins	35.1%	41.3%	29.3%	32.9%	33.4%		34.7%	
Operating Margins	11.1%	19.1%	13.4%	8.2%	9.9%		12.1%	
EPS	0.35	0.90	0.88	0.43	0.50	0.58	0.69	0.81
- y/y growth		156.9%	-1.2%	-51.0%	14.2%	33.5%	38.9%	39.7%
Cash	571.2	623.3	901.5	631.7	741.9		1094.2	
Debt	933.5	888.8	1207.0	1011.9	949.6		949.6	
Net Cash/Shr	-0.4	-0.3	0.1	-0.1	0.1		0.8	
Tangible Book Value/Shr	1.2	2.0	2.1	2.0	2.5		3.2	

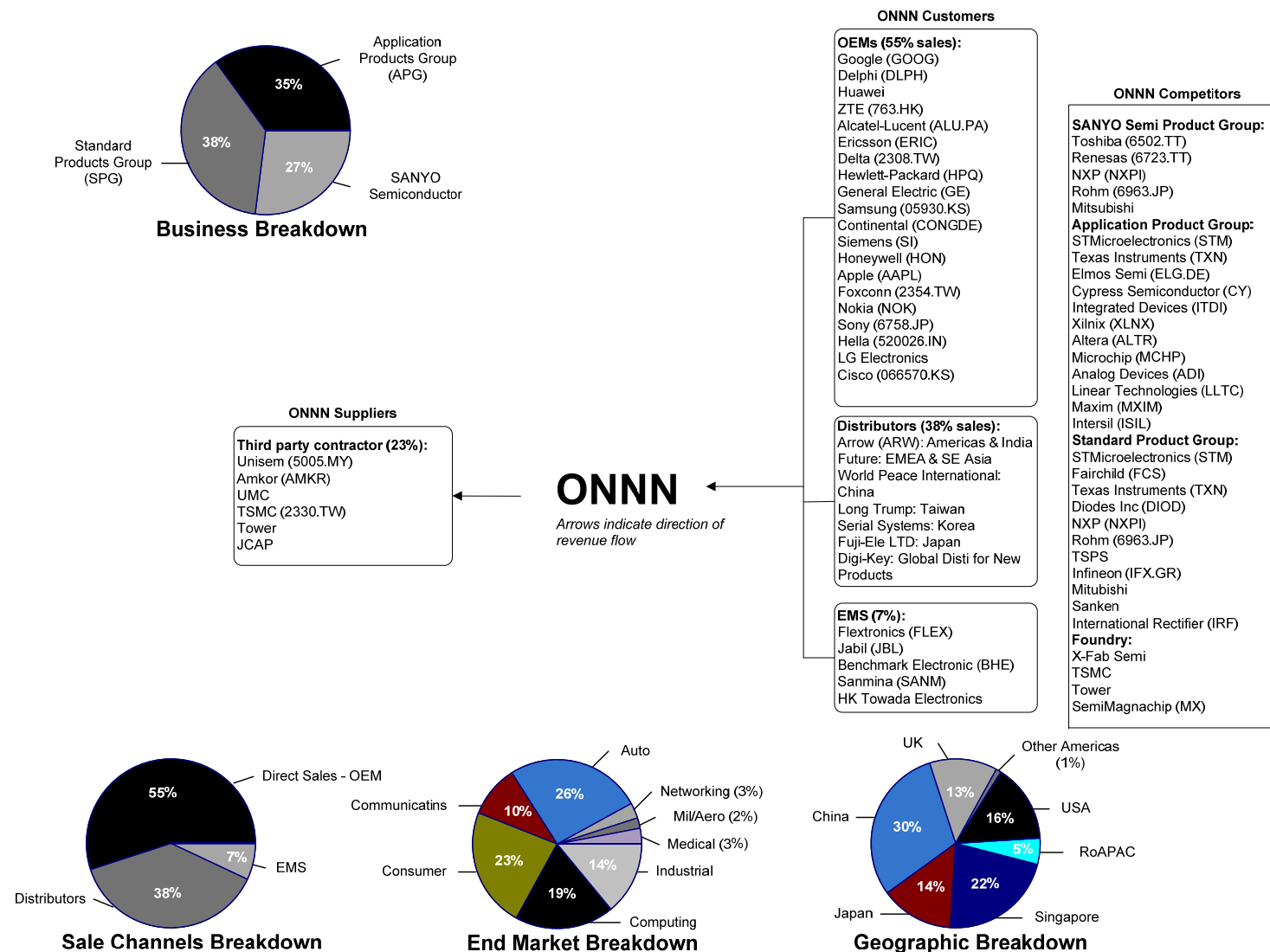
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 504. ON Semiconductor (ONNN)

Sector: Semiconductors

ON Semiconductor Corp. (ONNN)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Kota Ezawa

Panasonic

Panasonic Corp. engages in the development, manufacture, and sale of electronic and electric products. It operates through the following segments: Audio Visual Computer (AVC) Networks, Appliances, System and Communications, Eco Solutions, Automotive Systems, Device, Energy, and Others. The AVC Networks segment provides imaging equipment such as flat-panel TVs, AVC network equipment including Blu-ray Disc recorders, digital cameras and notebook PCs, as well as projectors, in-flight entertainment systems, and other business-use AV equipment. The Appliances segment delivers products and services in the homemaking, cooking, beauty and grooming and health, cooling and heating, hot water supply, and cold chain equipment fields. The System and Communications segment is comprised of the system network and mobile communications businesses. The Eco Solutions segment involves the development of products that conserve energy. The Automotive Systems segment offers car navigation systems, camera systems, engine control units, and batteries for eco-cars. The Devices segment covers a wide range of products such as electronic components, electronic materials, semiconductors, and optical devices. The Energy segment develops solar photovoltaic systems and lithium-ion batteries. The Other segment includes healthcare company, manufacturing solutions company, and PanaHome Corporation. The company was founded by Konosuke Matsushita on March 7, 1918 and is headquartered in Osaka, Japan.

Figure 505. Panasonic (6752.JP) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	9068928.0	7765507.0	7417980.0	8692672.0	7846216.0	7178000.0	7249381.0	6726000.0	7331233.0
- y/y growth	-0.4%	-14.4%	-4.5%	17.2%	-9.7%	-8.5%	-7.6%	-6.3%	1.1%
Gross Margins	29.7%	27.0%	28.0%	26.5%	25.3%	24.6%		24.8%	
Operating Margins	5.7%	0.9%	2.6%	3.5%	0.6%	2.0%		3.8%	
EPS	132.73	-181.68	-49.97	35.75	-333.96	-321.11	-324.75	20.20	28.81
- y/y growth	33.4%	-236.9%	72.5%	171.5%	-1034.2%	3.8%	2.8%	106.3%	108.9%
Cash	1332338.0	1165153.0	1201944.0	1044723.0	611469.0	632000.0		662500.0	
Debt	388606.0	745665.0	1327992.0	1595269.0	1575615.0	1519000.0		1446000.0	
Net Cash/Shr	518.0	246.3	83.6	-56.8	-142.9	-106.4		-126.5	
Tangible Book Value/Shr	1501.0	1083.3	610.7	527.2	323.2	81.5		101.9	

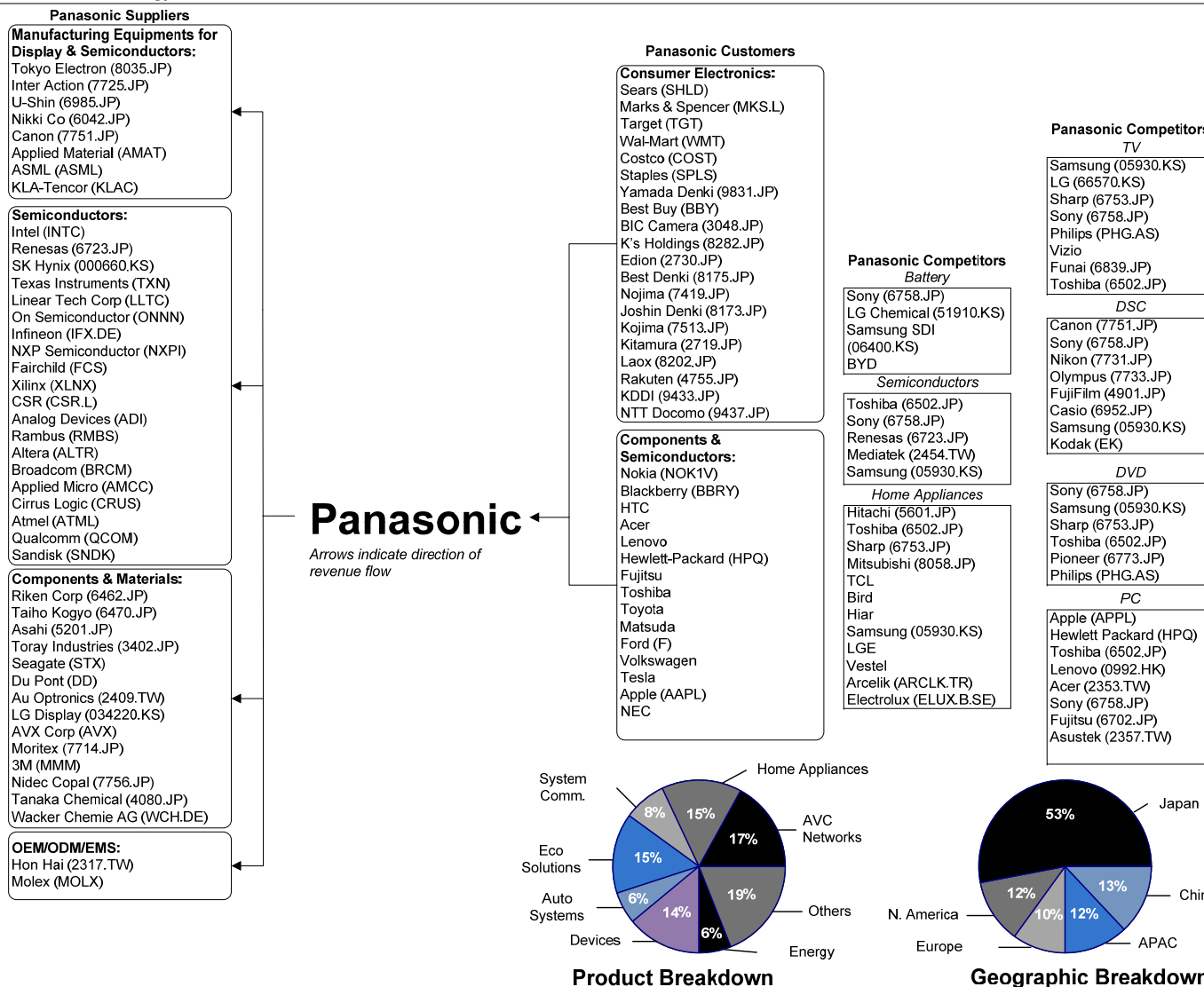
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 506. Panasonic (6752.JP)

Sector: Diversified Technology

Panasonic (6752.JP)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Wei Chen

Pegatron

Originally the manufacturing division of Asustek Computer, Pegatron Corporation was established in 2007 and spun off in June 2010. Pegatron provides Design and Manufacturing Services (DMS) to NB PC brands and other consumer electronics vendors. Its product lines include motherboards, desktop PCs, notebook PCs, game consoles, networking equipments, set-top boxes, and LCD TVs.

Figure 507. Pegatron (4938.TW) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	513294.2	538081.7	530531.4	599942.7	881895.4	970692.4	940824.2	1074242.9	1033413.1
- y/y growth		4.8%	-1.4%	13.1%	47.0%	10.1%	6.7%	10.7%	9.8%
Gross Margins	5.3%	6.0%	5.7%	4.5%	4.8%	5.4%		5.8%	
Operating Margins	1.5%	2.0%	1.6%	0.2%	1.3%	1.9%		2.3%	
EPS	2.93	2.95	2.75	0.05	2.71	5.29	4.10	7.22	5.01
- y/y growth		0.7%	-6.8%	-98.2%	5380.9%	95.6%	51.6%	36.6%	22.2%
Cash	30235.7	40205.2	49668.7	57325.9	68197.5	80607.5		94481.2	
Debt	22619.9	19055.5	26325.9	52665.3	55955.6	58455.6		58455.6	
Net Cash/Shr	11.7	14.1	16.9	12.7	18.1	23.0		29.1	
Tangible Book Value/Shr	47.7	41.9	40.3	40.6	42.0	46.6		52.2	

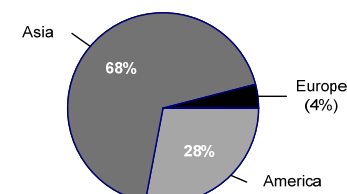
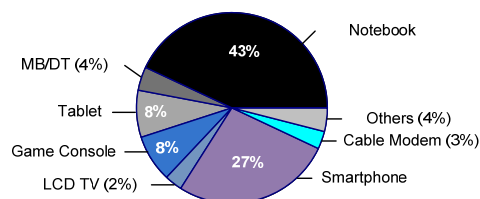
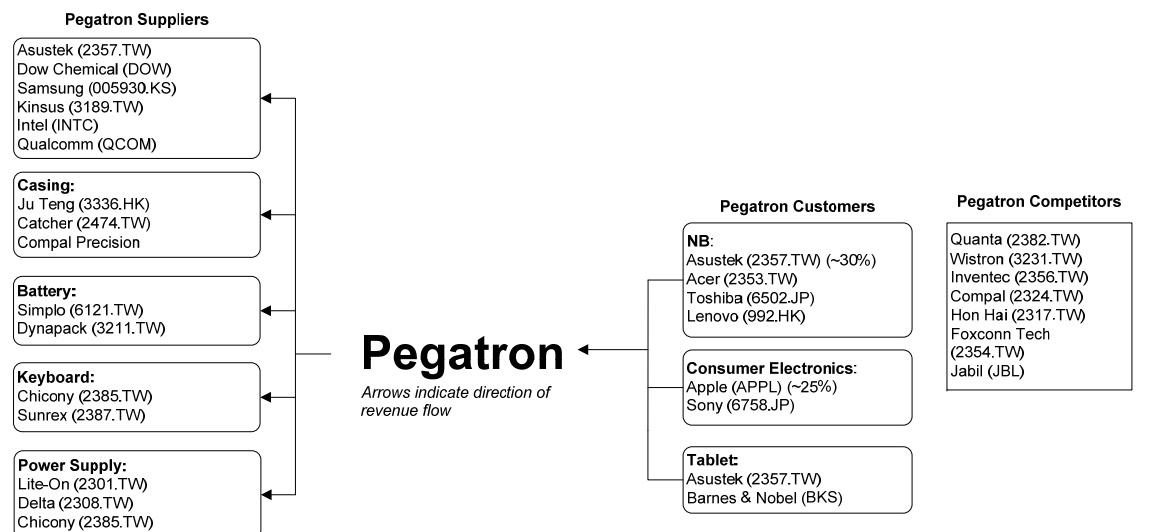
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 508. Pegatron (4938.TW)

Sector: PC & Enterprise Hardware

Pegatron Corp. (4938.TW)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jim Suva, CPA

Plexus Corp

Plexus, headquartered in Neenah, Wisconsin, is one of the smaller EMS companies, with approximately 1-2% market share. The company provides electronics manufacturing services for major high-technology OEMs, primarily in the communications and medical sectors. The company's largest customer is Juniper Networks comprising approximately 12% of sales (in the Dec 2012 quarter). Despite the announcement of disengagement between PLXS and JNPR, PLXS has had impressive wins that will more than offset the loss of JNPR. GE Health & GE Industrial is the next biggest customer (~10). Sales by end markets include: 38% networking & communications, 22% medical, 29% industrial/commercial and 11% defense/security/aerospace.

Figure 509. Plexus (PLXS) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	1841.6	1616.6	2013.4	2231.2	2306.7	2212.6	2209.2	2322.5	2262.1
- y/y growth	19.1%	-12.2%	24.5%	10.8%	3.4%	-4.1%	-4.2%	5.0%	2.4%
Gross Margins	11.2%	9.6%	10.1%	9.6%	9.5%	9.5%		9.6%	
Operating Margins	5.7%	3.8%	4.8%	4.5%	4.5%	4.2%		4.4%	
EPS	1.92	1.33	2.14	2.30	2.39	2.11	2.13	2.30	2.39
- y/y growth	33.5%	-30.8%	61.4%	7.4%	3.8%	-11.5%	-10.7%	8.6%	11.8%
Cash	166.0	258.4	188.2	242.1	297.6	290.2		397.9	
Debt	171.2	150.8	130.6	287.6	270.4	261.7		261.7	
Net Cash/Shr	0.3	3.1	1.8	-0.7	1.1	0.9		4.0	
Tangible Book Value/Shr	10.7	13.4	16.3	14.7	18.5	20.4		23.4	

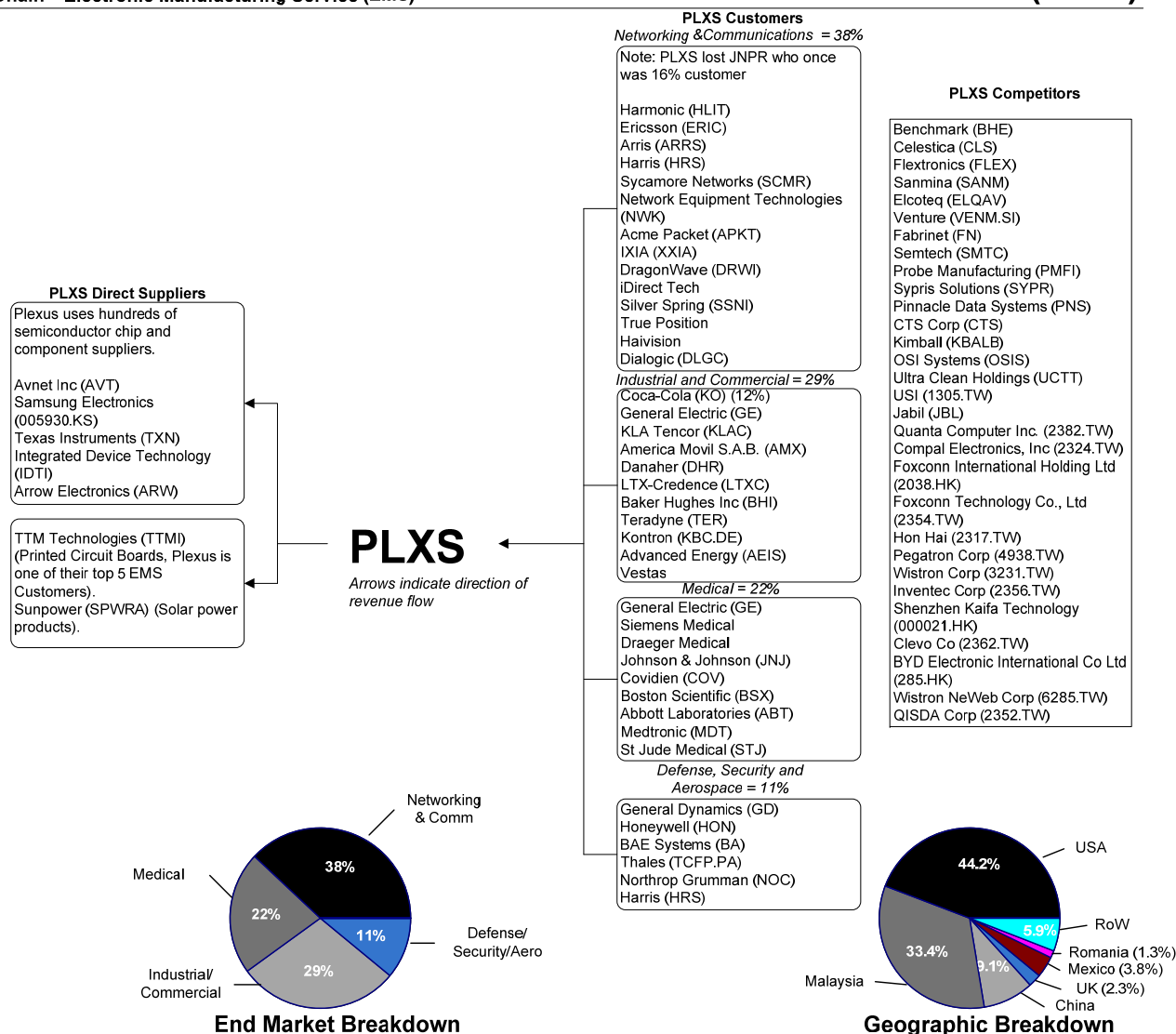
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 510. Plexus (PLXS)

Sector: Technology Supply Chain – Electronic Manufacturing Service (EMS)

Plexus (PLXS)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Kevin Dennean, CFA

Polycom Inc

Polycom Inc., incorporated in December 1990, is a leading global provider of video and voice conferencing and communications equipment. Its products include video communication products (telepresence, group and video desktop products), network systems products (video and voice media servers and network management solutions) and voice communications products (conference phone, wired desktop voice products and wireless handset voice products). In 2011, Polycom held a 28% share in the \$3.0Bn video conference market. From a vertical standpoint, Polycom has a strong foothold in the government, education and healthcare segment (each representing ~20% of revenues) and is making a strong push to gain share in enterprises (pharmaceuticals, financials and energy, each segment currently representing 10-15% of total revenues) and internationally.

Most Relevant Relationships: Approximately 50% of revenue comes from North America. Their primary competitor is Cisco.

Figure 511. Polycom (PLCM) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	1069.3	967.0	1218.5	1495.8	1414.4	1415.9	1415.5	1597.8	1514.9
- y/y growth	15.0%	-9.6%	26.0%	22.8%	-5.4%	0.1%	0.1%	12.8%	7.0%
Gross Margins	57.9%	56.8%	58.8%	60.0%	58.9%	58.9%		59.1%	
Operating Margins	15.8%	14.2%	14.7%	17.2%	11.1%	9.1%		10.0%	
EPS	0.37	0.30	0.38	1.18	0.71	0.57	0.64	0.71	0.77
- y/y growth	-45.3%	-20.3%	26.2%	213.4%	-40.0%	-19.1%	-10.1%	24.0%	21.4%
Cash	318.1	454.8	494.3	534.9	674.3	786.1		912.7	
Debt	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Net Cash/Shr	0.9	1.3	1.4	3.0	3.8	4.4		5.2	
Tangible Book Value/Shr	1.2	1.5	1.9	4.0	4.6	5.0		5.7	

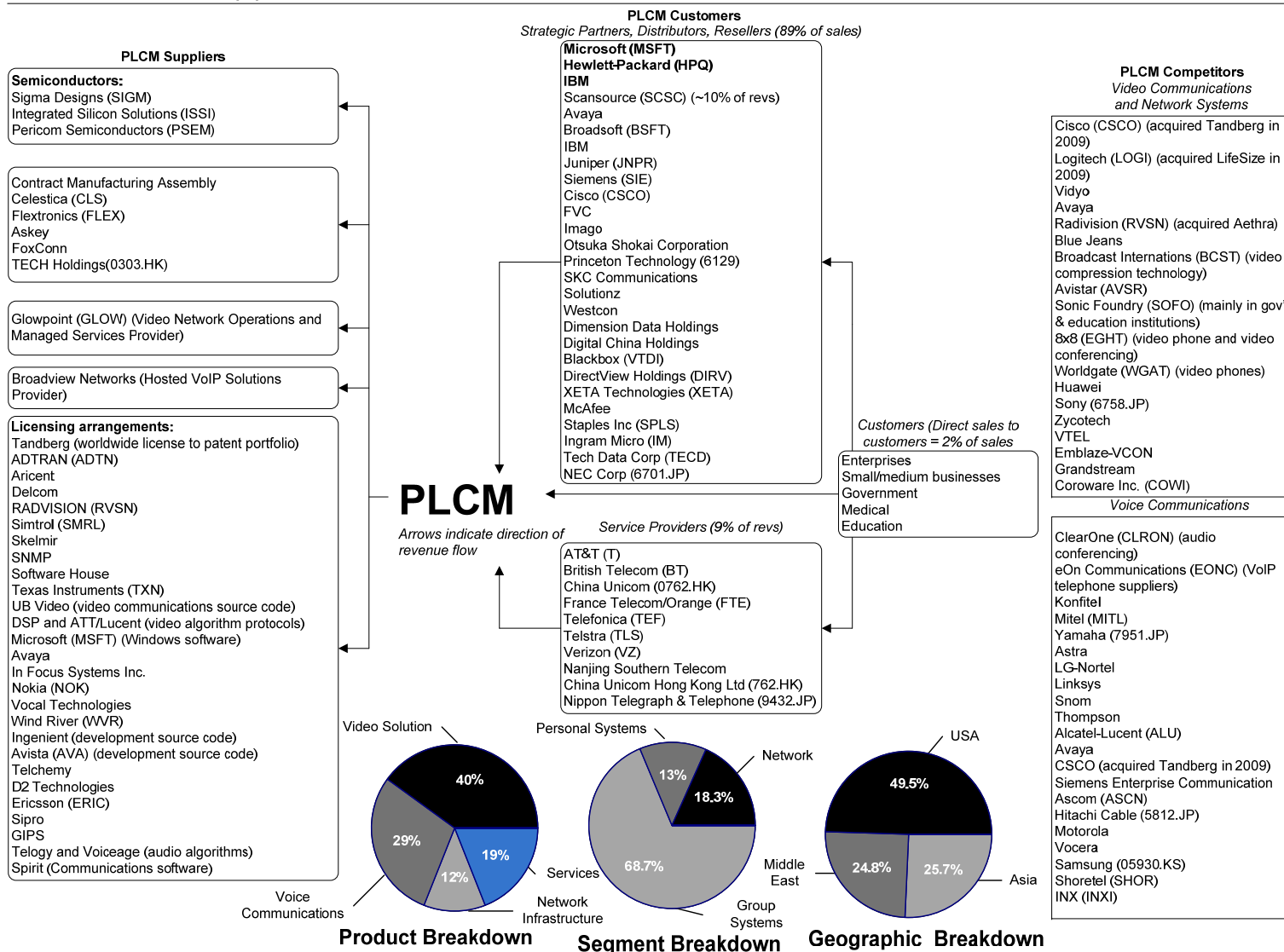
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 512. Polycom (PLCM)

Sector: Communications Equipment

Polycom Inc. (PLCM)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Roland Shu

Powertech Technology

Powertech was founded in May 1997, initially providing testing services to Powerchip and Macronix. In 1999, Kingston Technology, the world's largest memory module provider, became the largest shareholder. Soon after, management was replaced by executives from Kingston and the company started to provide turnkey solutions by expanding its packaging capacities. Over the past years, it has expanded its footprint into the Japanese market by gaining business from IDMs such as Toshiba and Elpida.

Figure 513. Powertech (6239.TW) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	31189.0	29968.5	37830.0	39451.3	41611.1	39504.7	41190.6	40968.7	43382.4
- <i>y/y growth</i>	27.6%	-3.9%	26.2%	4.3%	5.5%	-5.1%	-1.0%	3.7%	5.3%
Gross Margins	27.4%	23.9%	27.1%	24.2%	17.8%	16.1%		16.6%	
Operating Margins	23.4%	19.7%	22.6%	19.1%	11.9%	11.0%		11.6%	
EPS	9.16	6.77	9.86	5.93	4.56	4.33	4.85	4.88	5.05
- <i>y/y growth</i>	3.2%	-26.1%	45.7%	-39.8%	-23.1%	-5.1%	6.4%	12.6%	4.1%
Cash	4094.6	8999.8	11078.3	13830.2	20470.4	24052.6		27603.1	
Debt	16537.4	14612.5	14673.6	23100.6	19027.4	17790.6		16763.9	
Net Cash/Shr	-12.9	0.4	1.9	-2.0	7.8	14.0		19.6	
Tangible Book Value/Shr	29.5	34.4	42.6	44.7	46.7	48.9		51.2	

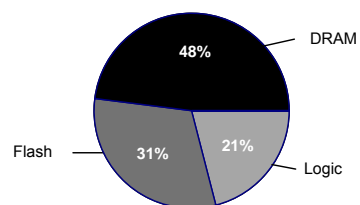
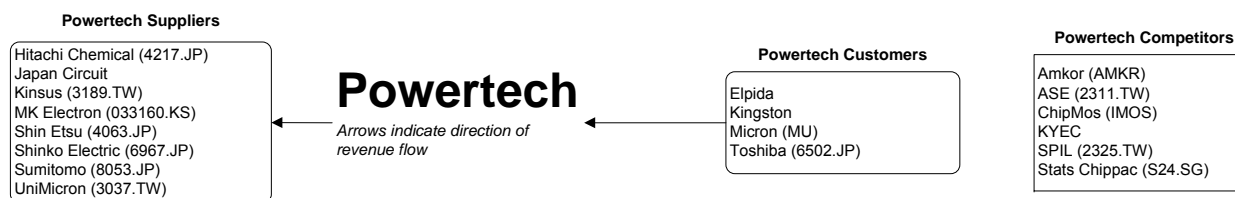
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

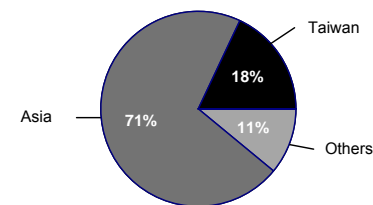
Figure 514. Powertech Technology (6239.TW)

Sector: Semiconductors

Powertech Technology (6239.TW)



Business Breakdown



Geographic Breakdown

Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

QLogic Corp

QLogic Corp. designs and supplies network infrastructure connectivity products. These products provide, enhance and manage computer data communication and facilitate the rapid transfer of data and enable resource sharing between servers and storage devices. Its products primarily consist of adapters, switches, storage routers and application-specific integrated circuits. The company's products are used in enterprise data centers, cloud computing and other environments dependent on high performance, reliable networking. It was founded in 1992 and is headquartered in Aliso Viejo, CA.

Figure 515. QLogic (QLGC) Results and Forecasts

	2008	2009	2010	2011	2012	Street 2013E	Street 2014E
Revenues	633.9	549.1	597.2	558.6	484.5	472.93	490.9
- <i>y/y growth</i>	6.0%	-13.4%	8.8%	-6.5%	-13.3%	-2.4%	3.8%
Gross Margins	66.3%	63.9%	42.8%	68.2%	67.1%		
Operating Margins	27.0%	19.0%	23.5%	23.2%	11.9%		
EPS	1.03	1.00	1.54	1.39	0.81	0.71	0.82
- <i>y/y growth</i>	23.8%	-2.7%	54.0%	-9.7%	-41.7%	-12.7%	16.1%
Cash	343.28	375.67	384.08	537.96	455.51		
Debt	0.00	0.00	0.00	0.00	#N/A		
Net Cash/Shr	1.72	1.38	1.75	1.62	1.03		
Tangible Book Value/Shr	4.09	3.97	4.48	6.52	#N/A		

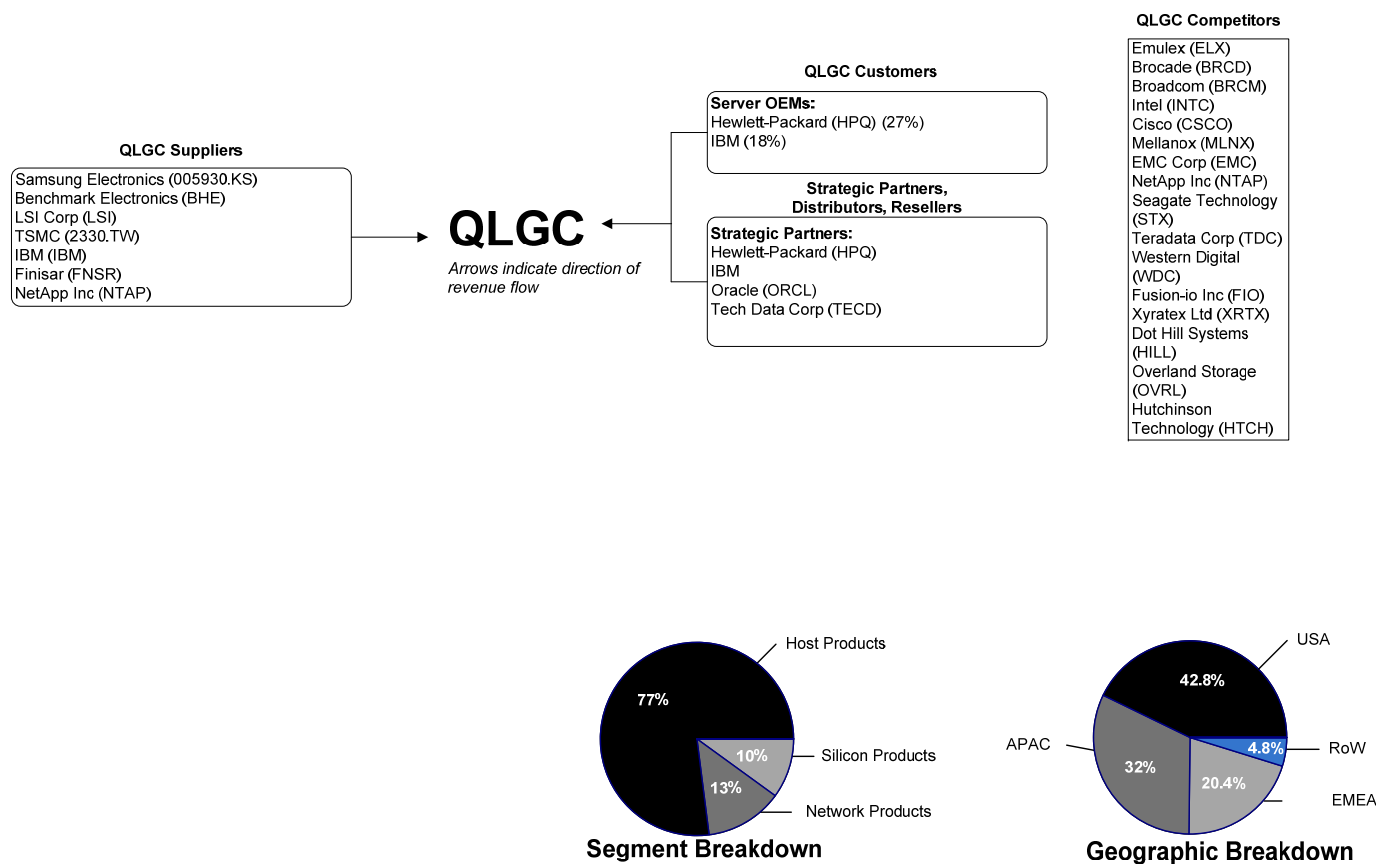
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, FactSet

Figure 516. QLogic (QLGC)

Sector: Storage and Enterprise Hardware

QLogic Corp (QLGC)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Glen Yeung

Qualcomm Inc

Qualcomm is the #1 vendor of baseband modems globally, derived from its invention of the code division multiple access (CDMA) standard. Having started in satellite and digital radio, Qualcomm now generates the vast majority of its revenues from semiconductor sales (Qualcomm CDMA Technologies, QCT) and royalties from the licensing of its CDMA technology and its derivatives (Qualcomm Technology Licensing, QTL). The company generates revenue to a lesser degree from wireless internet services and satellite mobile communications systems and services (Qualcomm Wireless & Internet, QWI). Among wireless chip vendors, Qualcomm is the most profitable, with an average GAAP operating margin of ~30% over the past five years. This strong position makes Qualcomm one of the largest chip companies in the world, ranking #9 within the global chip industry, and as the largest fabless semiconductor company. Qualcomm is headquartered in San Diego, CA.

Figure 517. Qualcomm (QCOM) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	11142.0	10415.0	10991.0	14963.0	19121.0	24500.2	24514.3	27886.8	27122.9
- y/y growth	25.6%	-6.5%	5.5%	36.1%	27.8%	28.1%	28.2%	13.8%	10.6%
Gross Margins	69.4%	69.5%	68.0%	64.8%	62.9%	60.3%		59.1%	
Operating Margins	33.5%	21.4%	29.9%	31.1%	29.7%	29.7%		28.6%	
EPS	2.24	1.69	2.46	3.20	3.71	4.48	4.54	4.80	4.91
- y/y growth	11.5%	-24.3%	45.1%	30.2%	16.0%	20.7%	22.2%	7.1%	8.1%
Cash	6411.0	11069.0	10279.0	11652.0	12374.0	15904.7		22270.3	
Debt	0.0	0.0	0.0	994.0	0.0	0.0		0.0	
Net Cash/Shr	3.9	6.6	6.2	6.9	7.1	9.0		12.5	
Tangible Book Value/Shr	10.1	11.5	11.9	14.2	17.4	21.4		25.5	

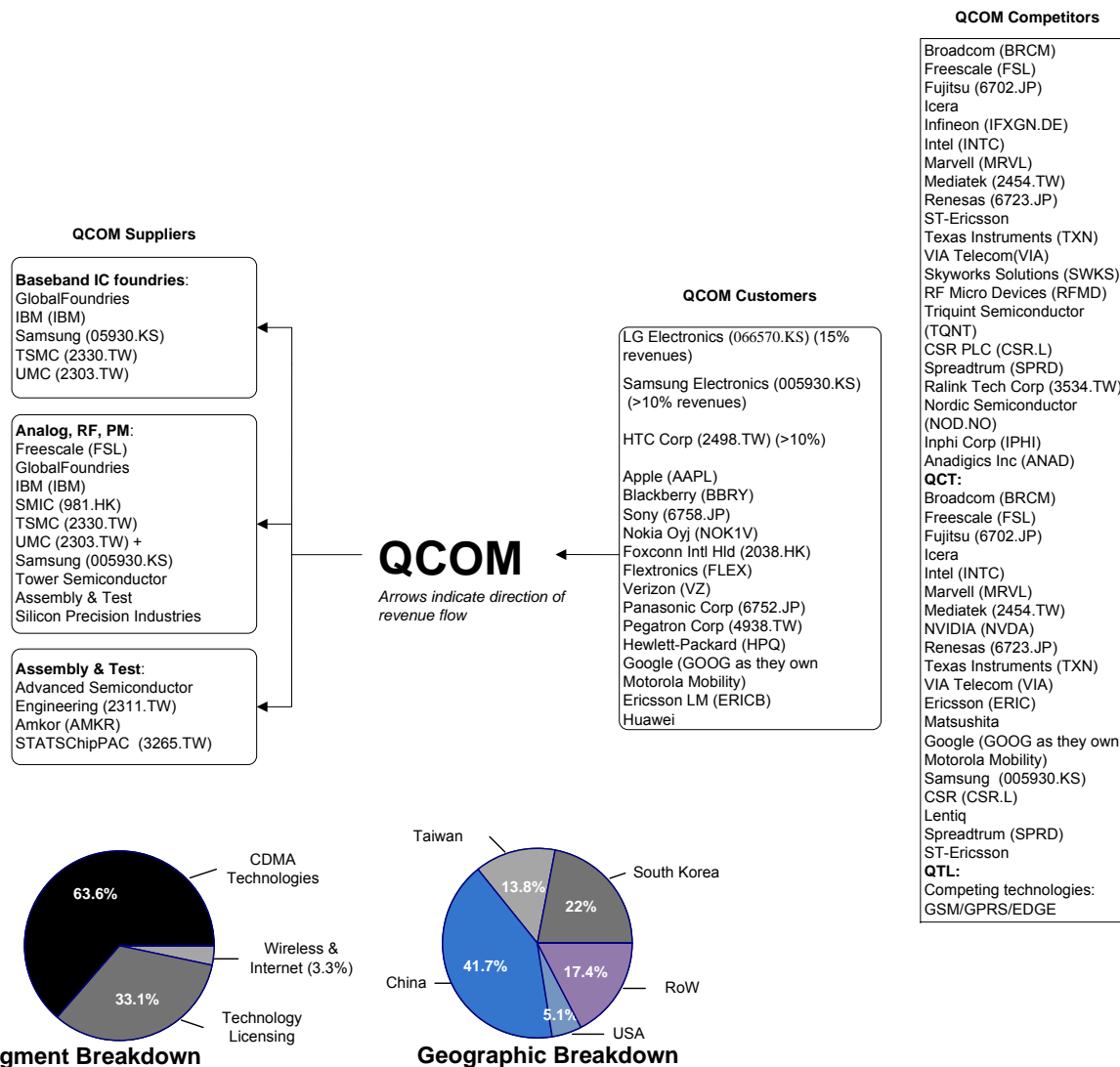
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 518. Qualcomm (QCOM)

Sector: Wireless Equipment

Qualcomm (QCOM)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Wei Chen

Quanta Computer

Founded in 1988, Quanta Computer Incorporated (2382.TW) is a Taiwan-based original design manufacturer (ODM) of notebook (NB) PCs and other electronic hardware. It is the world's largest NB ODM in terms of shipments in 1H12, with major customers including Acer, Apple, HPQ, Lenovo, Sony, and Toshiba.

Figure 519. Quanta Computer (2382.TW) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	818737.9	839791.2	1124727.6	1109727.9	1017544.5	1034975.7	1010558.1	1088218.7	1064793.1
- y/y growth	5.3%	2.6%	33.9%	-1.3%	-8.3%	1.7%	-0.7%	5.1%	5.4%
Gross Margins	5.1%	5.4%	3.5%	3.8%	3.9%	3.8%		4.0%	
Operating Margins	2.3%	2.6%	1.4%	1.4%	1.5%	1.6%		1.7%	
EPS	5.54	5.90	4.85	6.01	5.99	5.26	5.94	5.55	6.59
- y/y growth	4.4%	6.5%	-17.8%	23.8%	-0.2%	-12.2%	-0.8%	5.5%	10.8%
Cash	87203.6	101777.0	171641.8	284781.4	200195.5	255260.6		265595.4	
Debt	56995.2	64803.2	160960.6	301393.0	200944.0	200944.0		200944.0	
Net Cash/Shr	18.5	26.9	37.0	65.7	47.2	61.5		64.2	
Tangible Book Value/Shr	23.6	28.2	29.1	30.3	32.2	34.3		37.2	

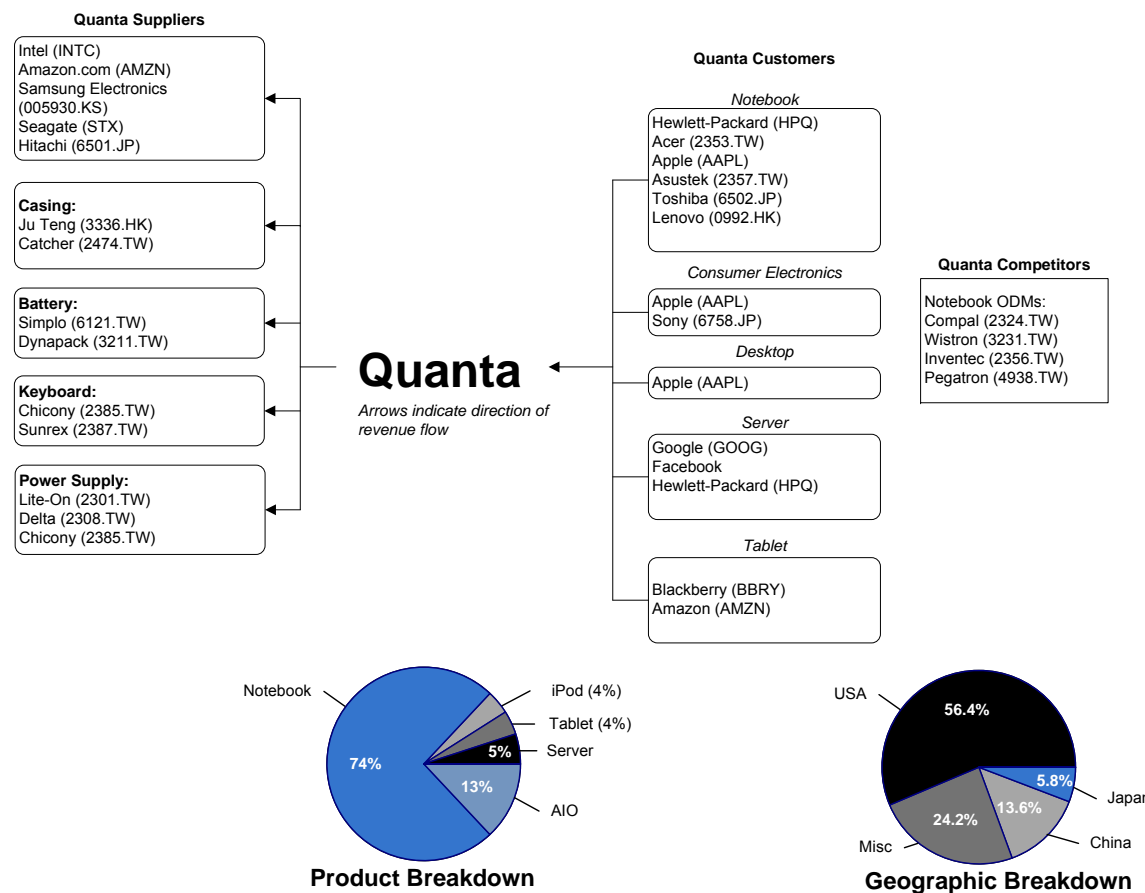
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 520. Quanta Computer (2382.TW)

Sector: PC & Enterprise Hardware

Quanta Computer (2382.TW)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Arthur Lai

Radiant Opto-Electronics

Radiant was founded in 1995 and is one of the leading backlight module makers in the world, providing backlight units and light guide plates for different applications. IT products contribute ~85-90% of total revenues and TV <15%. As the industry is moving to greater supply chain integration, Radiant is also actively developing customers and building LCM operations to collaborate with major customers such as Samsung and AUO. Korean customers account for ~70% of its total revenues, Taiwanese customers ~20%, and Japan customers ~10%.

Figure 521. Ration Opto-Electronics (6176.TW) Results and Forecast

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	34015.8	36702.4	48311.5	63431.4	76212.2	81490.4	76365.7	92912.9	81251.4
- y/y growth	8.1%	7.9%	31.6%	31.3%	20.1%	6.9%	0.2%	14.0%	6.4%
Gross Margins	10.1%	9.2%	9.6%	10.6%	11.8%	12.8%		12.9%	
Operating Margins	4.7%	4.9%	6.3%	7.2%	8.2%	8.6%		8.7%	
EPS	2.81	3.01	5.75	9.71	12.05	12.84	12.31	14.70	13.14
- y/y growth	-36.0%	7.5%	90.9%	68.8%	24.1%	6.5%	2.2%	14.5%	6.7%
Cash	5297.1	9179.1	11391.8	17435.0	16653.7	22950.5		23166.1	
Debt	4712.4	4609.2	4849.5	14839.1	7221.9	5890.6		5154.9	
Net Cash/Shr	8.4	18.1	21.2	30.0	29.5	43.1		46.9	
Tangible Book Value/Shr	28.9	29.9	31.9	41.1	45.0	49.8		56.1	

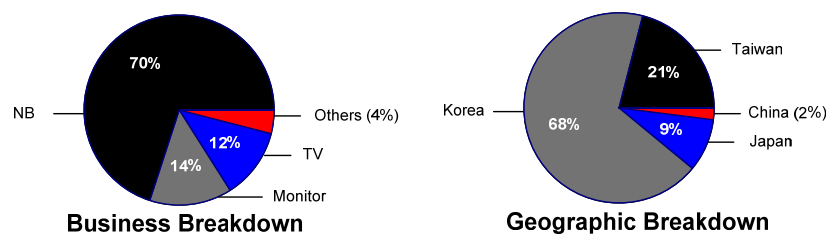
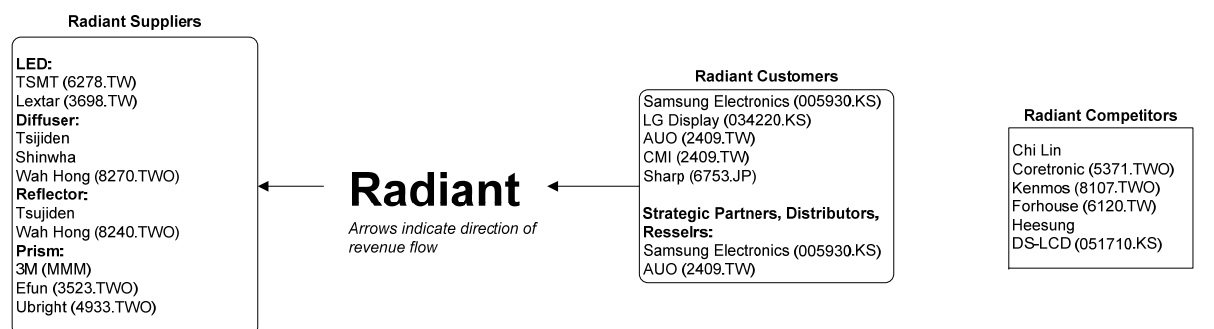
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 522. Radian Opto-Electronics (6176.TW)

Sector: Semiconductors and Components

Radian Opto-Electronics Corp. (6176.TW)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jason Channell

Renewable Energy Corporation

REC is an integrated manufacturer present along the whole of the value chain. It is one of the premier manufacturers of polysilicon globally, using both Siemens and FBR technology. It has production facilities in the US (silicon) and Singapore (wafer, cells and modules).

Figure 523. Renewable Energy (REC.NO) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	8190.8	8831.0	13778.0	13367.0	7496.7	6070.0	5757.0	5890.1	5937.3
- y/y growth	23.3%	7.8%	56.0%	-3.0%	-43.9%	-19.0%	-23.2%	-3.0%	3.1%
Gross Margins	66.7%	51.2%	42.1%	41.2%	36.5%	34.8%		34.6%	
Operating Margins	31.2%	5.5%	5.8%	4.3%	-14.2%	-8.9%		-4.5%	
EPS	2.54	0.20	-0.63	-0.55	-0.81	-0.18	-0.30	-0.11	-0.08
- y/y growth	-4.5%	-92.0%	-409.9%	12.9%	-47.3%	77.1%	63.5%	42.8%	72.9%
Cash	496.8	1688.0	849.0	1595.6	2220.0	2948.7		1046.0	
Debt	7014.5	12455.0	9265.0	6486.3	5039.3	5039.3		2639.3	
Net Cash/Shr	-7.0	-12.9	-8.3	-4.2	-1.8	-0.9		-0.7	
Tangible Book Value/Shr	20.9	18.7	19.7	10.8	4.0	3.8		3.7	

(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 524. Renewable Energy (REC.NO)

Sector: Alternative Energy

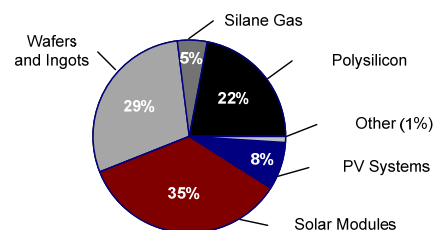
Renewable Energy Corp. ASA (REC.NO)

REC.NO

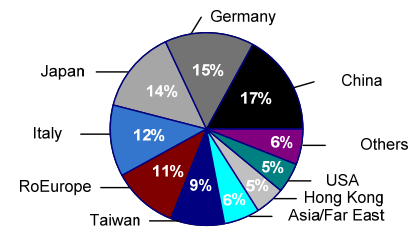
Arrows indicate direction of revenue flow

REC Competitors

Bosch Solar
Canadian Solar (CSIQ)
Changzhou
CNVP Dongying
Conergy (CGYK.DE)
GCL(3800.HK)
Guodian
Hanwha Solar (HSOL)
Hemlock
Hereon Solar
JA Solar (JASO)
Jinko Solar (JKS)
LDK Solar (LDK)
MEMC (WFR)
OCI (010060.KS)
Q-Cells (QCE.DE)
Renesola (SOL)
Sanyo
Shanghai Chaori (005506.HK)
Sharp (6753.JP)
Solar-Fabrik (SFX.DE)
Solargiga (757.HK)
SolarWorld (SWV.DE)
Solon (SOO1)
Suntech (STP)
Sunways (SWW.DE)
Tianwei
Trina Solar (TSL)
Wacker Chemie (WCH.DE)
Yingli Green Energy (YGE)
Wacker Chemie (WCH.DE)
Daqo (DQ)



Segment Breakdown



Geographic Breakdown

Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

RF Micro Devices

RF Micro Devices, Inc. designs and manufactures radio frequency components and compound semiconductor technologies. Its services include connectivity and support functionality in the cellular handset, wireless infrastructure, wireless local area network, cable television broadband, smart energy, metering infrastructure and aerospace and defense markets. The company was founded by William J. Pratt, Powell T. Seymour and Jerry D. Neal in 1991 and is headquartered in Greensboro, NC.

Figure 525. RF Micro Devices (RFMD) Results and Forecasts

	2008	2009	2010	2011	2012	Street 2013E	Street 2014E
Revenues	886.5	978.4	1051.8	871.4	964.1	1204.07	1319.3
- y/y growth	-7.3%	10.4%	7.5%	-17.2%	10.6%	24.9%	9.6%
Gross Margins	24.5%	36.3%	37.0%	33.1%	31.7%		
Operating Margins	-28.2%	11.2%	13.3%	2.7%	-1.6%		
EPS	-3.42	0.50	0.61	0.18	0.18	0.39	0.51
- y/y growth	-11500.0%	114.6%	21.6%	-70.2%	-0.7%	118.5%	28.4%
Cash	266.58	259.66	292.06	300.40	179.65		
Debt	578.08	317.79	181.20	151.71	82.04		
Net Cash/Shr	0.43	0.64	0.76	0.44	#N/A		
Tangible Book Value/Shr	0.56	1.23	1.80	1.85	#N/A		

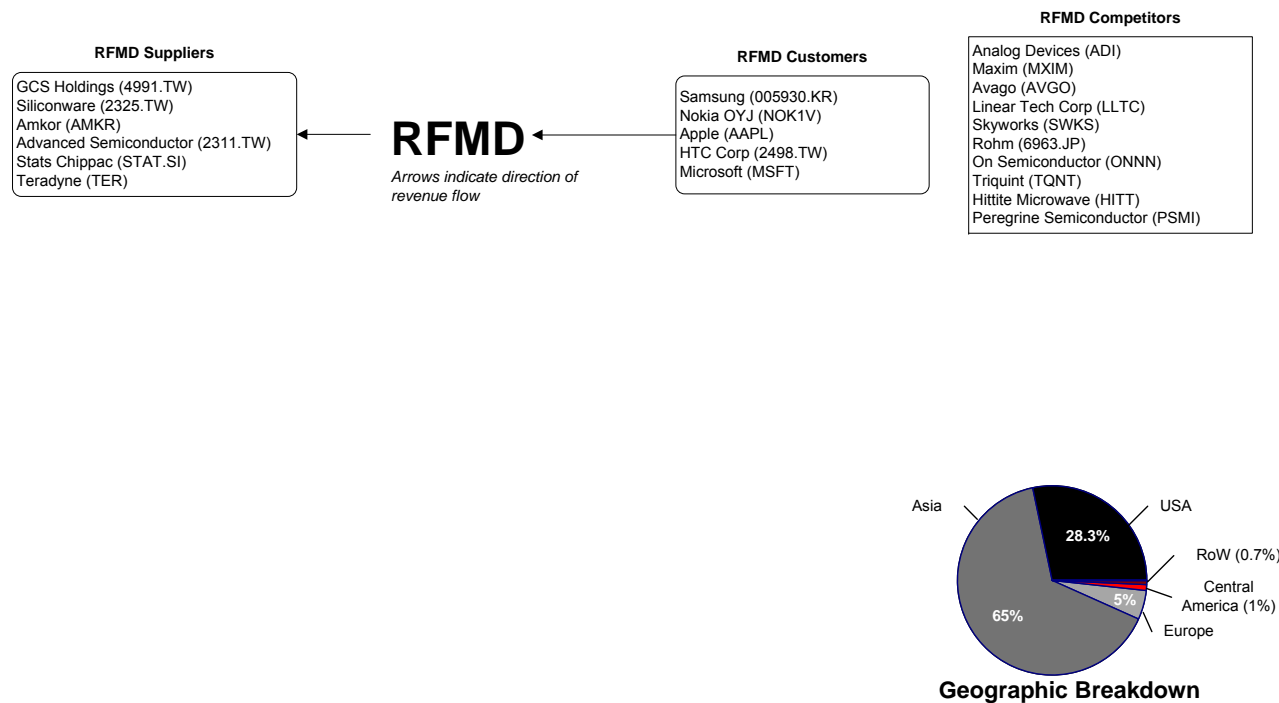
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, FactSet

Figure 526. RF Microdevices (RFMD)

Sector: Specialty Semiconductor

RF Microdevices (RFMD)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Richtek Technology

Richtek is a leading analog IC designer in Taiwan. In the past, the company was focused on PC voltage control analog IC products, but it has since expanded to become a supplier of power-management solutions in a range of consumer electronics products, among them digital still cameras, LCD displays and handsets.

Figure 527. Richtek (6286.TW) Results and Forecasts

	2008	2009	2010	2011	2012	Street 2013E	Street 2014E
Revenues	6961.7	8394.0	12141.4	11115.3	11272.7	12157.87	13119.1
- <i>y/y growth</i>	14.9%	20.6%	44.6%	-8.5%	1.4%	7.9%	7.9%
Gross Margins	37.1%	37.0%	36.4%	35.7%	36.8%		
Operating Margins	20.0%	19.6%	19.0%	15.6%	16.9%		
EPS	9.23	10.43	14.60	10.24	11.40	12.09	13.09
- <i>y/y growth</i>	-25.8%	13.0%	40.0%	-29.9%	11.3%	6.0%	8.3%
Cash	2106.00	2625.75	2992.99	2708.04	3256.01		
Debt	0.00	0.00	0.00	20.00	29.00		
Net Cash/Shr	8.65	11.07	16.14	11.56	13.93		
Tangible Book Value/Shr	27.74	33.09	38.51	38.40	43.03		

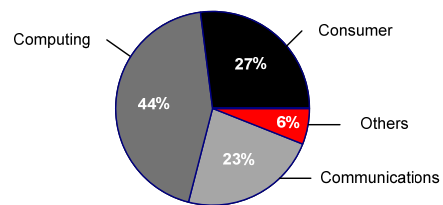
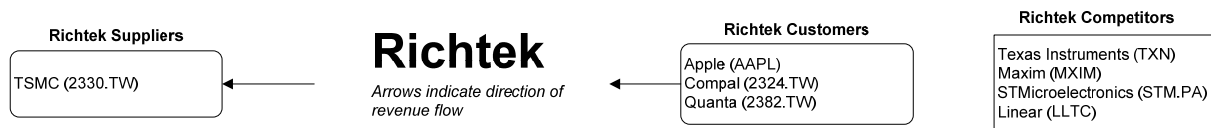
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

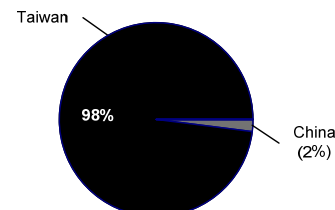
Figure 528. Richtek Technology (6286.TW)

Sector: Semiconductors

Richtek Technology (6286.TW)



Geographic Breakdown



Geographic Breakdown

Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Masahiro Shibano

Ricoh

Ricoh Co., Ltd. engages in the development, production, sale, and provision of services for imaging, solution and industrial products. It operates through the following segments: Imaging and Solutions, Industrial Products, and Other. The Imaging and Solutions segment provides imaging and network systems solutions. Its products include monochrome and color digital multifunctional, laser, and GELJET printers; and production printing products. The Industrial Products segment manufactures and sells thermal media, optical and electrical component units, semiconductors, and measuring devices. The Other segment includes digital camera, financing, and distribution businesses. The company was founded by Kiyoshi Ichimura on February 6, 1936 and is headquartered in Tokyo, Japan.

Figure 529. Ricoh (7752.JP) Results and Forecast

	2009	2010	2011	2012	2013	CIR 2014E	Street 2014E	CIR 2015E	Street 2015E
Revenues	2091696.0	2016337.0	1942013.0	1903477.0	1924497.0	2038100.0	2040461.0	2107500.0	2076478.0
- y/y growth	-5.8%	-3.6%	-3.7%	-2.0%	1.1%	5.9%	6.0%	3.4%	1.8%
Gross Margins	40.8%	40.8%	40.7%	39.5%	39.9%	40.0%		38.5%	
Operating Margins	3.6%	3.3%	3.1%	-0.9%	3.3%	7.1%		7.9%	
EPS	8.79	37.90	26.72	-60.59	44.76	114.79	105.03	133.41	112.44
- y/y growth	-93.8%	331.2%	-29.5%	-326.8%	173.9%	156.4%	134.6%	16.2%	7.1%
Cash	260527.0	243888.0	181179.0	158671.0	120331.0	162259.0		160862.0	
Debt	779195.0	684445.0	630445.0	741867.0	702780.0	720000.0		670000.0	
Net Cash/Shr	-335.0	-368.2	-405.5	-498.7	-490.9	-479.6		-260.9	
Tangible Book Value/Shr	1344.1	1341.4	1281.5	1134.6	1238.6	1320.2		1415.4	

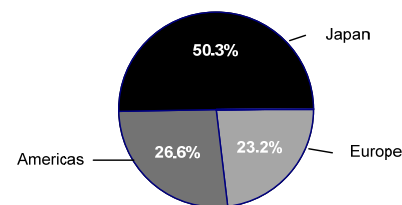
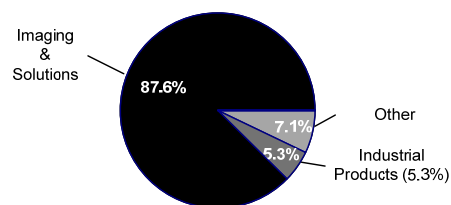
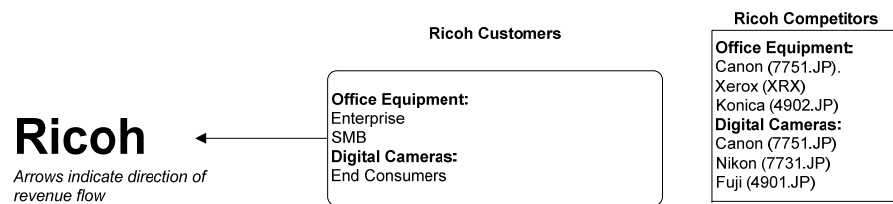
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 530. Ricoh (7752.JP)

Sector: Imaging

Ricoh Co. Ltd. (7752.JP)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Kevin Dennean, CFA

Riverbed Technology Inc.

Riverbed is the leading provider of WAN optimization solutions, which improve the performance of distributed applications while lowering network complexity and costs. Its flagship Steelhead product relies on proprietary technology to reduce latency and "chattiness" caused by both networking and application protocols. As enterprises and business increasingly embrace the cloud, consolidation, and virtualization, they face the challenge of re-creating LAN-like user experiences in WAN environment characterized by multiple network hops and sometimes unpredictable, inconsistent bandwidth availability, the impact of which ranges from simply slower application performance to unacceptable processing times to outright failure.

The Riverbed Steelhead addresses these problems by reducing the round-trip travel of data application through a deep understanding of the application and networking protocols used in WAN environments. This competency allows for streamlining of data - in a non-optimized environment all of the data requested by an application must be sent across the WAN, whether the data is identical and re-requested because of network protocols or if has only been slightly modified.

Founded in 2002, Riverbed is headquartered in San Francisco, CA and has 1,610 employees globally.

Figure 531. Riverbed (RVBD) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	333.3	395.9	551.9	728.5	839.7	1095.9	1076.7	1259.0	1204.0
- y/y growth	41.0%	18.8%	39.4%	32.0%	15.3%	30.5%	28.2%	14.9%	11.8%
Gross Margins	74.8%	75.9%	76.8%	76.8%	75.5%	69.1%		69.9%	
Operating Margins	17.2%	19.0%	25.6%	29.4%	26.4%	22.1%		20.9%	
EPS	0.29	0.34	0.59	0.90	0.99	0.98	0.99	1.05	1.21
- y/y growth	-11.0%	17.3%	75.3%	51.7%	10.6%	-1.2%	-0.1%	6.7%	22.0%
Cash	267.8	325.7	425.0	470.2	451.1	522.9		658.8	
Debt	0.0	0.0	0.0	0.0	572.1	478.4		354.0	
Net Cash/Shr	1.8	2.2	2.7	2.8	-0.7	0.3		1.8	
Tangible Book Value/Shr	2.1	2.4	3.4	3.8	2.0	2.2		3.7	

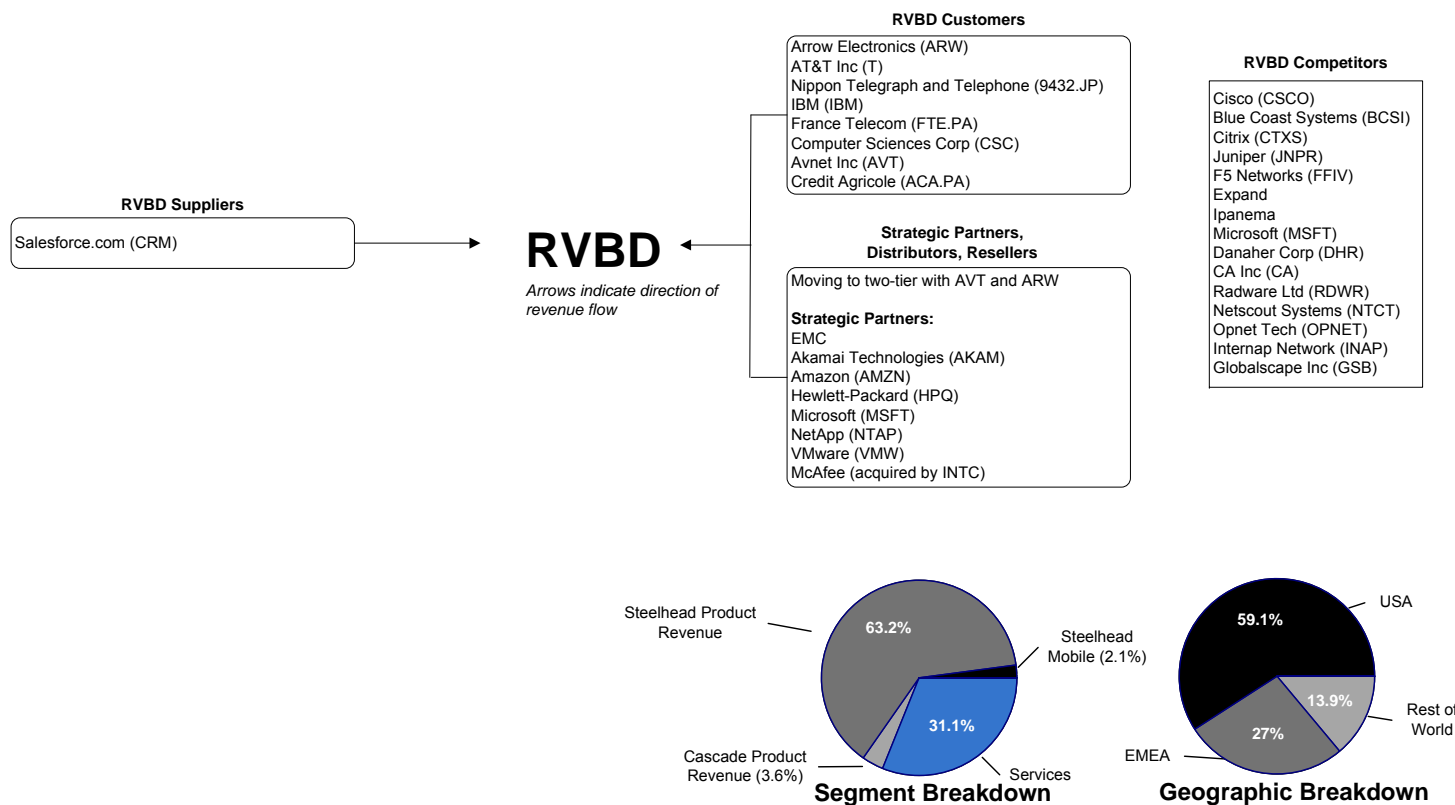
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 532. Riverbed (RVBD)

Sector: Computer Software

Riverbed Technology (RVBD)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Yuta Fukasawa

Rohm

ROHM Co., Ltd. engages in the design and manufacture of integrated circuits and other electronic components. It also develops LSI scanner engines designed specifically for cordless hand-held scanners. It operates through the following segments: Integrated Circuits, Discrete Semiconductor Devices, and Others. The Integrated Circuits segment includes analog ICs, logic ICs, memory ICs, ASICs, and foundry business operations. The Discrete Semiconductor Devices segment includes diodes, transistors, light-emitting diodes, and laser diodes. The Others segment includes resistors, printhead products, optical modules, tantalum capacitor, power modules, and lighting products. The company was founded in 1954 and is headquartered in Kyoto, Japan.

Figure 533. Rohm (6963.JP) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	373405.0	317140.0	335640.0	341885.0	304652.0	292674.0	291384.0	298600.0	297539.0
- y/y growth	-5.5%	-15.1%	5.8%	1.9%	-10.9%	-3.9%	-4.4%	2.0%	2.1%
Gross Margins	38.2%	31.5%	31.5%	35.9%	31.4%	28.2%		29.0%	
Operating Margins	18.0%	3.3%	5.6%	9.6%	2.1%	1.3%		3.2%	
EPS	284.68	89.74	65.10	88.09	-149.39	-10.12	-121.31	28.75	90.91
- y/y growth	-31.2%	-68.5%	-27.5%	35.3%	-269.6%	93.2%	18.8%	384.1%	174.9%
Cash	361357.0	291253.0	280026.0	258380.0	226817.0	238816.9		228995.7	
Debt	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Net Cash/Shr	3221.4	2657.6	2554.9	2362.5	2104.1	2215.1		2124.0	
Tangible Book Value/Shr	6330.9	5768.8	5790.1	5538.7	5488.3	5563.4		5562.2	

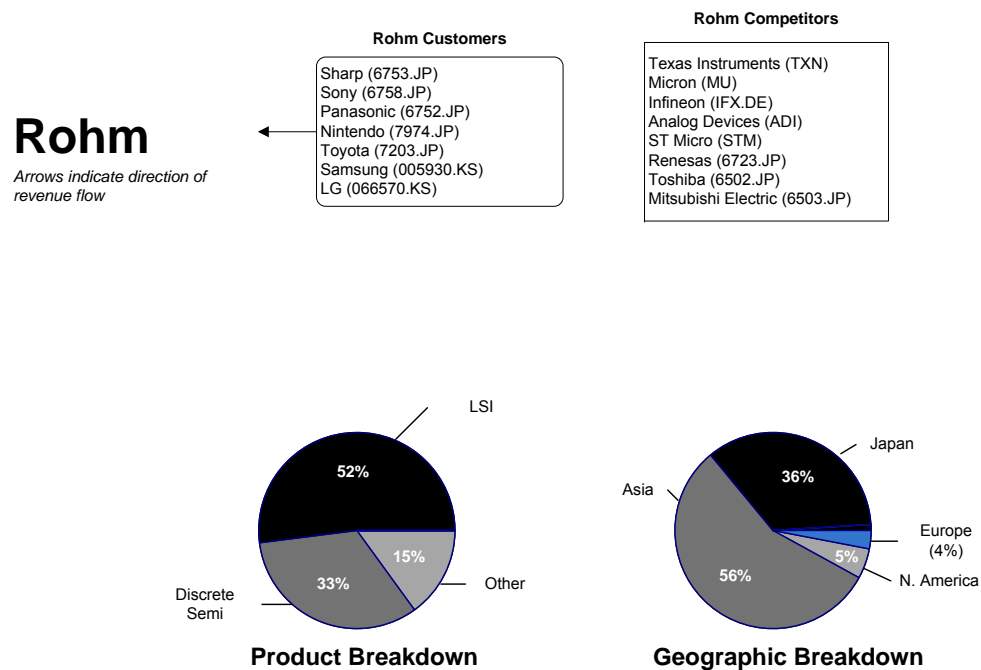
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 534. Rohm (6963.JP)

Sector: Semiconductors

Rohm (6963.JP)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Henry Kim, CFA

Samsung Electro-Mechanics

SEMCO manufactures electronic components used in computers, audio and video products, industrial electronics, and telecommunications equipment. The company's products include MLCC, packaging substrates and camera modules.

Figure 535. SEMCO (009150.KS) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	4285000.0	5550514.0	6968900.0	6031800.0	7912800.0	9741228.8	9401882.0	10439603.2	10437535.0
- y/y growth	21.8%	29.5%	25.6%	-13.4%	31.2%	23.1%	18.8%	7.2%	11.0%
Gross Margins	17.1%	21.3%	24.3%	16.3%	17.6%	19.8%		19.7%	
Operating Margins	3.2%	8.7%	11.2%	4.6%	7.3%	7.3%		7.1%	
EPS	643.70	3799.36	7425.71	4678.76	5901.49	6357.34	6920.55	6720.35	7782.65
- y/y growth	-57.4%	490.2%	95.4%	-37.0%	26.1%	7.7%	17.3%	5.7%	12.5%
Cash	330013.3	1088629.0	695981.3	525902.0	683529.0	624676.3		799476.9	
Debt	1181180.0	1719262.0	1709453.0	1290138.0	1380803.0	1380803.0		1380803.0	
Net Cash/Shr	-2275.8	6432.8	-3440.8	419.3	1393.0	605.1		2945.3	
Tangible Book Value/Shr	24004.3	32424.0	43239.7	44897.6	47567.3	52774.7		58345.0	

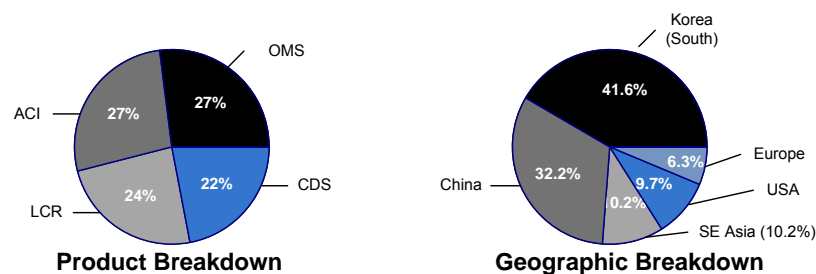
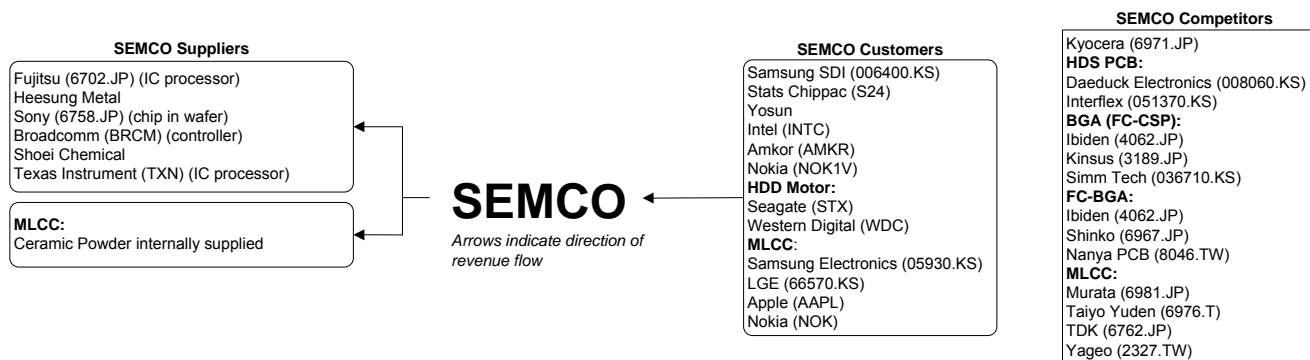
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 536. SEMCO (009150.KS)

Sector: Diversified

Samsung Electro-Mechanics (009150.KS)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Henry Kim, CFA

Samsung Electronics

Samsung Electronics (SEC) is a global leader in semiconductor, telecommunications, and digital convergence technology. It is the world's leading producer of memory semiconductors, display panels, mobile phones, monitors and TVs. SEC has four main business units: 1) Semiconductor; 2) Display Panel; 3) Telecommunications; and 4) Media & Appliances.

Figure 537. Samsung Electronics (005930.KS) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	72952991.0	136323700.0	154630328.0	165001771.0	201103613.0	236343179.2	241004187.0	255504463.9	265352306.0
- y/y growth	15.5%	86.9%	13.4%	6.7%	21.9%	17.5%	19.8%	8.1%	10.1%
Gross Margins	24.1%	30.6%	33.6%	32.0%	37.0%	40.8%		41.6%	
Operating Margins	5.7%	8.0%	11.2%	9.5%	14.4%	18.3%		19.1%	
EPS	37514.79	64980.50	107258.02	90864.65	157404.37	231540.64	213738.61	260563.77	237213.59
- y/y growth	-25.6%	73.2%	65.1%	-15.3%	73.2%	47.1%	35.8%	12.5%	11.0%
Cash	6648583.0	20883500.0	22479963.0	26877630.0	37448271.0	55016174.1		77536158.3	
Debt	114179.0	9394611.0	10775424.0	14646610.0	14895164.0	13927736.2		13035941.8	
Net Cash/Shr	44402.2	132405.4	144319.7	148778.9	217216.7	340184.9		496402.2	
Tangible Book Value/Shr	389281.9	455792.8	553747.5	623442.0	751726.4	975277.4		1228385.1	

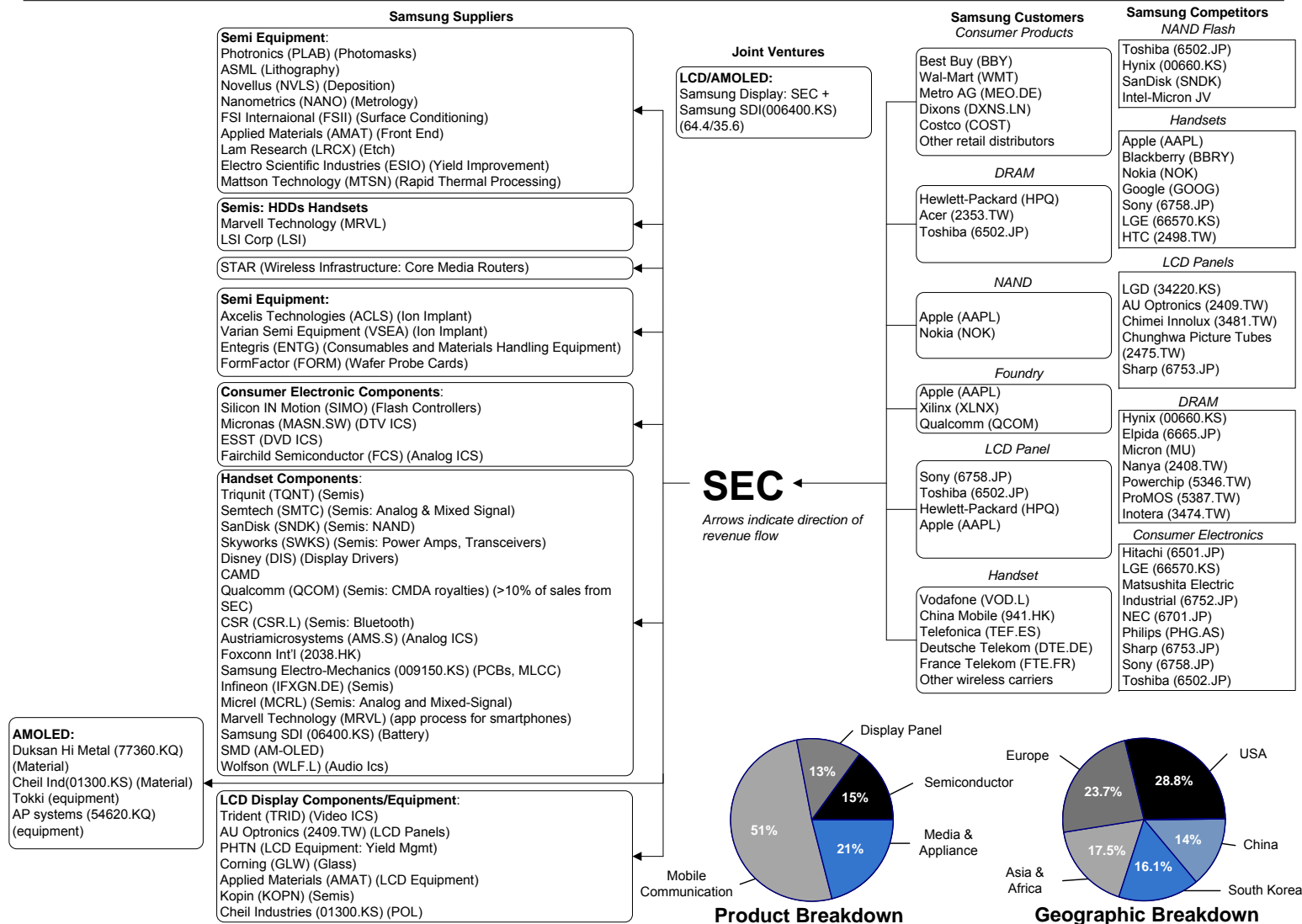
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 538. Samsung Electronics (005930.KS)

Sector: Diversified

Samsung Electronics (005930.KS)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Henry Kim, CFA

Samsung SDI

Samsung SDI is a diversified producer of CRT, PDP and rechargeable batteries. The company has spun off its Mobile Display division to create Samsung Mobile Display, which produces STN-LCD and OLED and is now merged into Samsung Display Co.

Figure 539. Samsung SDI (006400.KS) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	5215861.1	4950300.0	5124300.0	5443900.0	5771202.0	5785376.3	5759530.0	6281234.8	6137416.0
- y/y growth	1.3%	-5.1%	3.5%	6.2%	6.0%	0.2%	-0.2%	8.6%	6.6%
Gross Margins	14.0%	14.6%	15.4%	12.5%	15.7%	12.8%		13.6%	
Operating Margins	2.6%	2.2%	5.6%	2.0%	3.2%	2.2%		4.1%	
EPS	853.29	4702.19	7811.68	7025.12	32301.00	10564.51	11527.72	14119.83	15098.15
- y/y growth	106.6%	451.1%	66.1%	-10.1%	359.8%	-67.3%	-64.3%	33.7%	31.0%
Cash	1280077.8	1803446.0	1148286.0	801575.0	1011527.0	971329.7		981499.7	
Debt	1032673.2	965232.0	358378.0	761366.0	1133053.0	1410339.3		1700339.3	
Net Cash/Shr	11706.5	31258.7	20200.7	17594.5	11792.3	4325.0		-2036.8	
Tangible Book Value/Shr	99412.1	109285.3	132641.5	134111.2	161660.5	170746.0		183386.8	

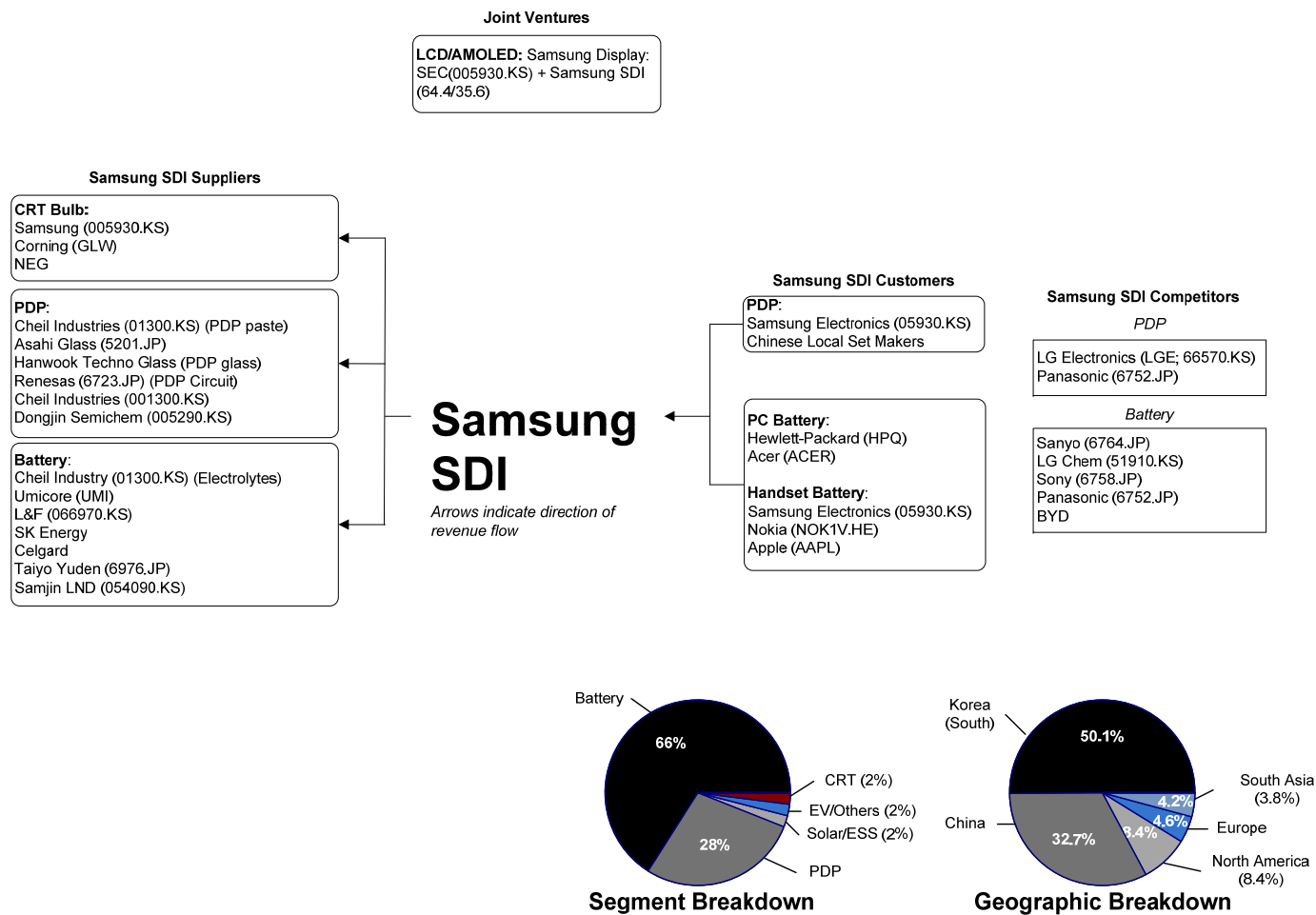
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 540. Samsung SDI (006400.KS)

Sector: Diversified

Samsung SDI (006400.KS)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Henry Kim, CFA

Samsung Techwin

Samsung Techwin started as Samsung Precision Industries Co with a business mix focusing on aircraft engines and film cameras. It now has five business units: Security Solutions (CCTV), Digital & IT Solutions (Semiconductor Materials), Intelligent Machinery & Solutions (Semiconductor Systems), Power Systems and Defense Program. It split its DSC camera business in 2009.

Figure 541. Samsung Techwin (012450.KS) Results and Forecast

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	2339638.8	2642742.8	3197700.0	2946762.3	2934282.0	3255505.8	3208867.0	3794883.8	3695894.0
- y/y growth	-27.9%	13.0%	21.0%	-7.8%	-0.4%	10.9%	9.4%	16.6%	15.2%
Gross Margins	13.7%	14.6%	18.8%	18.5%	23.0%	14.4%		15.8%	
Operating Margins	6.3%	7.8%	6.7%	3.0%	5.3%	5.8%		7.2%	
EPS	956.15	3239.44	4408.00	4355.35	2473.18	2815.82	3097.80	4203.41	4281.75
- y/y growth	-63.8%	238.8%	36.1%	-1.2%	-43.2%	13.9%	25.3%	49.3%	38.2%
Cash	174007.9	273182.0	111803.0	187847.0	272648.2	234499.5		262812.3	
Debt	265805.5	542285.4	648863.0	675859.0	578530.3	461863.7		328530.3	
Net Cash/Shr	1853.3	-1103.3	-5968.6	-5073.1	-2535.9	-1371.8		1043.3	
Tangible Book Value/Shr	13737.0	18124.7	18650.6	25634.5	24514.3	26830.1		30533.5	

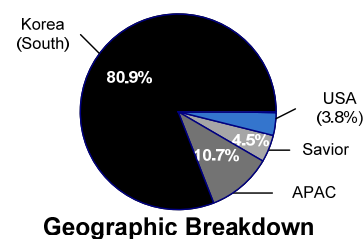
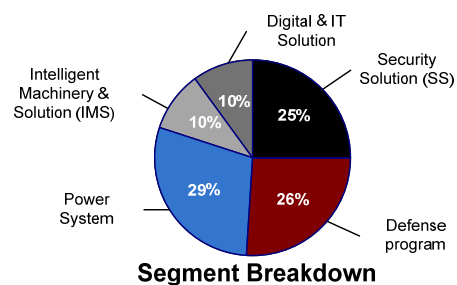
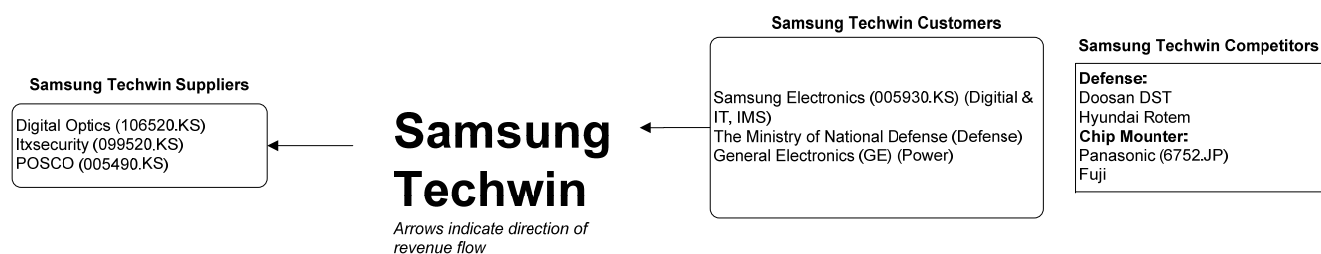
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 542. Samsung Techwin (012450.KS)

Sector: Diversified

Samsung Techwin (012450.KS)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jim Suva, CPA

Sanmina-SCI Corporation

Sanmina-SCI Corporation (SANM) is the fifth-largest electronics manufacturing services (EMS) company in the world in terms of CY12 revenue. SCI Systems (acquired December 2001) was one of the pioneers in the EMS industry. The combined company manufactures complex printed circuit board assemblies, custom designed backplane assemblies and subassemblies, multi-layer printed circuit boards (also known as PCBs, Sanmina-SCI is the largest manufacturer of this component in the world), and custom cable and wire harness assemblies. The company also tests and assembles electronic subsystems and systems. In CY 2008, the company divested its PC business. As of the most recent quarter, sales by end-markets include 47% communications, 16% enterprise computing and storage, 12% multi-media, and 25% industrial/defense/medical. Top customers include Alcatel-Lucent (>10%), Ericsson, EchoStar, IBM, Hewlett Packard, Nokia Siemens, Royal Philips, Nortel and Cisco.

Figure 543. Sanmina (SANM) Results and Forecast

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	7202.3	5182.5	6319.3	6602.4	6093.3	5951.5	5914.3	6306.0	6128.7
- y/y growth	-30.6%	-28.0%	21.9%	4.5%	-7.7%	-2.3%	-2.9%	6.0%	3.6%
Gross Margins	7.3%	6.6%	7.8%	7.8%	7.2%	7.2%		7.4%	
Operating Margins	3.7%	2.7%	3.5%	4.9%	1.9%	3.5%		3.4%	
EPS	0.84	-0.49	1.30	1.64	1.26	1.34	1.34	1.70	1.64
- y/y growth	92.4%	-157.8%	366.7%	25.7%	-22.9%	6.4%	6.6%	26.6%	21.9%
Cash	869.8	899.2	592.8	640.3	409.6	474.9		696.3	
Debt	1482.0	1437.7	1305.7	1242.5	897.4	744.3		744.3	
Net Cash/Shr	-7.5	-4.3	-7.9	-6.5	-5.1	-1.2		1.4	
Tangible Book Value/Shr	8.5	6.4	8.4	9.6	11.9	13.1		14.6	

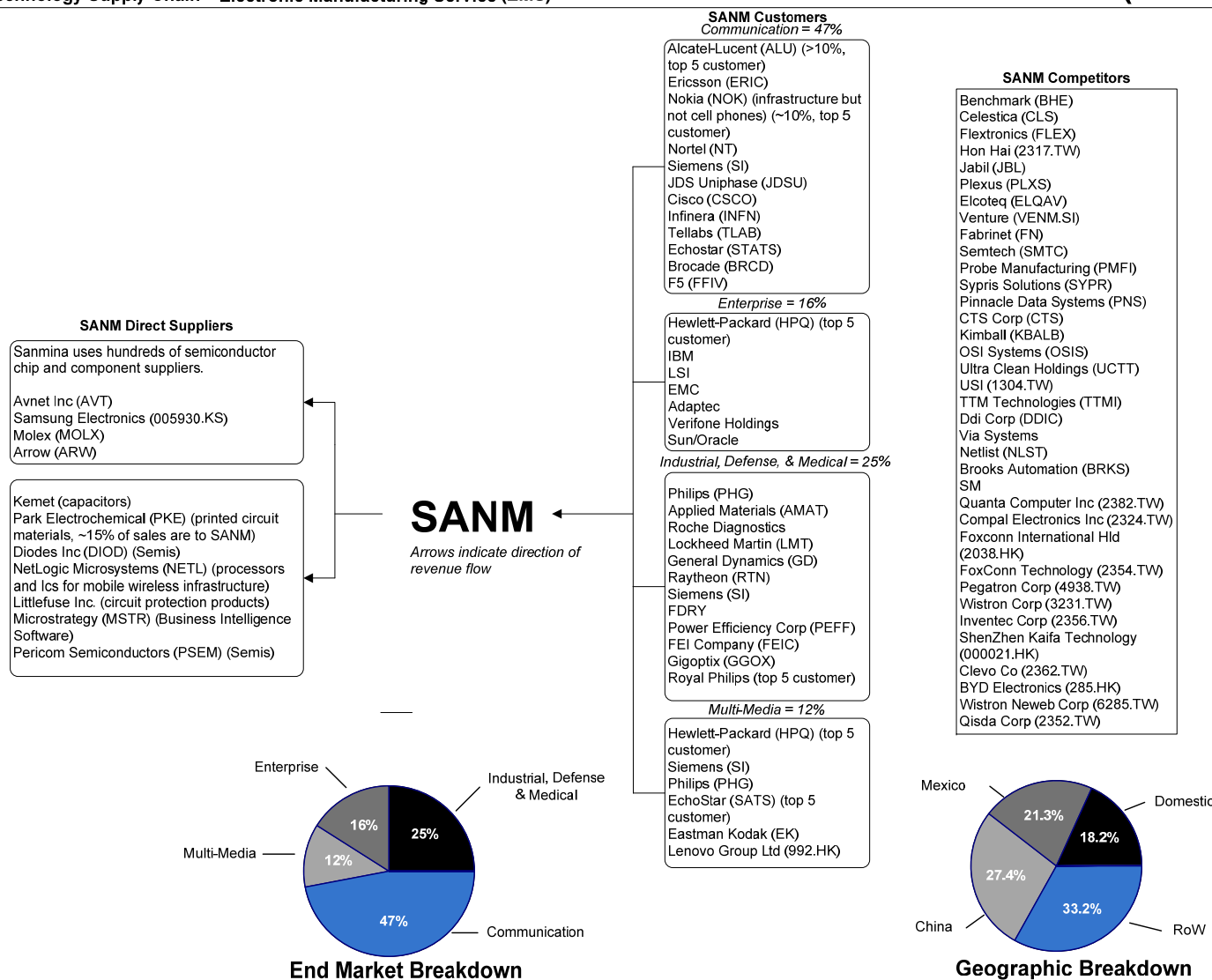
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 544. Sanmina (SANM)

Sector: Technology Supply Chain – Electronic Manufacturing Service (EMS)

Sanmina-SCI (SANM)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Joe Yoo

Seagate Technology

Headquartered in Cupertino, CA, Seagate is the second-largest global supplier of hard disk drives. It shipped 243M drives in CY12 and generated revenues of \$16.3B. The company has traditionally been the dominant player in the Enterprise market, and augmented its position in the desktop and notebook PC markets through the acquisition of Maxtor in 2006 and Samsung's HDD business in 2011. Seagate has vertically-integrated operations, and in-sources more than 90% of its key components (heads, media, and substrates). Primary facilities for hard drive assembly are located in China (Wuxi, Suzhou), Thailand (Korat), and Singapore (Ang Mo Kio). As of June 2012, Seagate employed about 57,900 employees (permanent and temporary) globally, with 50,600 located in Asia.

Figure 545. Seagate (STX) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	12708.0	9806.0	11395.0	10970.0	14937.5	14305.3	14324.6	14038.3	14052.1
- y/y growth	11.9%	-22.8%	16.2%	-3.7%	36.2%	-4.2%	-4.1%	-1.9%	-1.9%
Gross Margins	25.6%	14.8%	28.2%	19.5%	31.7%	27.9%		28.1%	
Operating Margins	12.4%	0.0%	16.7%	7.5%	21.7%	15.8%		15.5%	
EPS	2.70	-0.37	3.35	1.23	6.70	5.23	5.29	5.44	5.50
- y/y growth	85.4%	-113.8%	1001.2%	-63.2%	444.1%	-22.0%	-21.1%	3.9%	4.0%
Cash	1141.0	1541.0	2515.0	3151.0	2118.0	2169.5		1663.4	
Debt	2030.0	2727.0	2502.0	3512.0	2863.0	2478.0		2478.0	
Net Cash/Shr	-1.0	-0.8	0.7	0.4	-1.7	-0.8		-2.3	
Tangible Book Value/Shr	4.1	3.0	5.4	5.5	5.9	6.9		5.7	

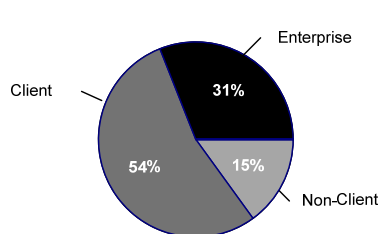
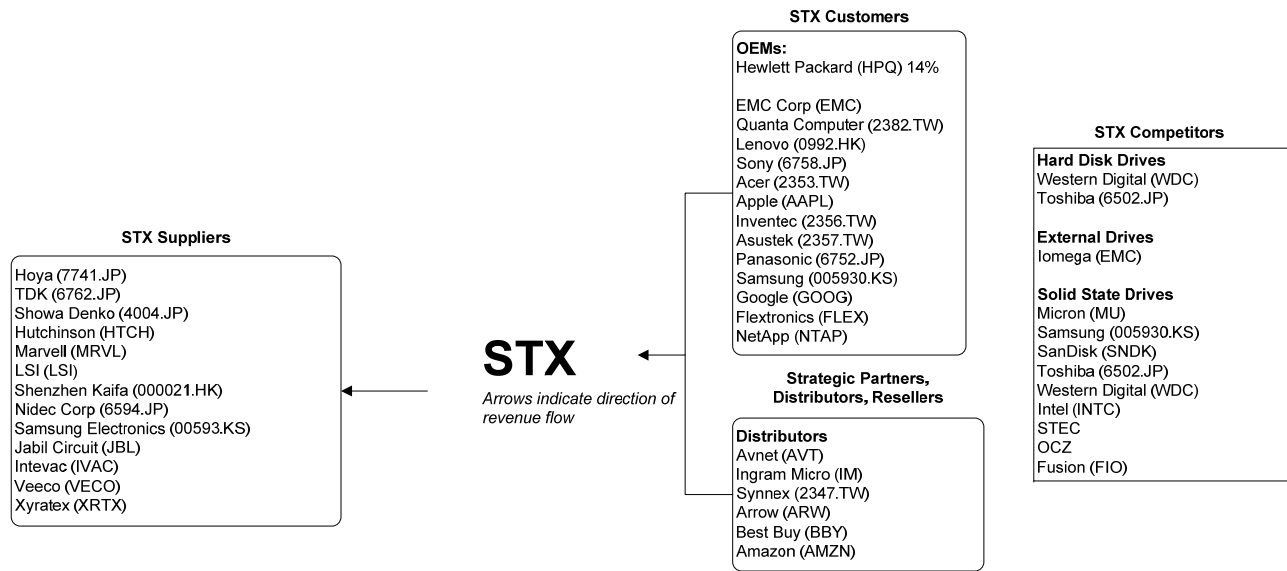
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

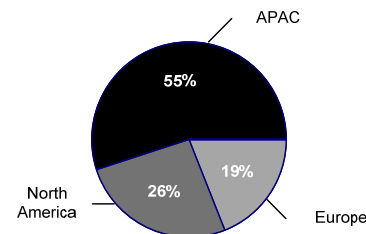
Figure 546. Seagate (STX)

Sector: Storage – Hard Disk Drive

Seagate Technology (STX)



Product Breakdown



Geographic Breakdown

Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Masahiro Shibano

Seiko Epson

Seiko Epson Corp. engages in the development, manufacture, and sales of information equipment. It operates through the following segments: Information Equipment, Device and Precision Products, and Others. The Information Equipment segment offers inkjet printers, page printers, serial impact dot matrix printers, large-format inkjet printers, color image scanners, mini printers, point-of-sale systems printers, projectors, projector panels, label writers, and personal computers. The Device and Precision Products segment offers crystal units, crystal oscillators, quartz sensors, complementary metal-oxide semiconductor large scale integration products, watches, watch movements, plastic corrective lenses, precision industrial robots, integrated circuit handlers, and industrial inkjet equipment. The Other segment engages in the intra-group services and small-and medium-sized liquid crystal display. The company was founded on May 18, 1942 and is headquartered in Suwa, Japan.

Figure 547. Seiko Epson (6724.JP) Results and Forecasts

	2009	2010	2011	2012	2013	CIR 2014E	Street 2014E	CIR 2015E	Street 2015E
Revenues	1122497.0	985363.0	973663.0	877997.0	851297.0	892300.0	887121.0	891600.0	883243.0
- y/y growth	-16.7%	-12.2%	-1.2%	-9.8%	-3.0%	4.8%	4.2%	-0.1%	-0.4%
Gross Margins	25.8%	26.3%	27.0%	28.3%	27.5%	28.2%		28.9%	
Operating Margins	-0.1%	1.8%	3.4%	2.8%	2.5%	4.1%		4.8%	
EPS	-569.82	-100.42	51.25	25.19	-50.50	82.59	94.95	103.61	105.90
- y/y growth	-686.0%	82.4%	151.0%	-50.9%	-300.5%	263.5%	288.0%	25.5%	11.5%
Cash	172921.0	193117.0	125807.0	123093.0	106678.0	103481.0		106181.0	
Debt	346047.0	309060.0	270722.0	238812.0	271126.0	266126.0		256126.0	
Net Cash/Shr	-575.3	-144.5	-208.7	-72.1	-179.3	-170.3		-106.7	
Tangible Book Value/Shr	1557.0	1407.9	1347.7	1233.5	1285.1	1348.4		1425.9	

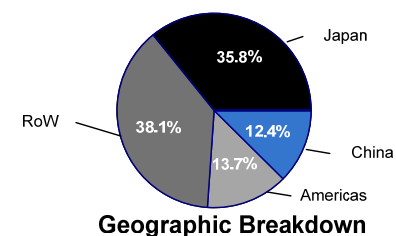
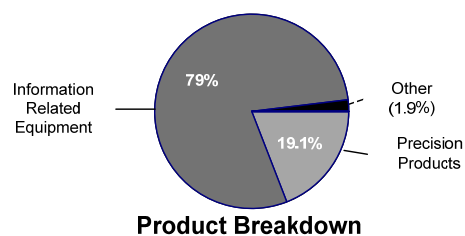
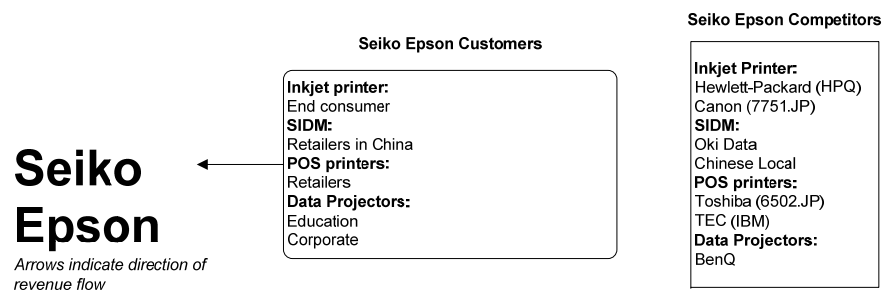
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 548. Seiko Epson (6724.JP)

Sector: Hardware

Seiko Epson (6724.JP)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Terence Whalen

Semtech

Semtech Corporation is a fabless application-focused analog and mixed-signal supplier. Semtech's products are designed into end-applications including consumer (29%), computing (16%), communications (32%), and industrial and military (23%). Approximately 48% of sales are through distributors and 52% directly to OEMs. Semtech's top customer is Samsung with Frontek its top distributor. Samsung was 13% of sales and Frontek was 10% of sales in F2012. Competitors in power management include Texas Instruments, Linear, Maxim, Fairchild and Intersil; ST Micro, ON semiconductor, NXP, and Infineon in protection products; and Texas Instruments, Silicon labs, and Maxim in test and measurement industrial products. Semtech recognizes distributor revenue on sell-through in North America and Europe and sell-in in Asia. Semtech's fiscal year ends in January.

Figure 549. Semtech (SMTC) Results and Forecasts

	2009	2010	2011	2012	2013	CIR 2014E	Street 2014E	CIR 2015E	Street 2015E
Revenues	294.8	286.6	454.5	480.6	578.8	676.6	677.7	738.7	745.7
- y/y growth			58.6%	5.7%	20.4%	16.9%	17.1%	9.2%	10.0%
Gross Margins	54.1%	55.2%	59.5%	59.4%	61.0%	61.4%		61.6%	
Operating Margins	15.9%	14.4%	22.9%	22.8%	19.8%	21.5%		24.0%	
EPS	0.85	0.87	1.71	1.73	1.70	2.22	2.18	2.69	2.66
- y/y growth			96.8%	0.8%	-1.6%	30.5%	28.2%	21.1%	22.1%
Cash	246.4	136.1	231.3	310.1	228.2	328.1		538.1	
Debt	0.0	0.0	0.0	0.0	330.7	282.3		282.3	
Net Cash/Shr	4.0	2.2	3.6	4.6	-0.8	0.7		3.7	
Tangible Book Value/Shr	5.8	3.2	5.4	7.2	1.6	4.7		8.4	

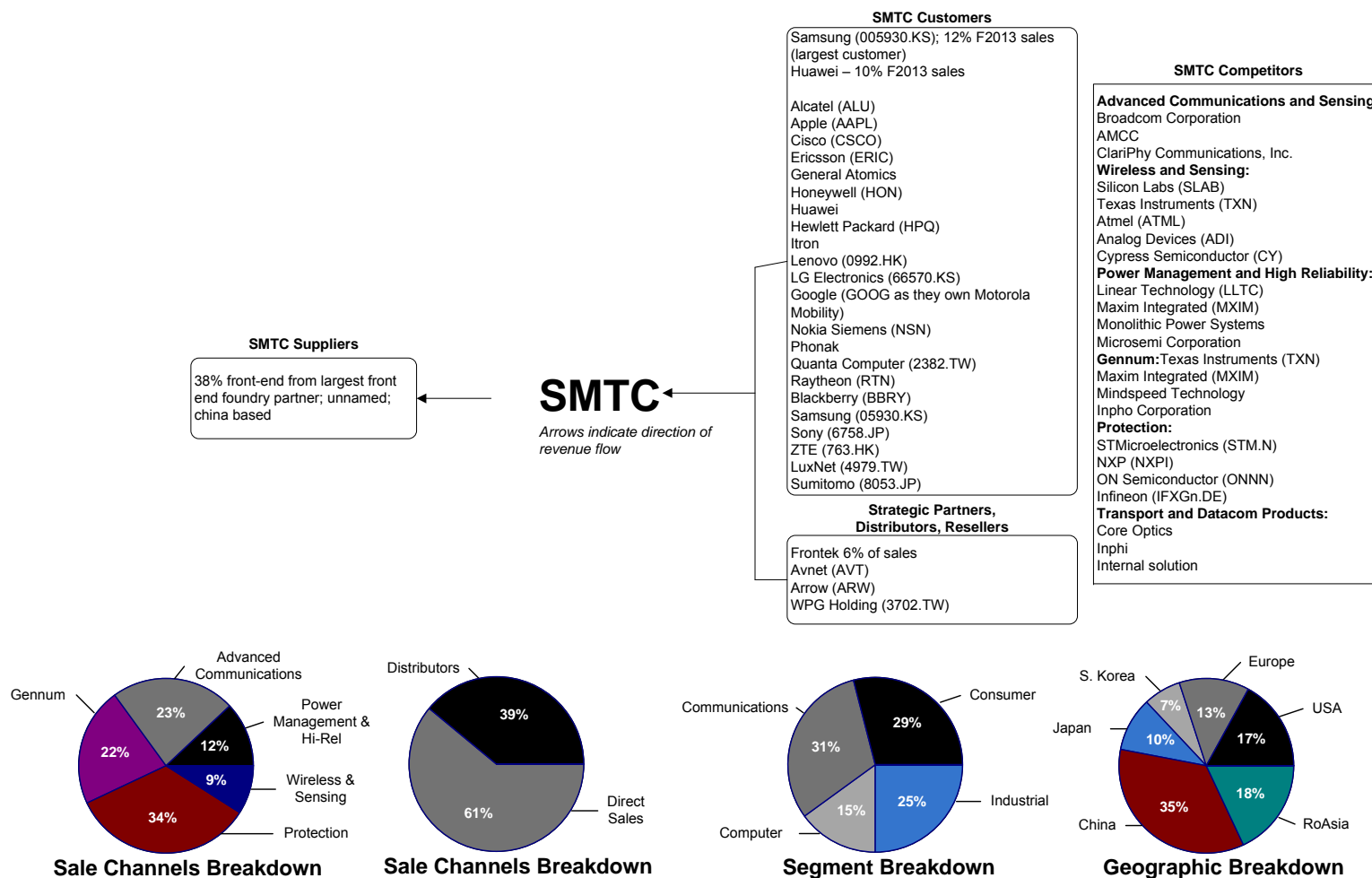
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 550. Semtech (SMTC)

Sector: Semiconductors

Semtech (SMTC)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jim Suva, CPA

Sensata Technologies Holding B.V.

Sensata Technologies Holding B.V. develops, manufactures, and sells sensors and controls. These products are generally considered mission critical components used in aerospace, automotive, industrial, construction, wireless infrastructure, and Heating, Ventilating, and Air Conditioning systems (HVAC) and generally represent a small portion of total bill of materials for such products and systems. The company was originally founded as General Plate Company in 1916 to provide gold plating for the jewelry industry. Through various transactions the company was eventually acquired by Texas Instruments in 1959 until 2006 at which time Texas Instruments divested Sensata for \$3 billion to Bain Capital. Sensata filed its initial public offering to trade on the New York Stock Exchange and the stock started trading on March 11, 2010 with the ticker ST starting on March 11, 2010. Citi was a co-manager on the offering. Sensata is legally incorporated in the Netherlands as a part of Texas Instruments' historical M&A and also for lower taxes while the company's executive management team is in Attleboro, Massachusetts. Sensata's manufacturing plants are located in Massachusetts, Mexico, Dominican Republic, Brazil, The Netherlands, China, Japan, Korea, and Malaysia. Sensata has approximately 11,400 employees of which less than 10% are located in the United States. Sales by end market are 64% automotive (23% Europe Auto, 16% North America Auto, 26% Asia/RoW Auto), 9% HVAC, 9% Industrial, 7% HVOR, and 10% Other. Sales by end market: 35% Americas, 27% Europe, and 38% Asia Pacific. The word Sensata is Latin meaning for those gifted with sense.

Figure 551. Sensata (ST) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	1422.8	1134.9	1540.1	1826.9	1913.9	1950.0	1970.7	2129.5	2174.9
- y/y growth		-20.2%	35.7%	18.6%	4.8%	1.9%	3.0%	9.2%	10.4%
Gross Margins	33.8%	35.5%	38.3%	36.4%	35.2%	35.7%		36.0%	
Operating Margins	21.3%	24.0%	26.9%	24.7%	25.0%	24.7%		25.2%	
EPS	0.74	0.78	1.77	1.96	1.96	2.07	2.13	2.36	2.52
- y/y growth		5.4%	127.0%	10.6%	0.2%	5.2%	8.4%	14.0%	18.3%
Cash	77.7	148.5	493.7	92.1	413.5	363.7		541.1	
Debt	2511.2	2300.8	1889.7	1835.7	1824.7	1532.0		1337.0	
Net Cash/Shr	-15.3	-13.9	-8.0	-9.5	-7.7	-5.3		-3.2	
Tangible Book Value/Shr	-15.0	-13.9	-7.5	-8.2	-6.4	-4.9		-2.8	

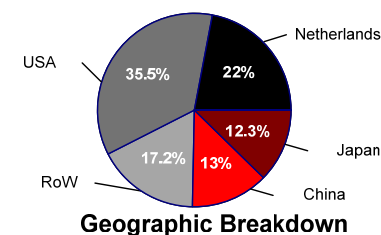
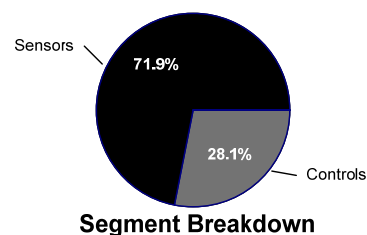
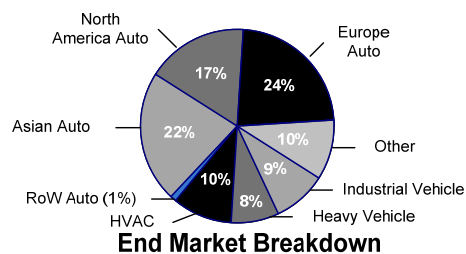
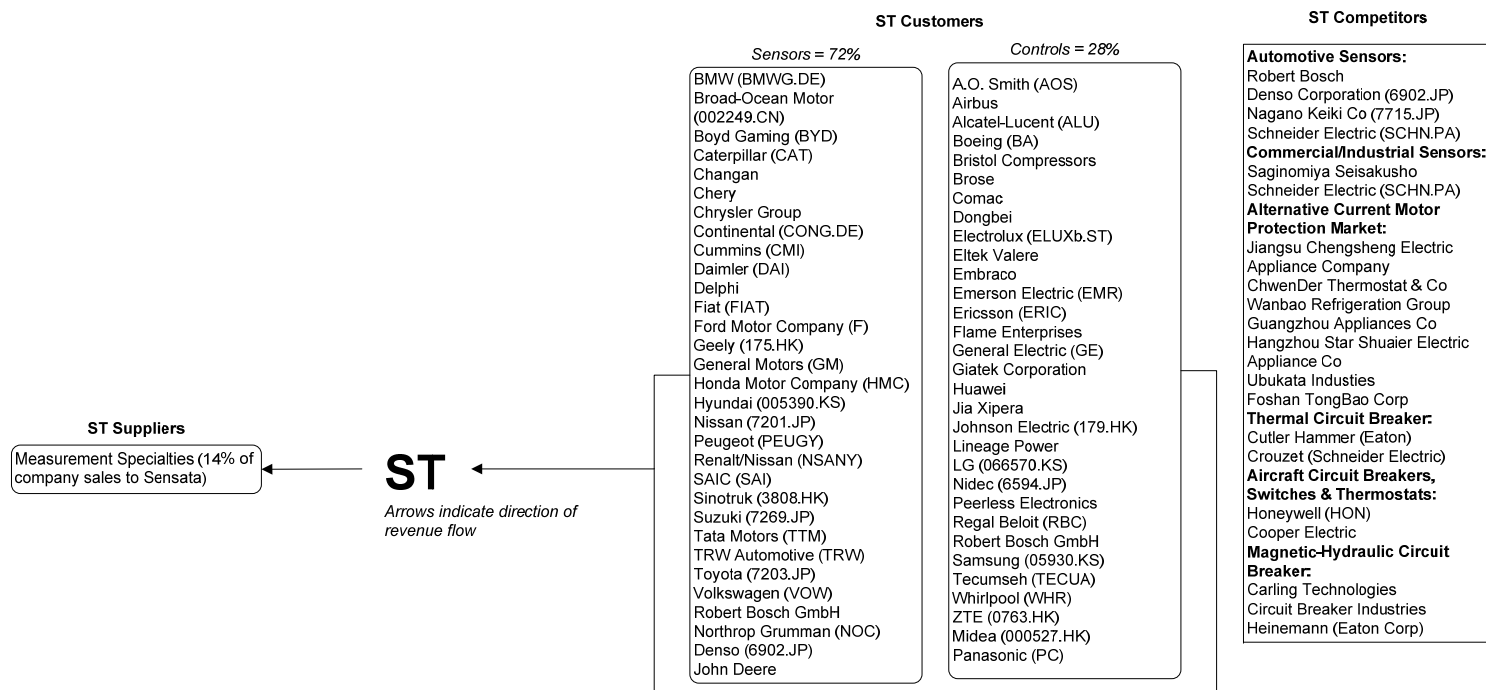
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 552. Sensata (ST)

Sector: Technology Supply Chain - Connectors

Sensata (ST)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Kota Ezawa

Sharp

SHARP Corp. engages in the manufacture and sale of consumer electronic products. It operates through the Consumer/Information Products and Electronic Components segments. The Consumer/Information Products segment provides audio-visual and communication equipment, health and environment equipment, and information equipment. The Electronic Components segment provides liquid crystal displays (LCD), solar cells, and other electronic devices. The company was founded by Tokuji Hayakawa on September 15, 1912 and is headquartered in Osaka, Japan.

Figure 553. Sharp (6753.JP) Results and Forecast

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	3417736.0	2847227.0	2755948.0	3021973.0	2455850.0	2448000.0	2455347.0	2647000.0	2535030.0
- y/y growth	9.3%	-16.7%	-3.2%	9.7%	-18.7%	-0.3%	0.0%	8.1%	3.2%
Gross Margins	22.1%	16.0%	19.1%	18.8%	16.8%	9.4%		16.8%	
Operating Margins	5.4%	-1.9%	1.9%	2.6%	-1.5%	-6.5%		1.8%	
EPS	86.91	-106.68	3.78	16.47	-341.78	-406.23	-393.14	-11.23	3.93
- y/y growth	-3.4%	-222.8%	103.5%	335.7%	-2175.2%	-18.9%	-15.0%	97.2%	101.0%
Cash	391277.0	336937.0	348414.0	247888.0	195325.0	203000.0		223000.0	
Debt	660130.0	806480.0	794453.0	820961.0	1094467.0	1182000.0		1188000.0	
Net Cash/Shr	33.8	-60.3	-130.4	-250.1	-285.1	-18.8		-169.8	
Tangible Book Value/Shr	1036.0	865.3	876.0	851.2	497.8	107.9		110.9	

(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 554. Sharp (6753.JP)

Sector: Consumer Electronics

Sharp (6753.JP)

Sharp Suppliers

SK-Elec (6677.JP)
Kurita Water (6370.JP)
Kuroda Elec (7517.JP)
Kuramoto (5216.JP)
V Tech (7717.JP)
Geomatec (6907.JP)
Corning (GLW)
Tokyo Electron (8035.JP)
Hon Hai (2317.TW)
Rohm (6963.JP)
Nippon Elec Glass (5214.JP)
CSR PLC (CSR.L)
Hitachi High Tech (8036.JP)
Japan Steel Work (5631.JP)
Tokyo Electron (8035.JP)
Murata (6981.JP)
Hitachi Chem (5217.JP)
Sandisk (SNDK)
Nuance (NUAN)
Seiko Epson
Avago (AVGO)
Du Pont (DD)
Cypress (CY)
Analog Devices (ADI)
Texas Instruments (TXN)
Qualcomm (QCOM)
Renesas Electronics (6723.JP)
NXP Semiconductor (NXPI)
Asahi Glass (5201.JP)
Nitto Denko (6988.JP)
JSR Corp (4185.JP)

Sharp Customers

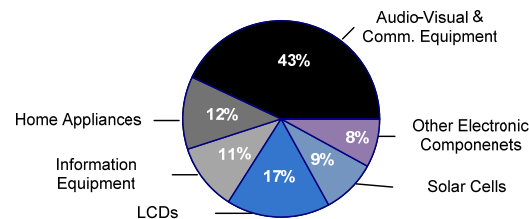
Stanley Elec (6923.JP)
Canon (7751.JP)
Best Buy (BBY)
Wal-Mart (WMT)
Yamada Denki (9831.JP)
NTT Docomo (9437.JP)
Softbank (9984.JP)
Apple (AAPL)
Samsung (005930.KS)
Hewlett-Packard (HPQ)
Acer (2353.TW)

Sharp Competitors

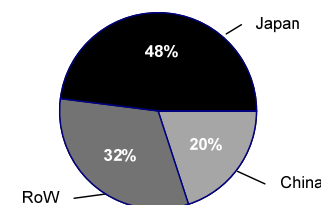
Apple (AAPL)
Samsung (005930.KS)
Motorola (MSI)
Nokia (NOK1V)
LG Electronics (066570.KS)
Blackberry (BBRY)
ZTE Corp (763.HK)
TCL Comm. (2618.HK)
Pantech (5125.MY)
Sony Ericsson
Panasonic (6752.JP)
Avigilon (AVO)
Innolux (3481.TW)
LG Display (034220.KS)
CPT (000536.CH)
Japan Display
Sanpower

Sharp

Arrows indicate direction of revenue flow



Product Breakdown



Geographic Breakdown

Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Yuta Fukasawa

Shinko Electric Industries

Shinko Electric Industries Co., Ltd. is engaged the manufacture and sale of semiconductor packages. It operates through the following business segments: Plastic Package, Metal Package, and Others. The Plastic Package segment manufactures plastic laminated packages (PLP) and integrated circuit assemblies. The Metal Package segment produces semiconductor lead frames, glass-to-metal seals, heat spreader, ceramic electro static chucks, and precision contact parts. The Others segment deals with the operation of its subsidiaries. The company was founded on February 1946 and is headquartered in Nagano, Japan.

Figure 555. Shinko Electric (6967.JP) Results and Forecasts

	2009	2010	2011	2012	2013	CIR 2014E	Street 2014E	CIR 2015E	Street 2015E
Revenues	140510.0	129836.0	140923.0	125825.0	124240.0	126800.0	138019.0	122800.0	142600.0
- <i>y/y growth</i>	-34.6%	-7.6%	8.5%	-10.7%	-1.3%	2.1%	11.1%	-3.2%	3.3%
Gross Margins	5.1%	13.2%	11.6%	6.2%	10.4%	15.0%		15.3%	
Operating Margins	-4.9%	4.1%	3.3%	-2.9%	0.6%	5.5%		5.5%	
EPS	-44.73	23.61	17.81	-16.61	14.32	33.00	55.28	32.26	59.51
- <i>y/y growth</i>	-153.3%	152.8%	-24.6%	-193.3%	186.2%	130.5%	286.2%	-2.2%	7.6%
Cash	20173.0	21057.0	23625.0	16261.0	7273.6	6573.6		8447.7	
Debt	600.0	600.0	600.0	600.0	600.0	600.0		600.0	
Net Cash/Shr	149.3	155.9	174.9	120.4	53.8	48.6		62.5	
Tangible Book Value/Shr	974.4	994.7	992.9	955.5	946.7	959.7		972.0	

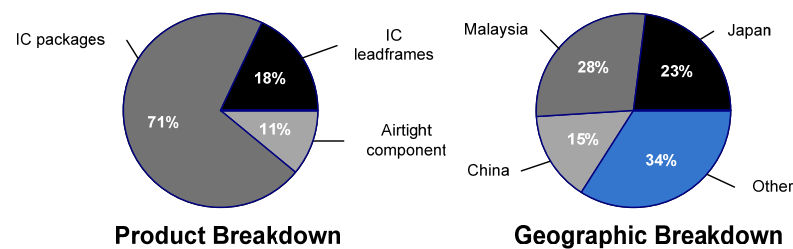
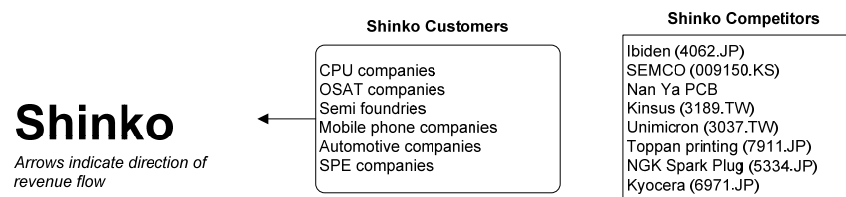
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 556. Shinko Electric (6967.JP)

Sector: Semiconductors

Shinko Electric Industries (6967.JP)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Terence Whalen

Silicon Laboratories

Silicon Labs is a non-traditional mixed-signal vendor that: a) is totally fabless so uses TSMC for foundry and ASE / Amkor for backend and b) designs products with complementary metal oxide silicon (CMOS) which is a difficult process for analog mixed-signal designs but offers cost/size/performance advantages if successfully implemented. Sales are spread across consumer audio (12%), handset FM tuners (3%), video tuners & demodulators (17%), embedded MCU/wireless (29%), timing (13%), touch (5%), access (19%) and mature products (1%). Two distributors, Edom Technology and Avnet, represented 22% and 11% of CY12 sales. Samsung represented 19% of sales in 2012 with Cisco, Huawei, LG Electronics, Pace, Panasonic, Sagem, Samsung, Technicolor, Varian Medical Systems and ZTE as other major customers. SLAB is headquartered in Austin TX, and its fiscal year ends in December.

Figure 557. Silicon Laboratories (SLAB) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	415.6	441.0	493.3	491.6	563.3	595.6	595.2	656.6	646.1
- y/y growth		6.1%	11.9%	-0.3%	14.6%	5.7%	5.7%	10.3%	8.6%
Gross Margins	61.5%	63.4%	65.7%	60.7%	60.0%	61.3%		61.5%	
Operating Margins	13.9%	15.2%	17.6%	11.8%	15.5%	16.0%		18.5%	
EPS	1.89	2.40	2.26	1.80	2.16	2.32	2.28	2.80	2.52
- y/y growth		26.8%	-5.9%	-20.4%	20.2%	7.5%	5.7%	20.6%	10.3%
Cash	273.5	410.2	365.9	307.5	282.0	380.0		495.3	
Debt	0.0	0.0	0.0	0.0	100.0	97.5		97.5	
Net Cash/Shr	5.6	8.8	7.8	6.9	4.3	6.6		9.2	
Tangible Book Value/Shr	7.8	11.0	10.6	10.2	10.4	13.2		16.6	

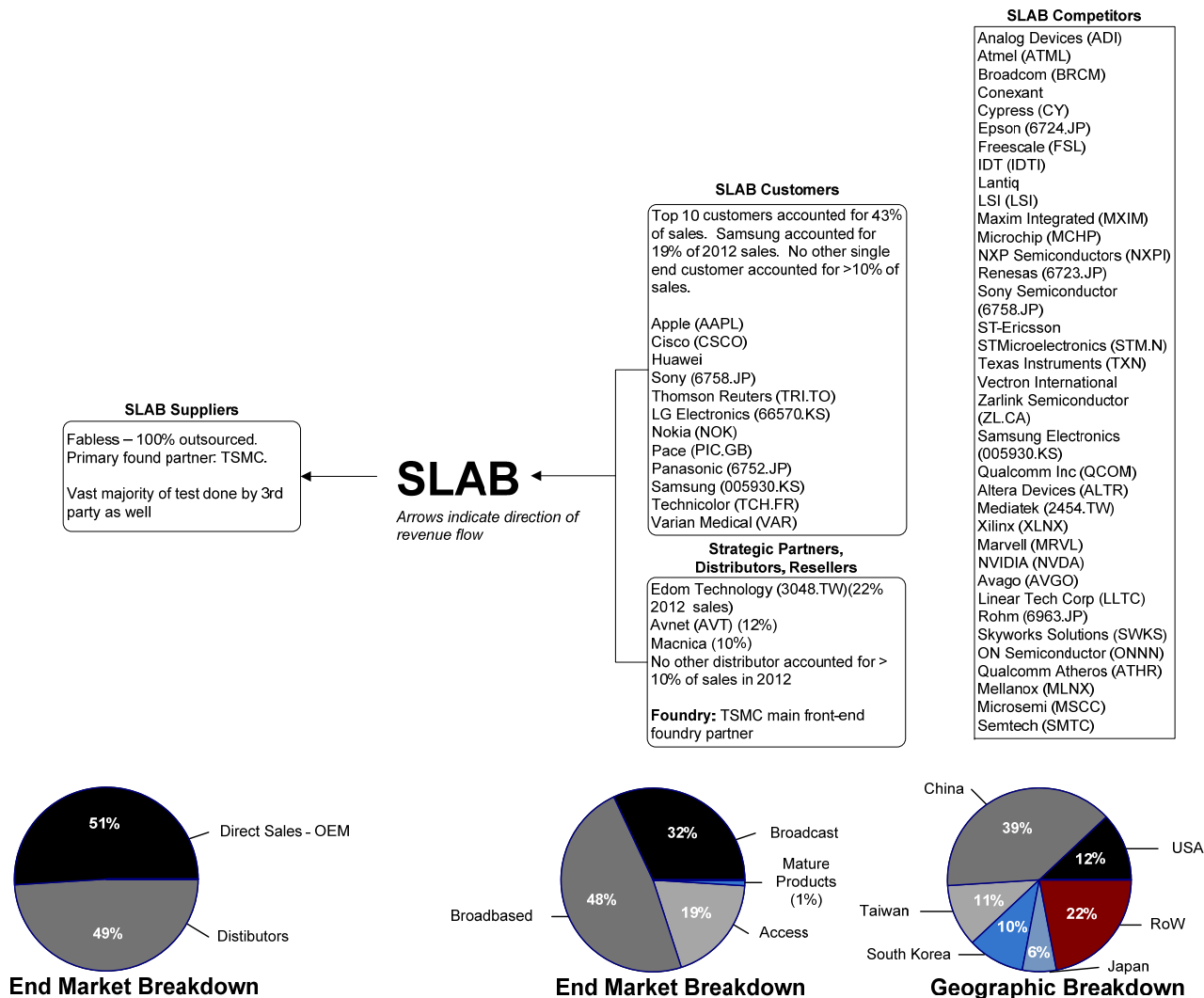
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 558. Silicon Laboratories (SLAB)

Sector: Semiconductors

Silicon Laboratories, Inc. (SLAB)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Silitech Technology

Silitech, which is 34.5%-owned by Lite-On Technology, is a keypad component vendor in Taiwan. In 2011, around 80% of revenue exposure was related to handset keypads, with the remainder coming from automotive and office automation components. Major handset customers include Nokia, Samsung, and RIM.

Figure 559. Silitech (3311.TW) Results and Forecasts

	2008	2009	2010	2011	2012	Street 2013E	Street 2014E
Revenues	9105.6	10820.9	13835.4	13630.1	9052.5	9382.47	10264.6
- <i>y/y growth</i>	2.2%	18.8%	27.9%	-1.5%	-33.6%	3.6%	9.4%
Gross Margins	22.3%	22.7%	21.9%	22.1%	24.1%		
Operating Margins	12.0%	13.5%	13.6%	12.1%	11.2%		
EPS	6.28	7.08	8.07	7.30	4.67	4.70	5.11
- <i>y/y growth</i>	-15.5%	12.9%	13.9%	-9.5%	-36.0%	0.5%	8.9%
Cash	2583.89	4079.68	5499.83	5117.37	4771.35		
Debt	1553.01	1728.35	1611.31	2208.11	1208.31		
Net Cash/Shr	8.46	13.52	15.71	2.81	10.13		
Tangible Book Value/Shr	25.10	29.30	31.76	34.94	33.80		

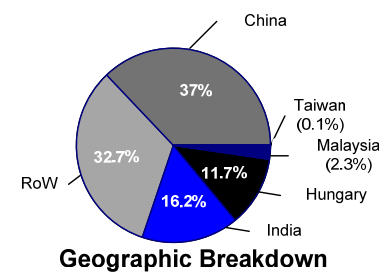
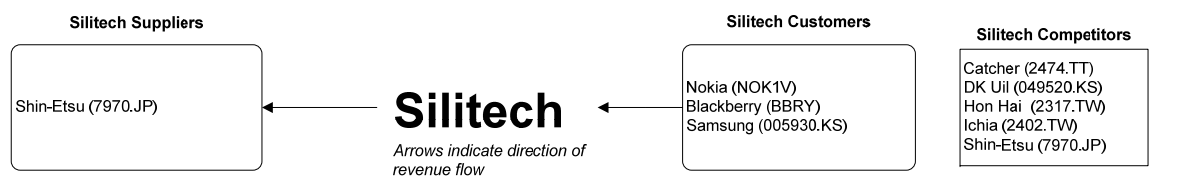
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, FactSet

Figure 560. Silitech Technology (3311.TW)

Sector: PC & Enterprise Hardware

Silitech Technology Corp. (3311.TW)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Wei Chen

Simplo Technology

Established in 1992, Simplo specializes in designing and producing battery packs for Notebooks, tablet PC, and electronic vehicle products. With strong execution and cost advantages, Simplo continues to broaden its client base. Its major customers include PC OEMs (such as HPQ, Asus, Acer, and Apple) and NB ODMs (such as Quanta, Compal, Wistron, and Inventec).

Figure 561. Simplo (6121.TW) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	30736.2	34253.1	38699.4	48113.8	58833.4	60766.2	63501.6	74230.5	74111.2
- y/y growth	33.1%	11.4%	13.0%	24.3%	22.3%	3.3%	7.9%	22.2%	16.7%
Gross Margins	18.1%	17.2%	18.1%	14.3%	12.0%	11.4%		10.6%	
Operating Margins	9.4%	9.7%	10.3%	8.4%	7.3%	6.9%		6.2%	
EPS	7.71	7.97	10.80	11.96	10.71	11.28	10.91	11.96	12.22
- y/y growth	57.6%	3.5%	35.4%	10.8%	-10.4%	5.3%	1.8%	6.1%	12.0%
Cash	3783.4	4760.4	7228.3	7706.3	8715.4	11499.6		14303.9	
Debt	328.9	320.5	946.2	3141.5	3684.0	3684.0		3684.0	
Net Cash/Shr	12.4	15.4	23.4	25.0	28.3	37.3		46.4	
Tangible Book Value/Shr	32.6	37.2	43.1	51.8	56.4	62.3		74.2	

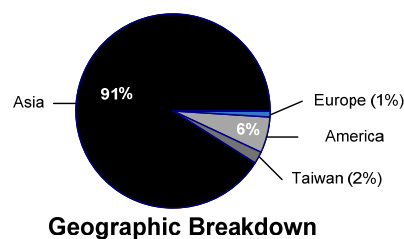
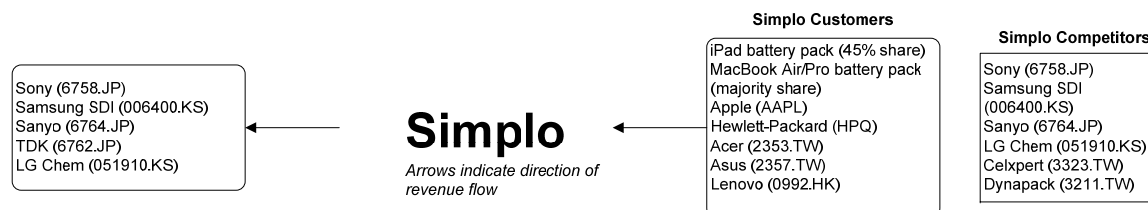
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 562. Simplo Technology (6121.TW)

Sector: Electronic Manufacturing Services

Simplo Technology Co. Ltd. (6121.TW)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Skyworks Solutions Inc

Skyworks Solutions, Inc. designs, develops, manufactures and markets proprietary semiconductor products. It offers diverse standard and custom linear products supporting automotive, broadband, cellular infrastructure, energy management, GPS, industrial, medical, military, wireless networking, smartphone and tablet applications. The company's portfolio consists of amplifiers, attenuators, circulators, demodulators, detectors, diodes, directional couplers, front-end modules, hybrids, infrastructure RF subsystems, isolators, lighting and display solutions, mixers, modulators, optocouplers, optoisolators, phase shifters, PLLs/synthesizers/VCOs, power dividers/combiners, power management devices, receivers, switches and technical ceramics. Skyworks Solutions was founded on June 25, 2002 and the company roots back to 1962 is headquartered in Woburn, MA.

Figure 563. Skyworks Solutions (SWKS) Results and Forecasts

	2008	2009	2010	2011	2012	Street 2013E	Street 2014E
Revenues	860.0	802.6	1071.8	1418.9	1568.6	1788.39	1976.7
- <i>y/y growth</i>	15.9%	-6.7%	33.6%	32.4%	10.5%	14.0%	10.5%
Gross Margins	39.2%	38.9%	42.0%	42.5%	40.4%		
Operating Margins	10.6%	10.9%	18.5%	21.0%	16.8%		
EPS	0.57	0.69	1.26	1.89	1.90	2.17	2.52
- <i>y/y growth</i>	46.2%	21.1%	82.6%	50.0%	0.5%	13.9%	16.3%
Cash	231.07	370.08	459.39	410.80	307.11		
Debt	187.62	129.73	74.74	26.09	0.00		
Net Cash/Shr	1.05	1.24	1.22	1.92	1.49		
Tangible Book Value/Shr	2.66	3.50	4.54	4.61	5.26		

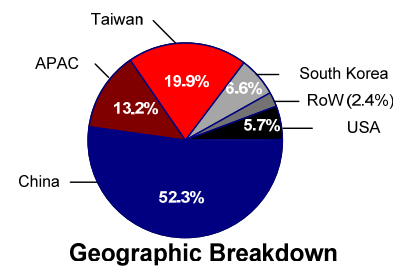
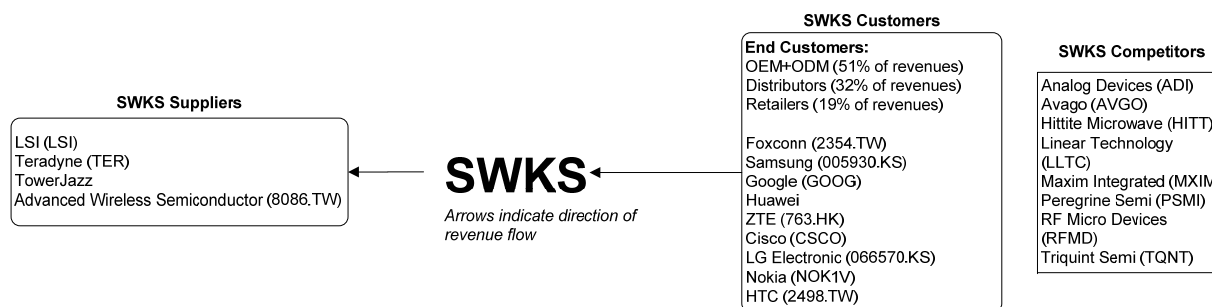
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, FactSet

Figure 564. Skyworks Solutions (SKWS)

Sector: Specialty Semiconductor

Skyworks Solutions Inc. (SWKS)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jason Channell

SMA Solar Technology

SMA produces inverters (DC to AC) which are required in every solar installation. The company offers the entire power range of inverters for residential, commercial and industrial solar installations, and is the market leader with around 25% market share globally.

Figure 565. SMA Solar (S92.DE) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	681.6	934.3	1920.1	1676.3	1453.3	1119.0	1144.1	1122.3	1187.1
- <i>y/y growth</i>	108.2%	37.1%	105.5%	-12.7%	-13.3%	-23.0%	-21.3%	0.3%	3.8%
Gross Margins	38.5%	37.8%	37.2%	30.6%	28.3%	24.5%		24.7%	
Operating Margins	24.6%	24.4%	26.9%	14.3%	8.6%	-0.7%		5.5%	
EPS	3.44	4.64	10.52	4.79	2.61	-0.09	-0.56	1.35	0.45
- <i>y/y growth</i>	179.7%	34.8%	126.6%	-54.5%	-45.5%	-103.4%	-121.5%	1623.8%	180.4%
Cash	240.7	225.0	354.1	371.1	326.1	356.5		363.5	
Debt	21.5	20.2	21.2	33.9	33.9	33.9		33.9	
Net Cash/Shr	6.4	5.9	9.6	9.8	8.5	9.4		9.6	
Tangible Book Value/Shr	7.9	11.3	20.1	21.1	21.8	20.5		21.4	

(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 566. SMA Solar Technology (S92.DE)

Sector: Alternative Energy

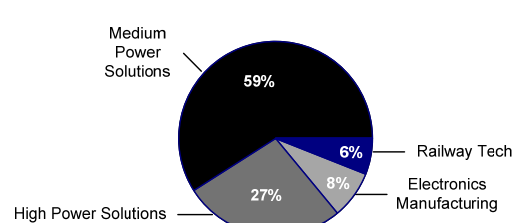
SMA Solar Technology (S92.DE)

S92-DE

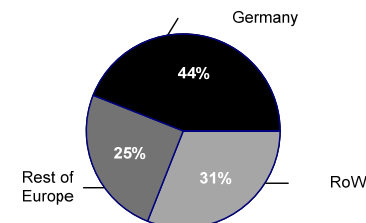
Arrows indicate direction of revenue flow

SMA Solar Competitors

Advanced Energy Industries (AEIS)
Enphase (ENPH)
Fronius
General Electric (GE)
Isofoton
Kaco New Energy
Power-One (POWER)
Satcon (SATC)
Schneider Electric (SU.PA)
Siemens (SIE.DE)



Segment Breakdown



Geographic Breakdown

Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jason Channell

SolarWorld

SolarWorld is an integrated solar manufacturing company producing wafers, cells, modules and systems from its facilities in the US and Germany. Extensive advertising has produced a premium brand which have allowed its 'Sunkits' (complete solar installation packages) to historically provide premium pricing.

Figure 567. SolarWorld (SWV.DE) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	900.3	1012.6	1304.7	1046.9	602.0	545.4	697.6	544.3	771.9
- <i>y/y growth</i>	30.6%	12.5%	28.8%	-19.8%	-42.5%	-9.4%	15.9%	-0.2%	10.7%
Gross Margins	52.1%	36.9%	36.7%	28.8%	10.2%	26.8%		23.0%	
Operating Margins	29.0%	12.6%	14.8%	2.9%	-32.1%	-20.8%		-21.7%	
EPS	1.21	0.70	0.80	0.76	-2.20	-1.06	-1.02	-1.10	-0.71
- <i>y/y growth</i>	22.1%	-42.0%	14.1%	-4.8%	-387.7%	51.7%	53.8%	-3.5%	30.2%
Cash	836.7	509.7	613.5	553.3	324.2	331.4		225.0	
Debt	699.5	789.5	1141.6	1271.9	1079.8	1079.8		1079.8	
Net Cash/Shr	1.4	-2.2	-3.7	-5.4	-5.7	-5.6		-6.6	
Tangible Book Value/Shr	7.2	7.4	8.3	5.4	2.6	1.6		0.5	

(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 568. SolarWorld AG (SWV.DE)

Sector: Alternative Energy

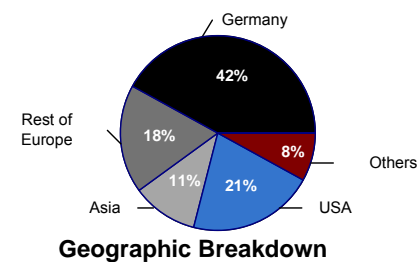
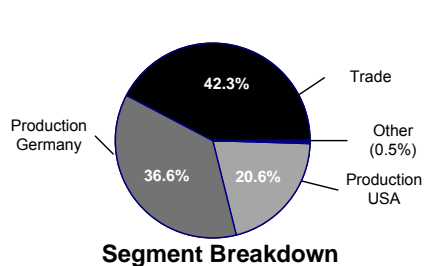
SolarWorld AG (SWV.DE)

SWV.DE

Arrows indicate direction of revenue flow

SolarWorld Competitors

Bosch Solar
Canadian Solar (CSIQ)
Chanzhou
CNVP Dongying
Conergy (CGYK.DE)
Guodian
Hanwha Solar (HSOL)
Hereon Solar
JA Solar (JASO)
Jinko Solar (JKS)
LDK Solar (LDK)
Q-Cells (QCE.DE)
Renewable Energy Co.(REC)
Renesola SOL)
Sanyo
Shanghai Chaori (005506.HK)
Sharp (6753.JP)
Solar-Fabrik (SFX.DE)
Solargiga (757.HK))
Solon (SOO1)
Suntech (STP)
Tianwei
Trina Solar (TSL)
Yingli Green Energy (YGE)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Kota Ezawa

Sony

Sony Corp. is engaged in the development, design, manufacture, and sale of electronic equipment, instruments, devices, game consoles, and software for consumers, professionals, and industrial markets. Its operations are carried out through the following segments: Consumer Products and Service; Professional, Device and Solutions; Pictures; Music; Financial Services; and Other. The Consumer Products and Service segment includes Sony Computer Entertainment, Sony Network Entertainment, VAIO & Mobile Business Group, Personal Imaging and Sound Business Group, and Home Entertainment Business Group. The Professional, Device and Solutions Group segment includes Professional Solutions Group, Device Solutions Business Group, and Semiconductor Business Group. The Pictures segment includes planning, production, and distribution of films and television programs. The Music segment includes planning, production, manufacture, and sale of music software; and production and sale of animation works. The Financial Service segment includes life insurance, damage insurance, banking, and credit finance businesses. The Other segment includes Blu-ray disc, DVD, and CD; Network Service-related Business, advertising agency business, and others. The company was founded by Akio Morita and Masaru Ibuka on May 7, 1946 and is headquartered in Tokyo, Japan.

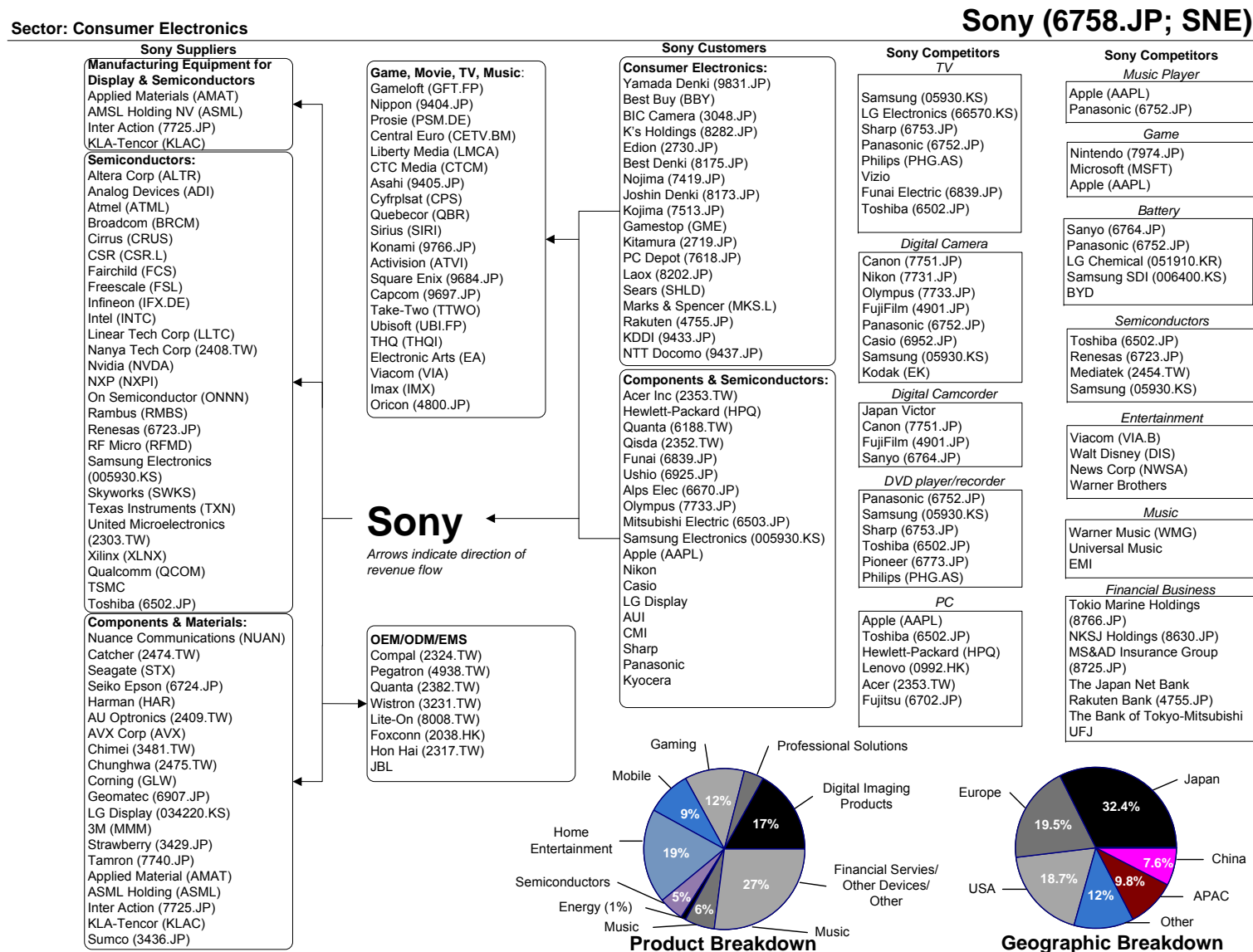
Figure 569. Sony (6758.JP) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	8871414.0	7729993.0	7213998.0	7181273.0	6493212.0	6670000.0	6680584.0	6925000.0	7030564.0
- y/y growth	6.9%	-12.9%	-6.7%	-0.5%	-9.6%	2.7%	2.9%	3.8%	5.2%
Gross Margins	29.1%	26.8%	32.2%	32.7%	32.4%	35.4%		33.2%	
Operating Margins	5.4%	-2.9%	0.4%	2.8%	-1.0%	2.7%		3.2%	
EPS	351.10	-94.18	-40.66	-258.48	-454.37	11.17	38.94	54.06	60.51
- y/y growth	191.9%	-126.8%	56.8%	-535.7%	-75.8%	102.5%	108.6%	384.0%	55.4%
Cash	1514140.0	1177610.0	1771101.0	1660583.0	1575489.0	1794000.0		1847000.0	
Debt	1084162.0	1111302.0	1208814.0	975586.0	1172582.0	1387000.0		1252000.0	
Net Cash/Shr	746.1	492.6	843.9	844.7	809.2	785.5		894.3	
Tangible Book Value/Shr	-2371.7	-3950.8	-4411.6	-5187.7	-6484.0	-7039.4		-7244.4	

(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 570. Sony (6758.JP)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Glen Yeung

Spansion Inc.

Spansion Inc is a top 3 vendor of NOR flash, a form of robust non-volatile memory. Spansion's particular focus is on the embedded NOR flash market, which accounts for over half of the overall NOR market, including wireless. Spansion emerged from Chapter 11 on May 10, 2010. The key components of their reorganization were new management, streamlined operations, a focus on embedded flash, and a flexible manufacturing strategy. Based in Sunnyvale, CA, Spansion has 3,400 employees, and currently serves over 4,000 customers.

Figure 571. Spansion (CODE) Results and Forecasts

	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	1410.7	1168.3	1069.9	915.9	901.6	913.0	947.3	1005.7
- y/y growth		-17.2%	-8.4%	-14.4%	-1.6%	-0.3%	5.1%	10.2%
Gross Margins	21.8%	21.1%	20.8%	31.0%	31.1%		33.2%	
Operating Margins	-8.9%	15.8%	5.8%	12.4%	7.3%		9.2%	
EPS	-0.49	1.56	1.41	1.03	1.02	1.06	1.30	1.44
- y/y growth		416.5%	-9.5%	-27.2%	-0.6%	3.7%	27.4%	35.0%
Cash	425.2	354.3	262.7	313.9	313.9		411.3	
Debt	64.2	454.9	449.4	416.3	415.0		415.0	
Net Cash/Shr	2.6	-1.0	-2.9	-1.6	-1.5		0.1	
Tangible Book Value/Shr	-5.3	3.1	2.9	4.1	5.2		6.5	

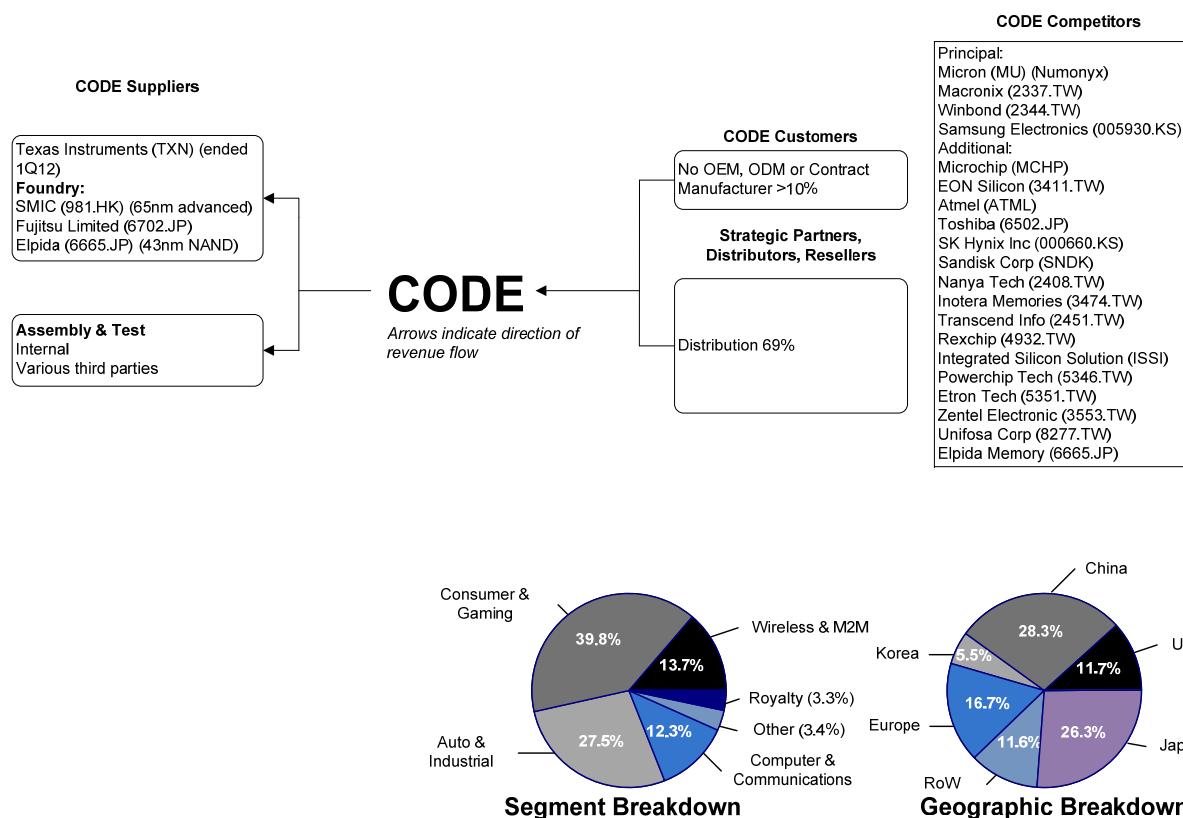
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 572. Spansion (CODE)

Sector: Semiconductors

Spansion Inc. (CODE)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Roland Shu

SPIL

Established in 1984, SPIL listed on the Taiwan Stock Exchange in 1993 and became a public company on the NASDAQ Stock Exchange in 2000. SPIL is a back-end IC packaging turnkey solutions provider that includes wafer bumping, wafer sort, assembly and testing. SPIL has manufacturing sites in Taiwan (Taichung, Hsinchu, Changhua) and China (Suzhou). SPIL is the world-wide No.3 Outsourced Assembly and Test (OSAT) provider with an 8.9% market share in 2010, according to Gartner.

Figure 573. SPIL (2325.TW) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	62402.9	59294.6	63857.5	61236.9	64654.6	68493.9	68758.6	76516.9	75662.5
- y/y growth	-3.4%	-5.0%	7.7%	-4.1%	5.6%	5.9%	6.3%	11.7%	10.0%
Gross Margins	20.7%	19.3%	15.4%	15.5%	18.2%	20.4%		22.8%	
Operating Margins	14.3%	13.7%	10.0%	8.3%	10.0%	11.2%		14.0%	
EPS	2.05	2.82	1.81	1.55	1.81	1.74	1.93	2.81	2.50
- y/y growth	-64.7%	37.8%	-36.0%	-14.0%	16.7%	-3.8%	6.4%	61.2%	29.9%
Cash	18841.0	20077.6	15519.0	15941.6	15858.0	22226.1		27497.6	
Debt	3652.4	225.5	5829.4	11046.1	14506.6	16211.7		15967.3	
Net Cash/Shr	5.4	6.4	3.6	2.1	1.2	3.6		5.3	
Tangible Book Value/Shr	19.0	20.2	19.7	18.9	19.3	19.4		20.9	

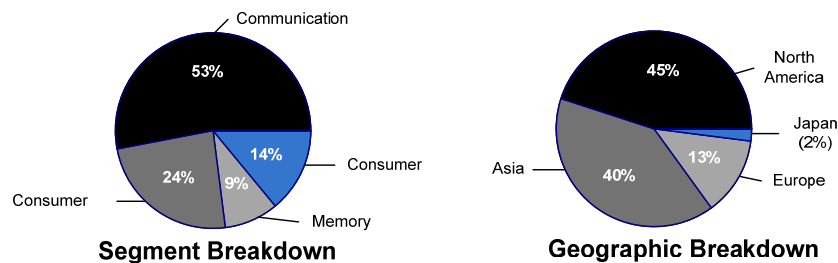
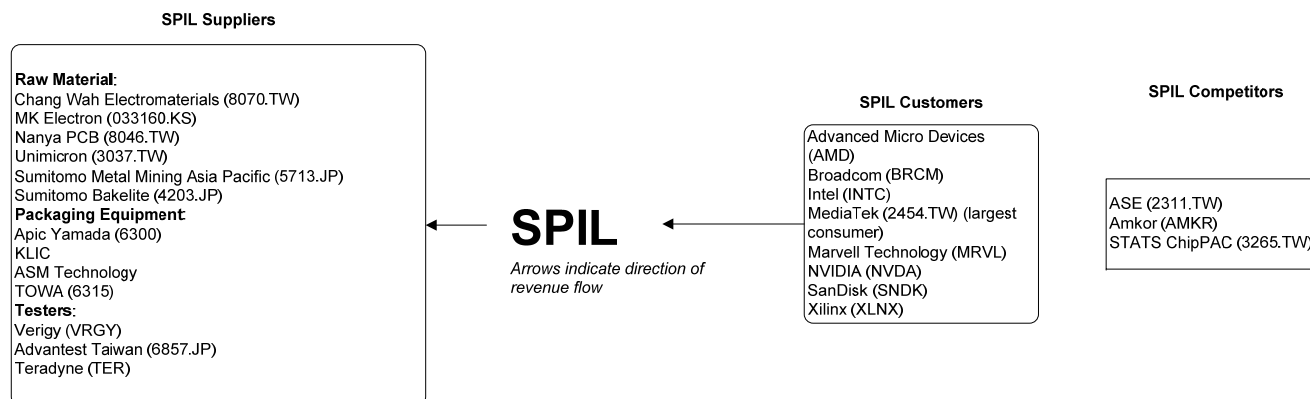
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 574. SPIL (2325.TW)

Sector: Semiconductors

SPIL (2325.TW)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Hugo Mills

Spirent Communications Plc

Spirent is a leading global provider of testing and assurance solutions that enable the development and deployment of next generation hardware devices and networking technologies, e.g. ethernet, wireless, positioning, web applications and security. The company has 1,540 employees and 1,400 customers spread across network equipment manufacturers, telco operators and governments.

Figure 575. Spirent (SPT.L) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	260.3	273.7	312.2	329.4	298.1	292.4	308.7	306.5	333.2
- y/y growth	9.9%	5.1%	14.1%	5.5%	-9.5%	-1.9%	3.6%	4.8%	7.9%
Gross Margins	64.6%	66.3%	66.6%	66.1%	71.6%	71.0%		72.0%	
Operating Margins	18.9%	20.3%	23.4%	23.6%	25.3%	22.5%		24.3%	
EPS	0.10	0.09	0.08	0.09	0.08	0.07	0.08	0.09	0.09
- y/y growth	212.5%	-14.2%	-13.4%	19.6%	-6.3%	-12.1%	-10.1%	14.2%	15.1%
Cash	58.6	107.6	143.5	152.2	153.0	174.0		214.4	
Debt	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Net Cash/Shr	0.1	0.2	0.2	0.2	0.2	0.3		0.3	
Tangible Book Value/Shr	0.1	0.2	0.3	0.3	0.3	0.3		0.4	

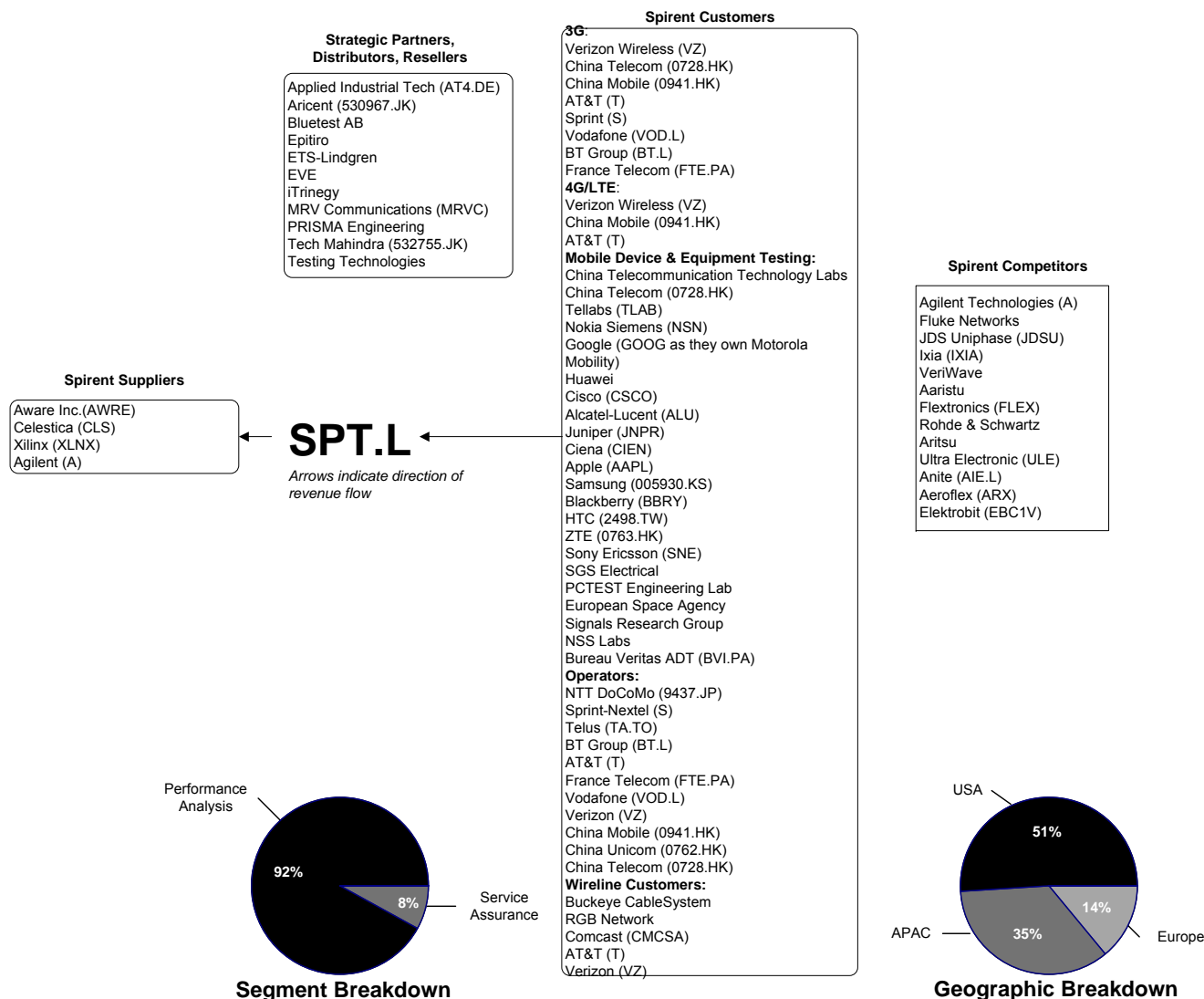
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 576. Spirent Communications (SPT.L)

Sector: Telecom Equipment

Spirent Communications (SPT.L)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Amit Harchandani

STMicroelectronics

STMicroelectronics is a global semiconductor company that designs and manufactures semiconductor products used in applications such as automotive, computer, telecommunications, consumer electronics, and industrial automation and control. It is headquartered in Switzerland.

Most Relevant Relationship: Apple

3

Figure 577. STMicroelectronics (STM)

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	6723.9	6119.0	7814.7	7000.7	6608.5	6419.7	6479.8	6489.4	6548.8
- y/y growth	-8.0%	-9.0%	27.7%	-10.4%	-5.6%	-2.9%	-1.9%	1.1%	1.1%
Gross Margins	36.2%	30.9%	38.8%	36.7%	32.8%	34.2%		35.2%	
Operating Margins	4.8%	-8.7%	5.6%	1.2%	-7.7%	-0.1%		6.6%	
EPS	0.27	-0.52	0.56	0.30	-0.26	0.23	0.04	0.39	0.39
- y/y growth	170.5%	-288.6%	208.1%	-45.9%	-184.9%	190.4%	117.0%	66.8%	802.0%
Cash	1187.4	1829.9	2200.4	1795.7	1886.1	1893.8		2210.6	
Debt	1914.9	1740.5	1322.9	1209.5	985.9	1217.7		1217.7	
Net Cash/Shr	-0.7	0.2	1.6	1.3	1.6	1.6		1.9	
Tangible Book Value/Shr	5.1	4.2	4.8	5.0	5.0	4.6		4.7	

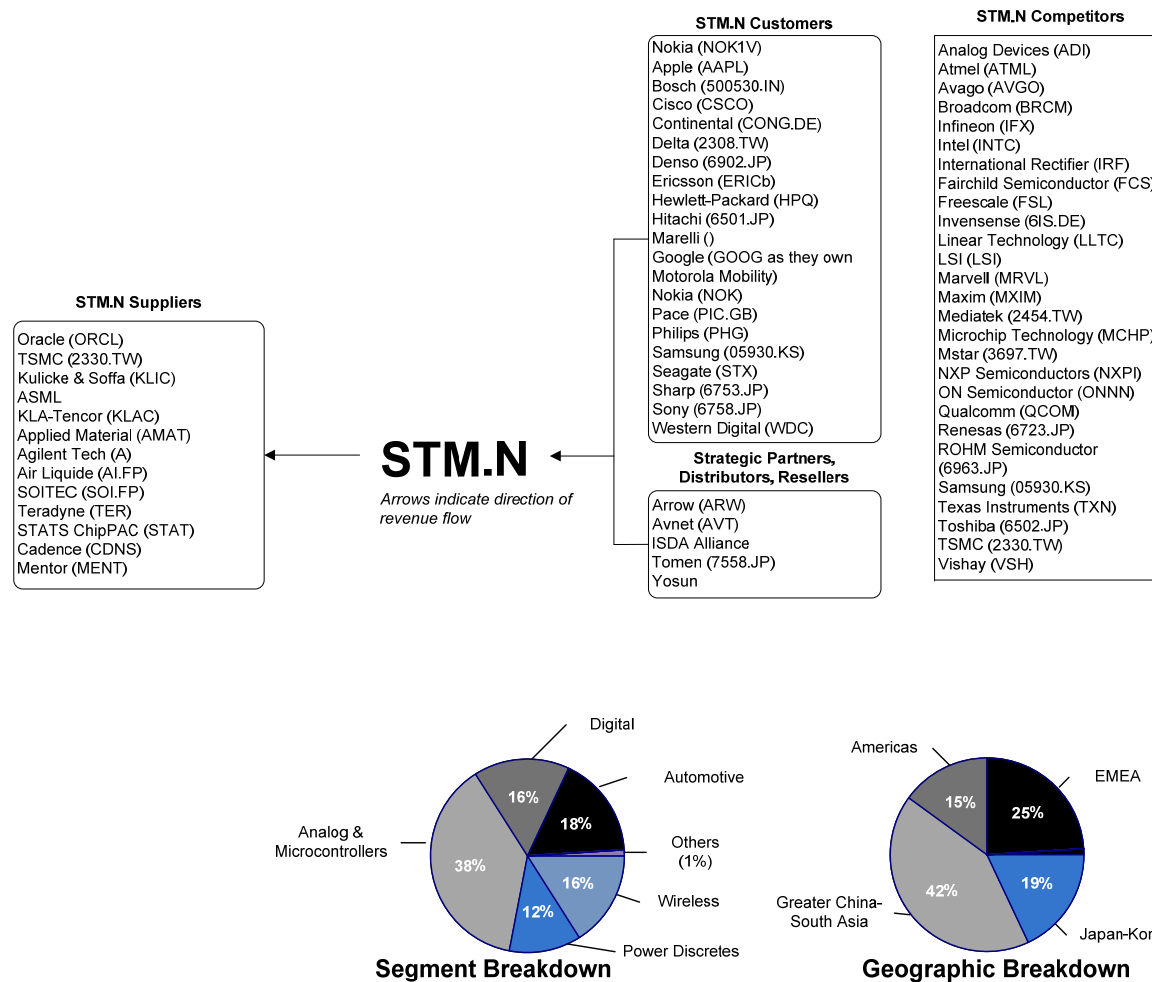
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 578. STMicroelectronics (STM)

Sector: Semiconductors

STMicroelectronics N.V. (STM)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Stratasys Ltd

Stratasys Ltd. manufactures 3D printers and production systems for rapid prototyping and manufacturing applications. Its systems create precision 3D models and parts directly from 3D CAD software for use in testing form, fit and function throughout the design, development and production process. The company provides additive manufacturing solutions for the creation of parts used in the processes of designing and manufacturing products and for the direct manufacture of end parts. Its solutions are sold under various brands, including affordable desktop 3D printers for idea and design development, various systems for rapid prototyping, and production systems for direct digital manufacturing. The company also manufactures Solidscape 3D Printers and operates the RedEye On Demand digital-manufacturing service. Its wide range of solutions, based on its proprietary AM technologies and production materials, enhance the ability of designers, engineers and manufacturers to visualize and communicate product ideas and designs; manufacture tools, jigs, fixtures, casts and injection molds used in the process of manufacturing end products; manufacture customized and short run end products; and produce objects that could not otherwise be manufactured through subtractive manufacturing methodologies. Stratasys was founded on March 3, 1998 and is headquartered in Eden Prairie, MN.

Figure 579. Stratasys (SSYS) Results and Forecasts

	2008	2009	2010	2011	2012	Street 2013E	Street 2014E
Revenues	#N/A	67.5	87.9	121.1	215.2	437.60	529.3
- y/y growth	#N/A	#N/A	30.1%	37.8%	77.7%	103.3%	21.0%
Gross Margins	#N/A	56.9%	61.6%	61.2%	51.1%		
Operating Margins	#N/A	12.3%	13.8%	14.5%	8.0%		
EPS	0.71	0.28	0.63	0.97	1.49	1.89	2.49
- y/y growth	7.6%	-60.6%	125.0%	53.4%	54.1%	26.5%	32.2%
Cash	#N/A	#N/A	57.15	59.22	154.82		
Debt	#N/A	0.00	0.00	0.00	#N/A		
Net Cash/Shr	#N/A	0.42	0.90	0.42	#N/A		
Tangible Book Value/Shr	#N/A	#N/A	#N/A	5.57	6.22		

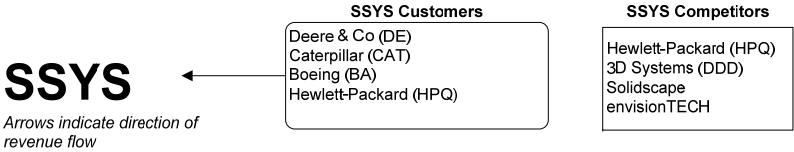
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, FactSet

Figure 580. Stratasys (SSYS)

Sector: 3D Printing

Stratasys Ltd. (SSYS)



Geographic Breakdown – 100% USA

Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Shahriar Pourreza, CFA

SunPower Corp.

Headquartered in California, SunPower Corp. is a vertically integrated manufacturer and service provider of solar photovoltaic technology. The company offers a suite of solar cells and solar panels based on traditional crystalline silicon technology and leverages proprietary manufacturing processes that have enabled it to achieve industry-leading conversion efficiencies. With its acquisition of PowerLight in early 2007, the company also entered into the solar systems segment where it designs, manufactures, and installs grid-connected commercial solar electric products and systems, integrating solar panels from both SunPower and external suppliers. Before its IPO in late 2005, SunPower operated as a subsidiary of Cypress Semiconductor.

Figure 581. SunPower (SPWR) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	1434.9	1524.3	2230.3	2498.3	2622.1	2684.4	2560.0	2896.8	2796.5
- y/y growth	84.9%	6.2%	46.3%	12.0%	5.0%	2.4%	-2.4%	7.9%	9.2%
Gross Margins	27.9%	20.4%	24.8%	13.6%	15.4%	16.4%		17.2%	
Operating Margins	18.2%	8.4%	11.7%	1.2%	3.7%	6.9%		7.7%	
EPS	2.17	1.01	1.79	0.28	0.19	0.78	0.62	0.97	0.71
- y/y growth	72.1%	-53.6%	77.8%	-84.4%	-32.0%	311.2%	225.1%	24.8%	14.6%
Cash	219.5	616.1	644.1	667.1	457.5	628.3		722.3	
Debt	411.8	785.5	839.9	975.0	814.3	848.9		856.4	
Net Cash/Shr	-2.3	-0.2	-1.9	-3.2	-3.0	-1.8		-1.1	
Tangible Book Value/Shr	10.8	12.7	13.0	10.7	8.5	9.0		9.8	

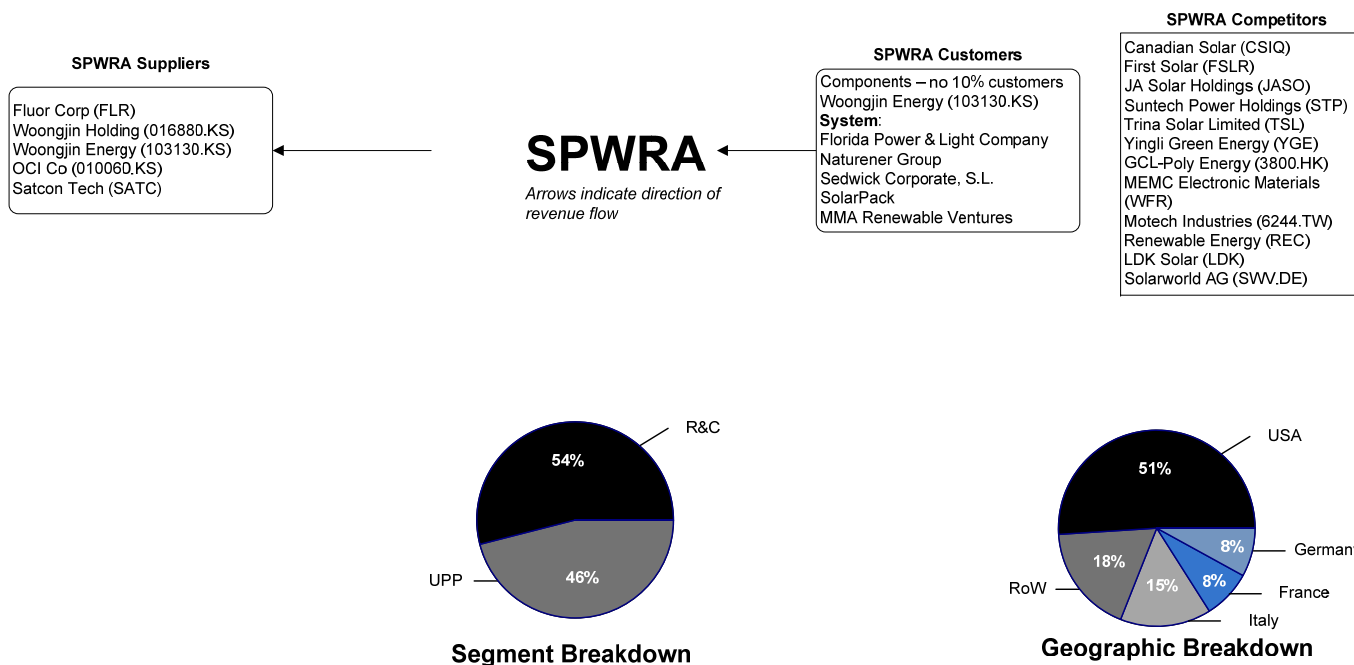
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 582. SunPower Corp (SPWRA)

Sector: Alternative Energy

SunPower Corporation (SPWRA)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Suntech Power Holdings Co Ltd

Suntech Power Holdings Co. Ltd. engages in the design, development, manufacture and marketing of photovoltaic (PV) modules and cells. Its other products include silicon wafers and ingots. It was founded by Zhengrong Shi on September 1, 2001 and is headquartered in Wuxi, China.

Figure 583. Suntech Power Holdings (STP) Results and Forecasts

	2007	2008	2009	2010	2011	Street 2012E	Street 2013E
Revenues	1348.5	1923.1	1693.4	2855.1	3154.2	1691.00	1740.5
- <i>y/y growth</i>	125.1%	42.6%	-11.9%	68.6%	10.5%	-46.4%	2.9%
Gross Margins	20.3%	17.8%	20.0%	17.4%	12.3%		
Operating Margins	12.7%	9.5%	10.3%	8.7%	-2.0%		
EPS	1.03	0.79	0.53	1.44	-5.58	-2.56	-1.56
- <i>y/y growth</i>	43.1%	-23.7%	-32.6%	171.7%	-487.5%	54.1%	38.9%
Cash	666.77	582.73	1159.20	1032.00	746.38		
Debt	841.83	1623.16	1679.30	2118.98	2287.54		
Net Cash/Shr	-0.05	-1.00	1.70	-0.16	0.52		
Tangible Book Value/Shr	4.98	3.19	6.24	7.97	5.11		

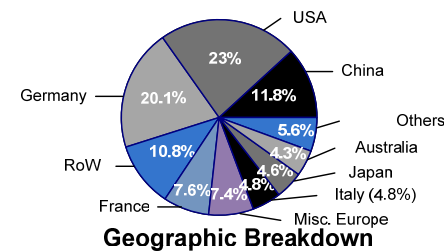
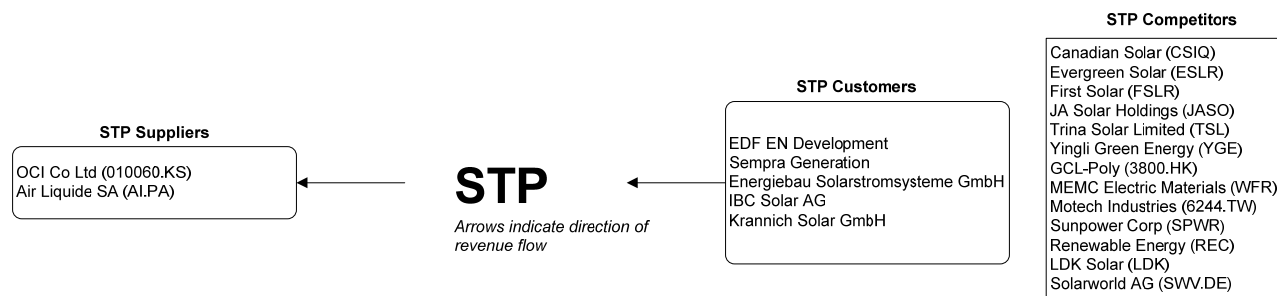
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 584. Suntech Power Holdings (STP)

Sector: Alternative Energy

Suntech Power Holdings (STP)



Segment Breakdown – 100% Photovoltaic Products

Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jim Suva, CPA

Synnex Corp

Synnex Corp. is the third-largest wholesale distributor of information technology products in North America behind Ingram Micro and Tech Data. The company distributes 20,000 systems, software, peripheral, networking, and component products from 100 vendors, including Hewlett-Packard (about 30-35% of total revenue), IBM, and Intel. Synnex sells to more than 20,000 small business resellers, direct marketers, corporate resellers, government resellers, and retailers, but does not sell directly to end users. No one customer represents more than 10% of total revenue, but large customers include CDW, Iron Bow Technologies, Staples Business Depot, Insight Enterprises, Systemax, etc. While traditional wholesale distribution represents 98% of Synnex's total revenue, the company also performs various value-added services (BPO) that include technical support, renewals management, back-office processing, and ITO. During FY12 the company generated revenue of \$10.3B, gross margin of 6.4%, operating margin of 2.5%, and diluted EPS of \$4.00.

Figure 585. Synnex (SNX) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	7768.2	7746.2	8614.1	10409.8	10285.5	10412.6	10404.5	10787.2	10844.7
- y/y growth	10.9%	-0.3%	11.2%	20.8%	-1.2%	1.2%	1.2%	3.6%	4.2%
Gross Margins	5.6%	5.7%	5.7%	6.1%	6.4%	6.4%		6.5%	
Operating Margins	2.0%	2.0%	2.3%	2.5%	2.5%	2.4%		2.6%	
EPS	2.52	2.67	3.26	4.11	4.00	3.89	3.80	4.31	4.22
- y/y growth	29.2%	6.2%	21.8%	26.3%	-2.9%	-2.5%	-4.8%	10.8%	10.9%
Cash	61.1	37.8	101.2	67.6	163.7	405.4		400.4	
Debt	492.8	303.9	520.4	383.0	275.3	297.7		297.7	
Net Cash/Shr	-2.7	-3.4	-3.2	-4.2	2.2	8.7		8.5	
Tangible Book Value/Shr	16.7	20.5	23.0	25.5	29.4	32.8		36.6	

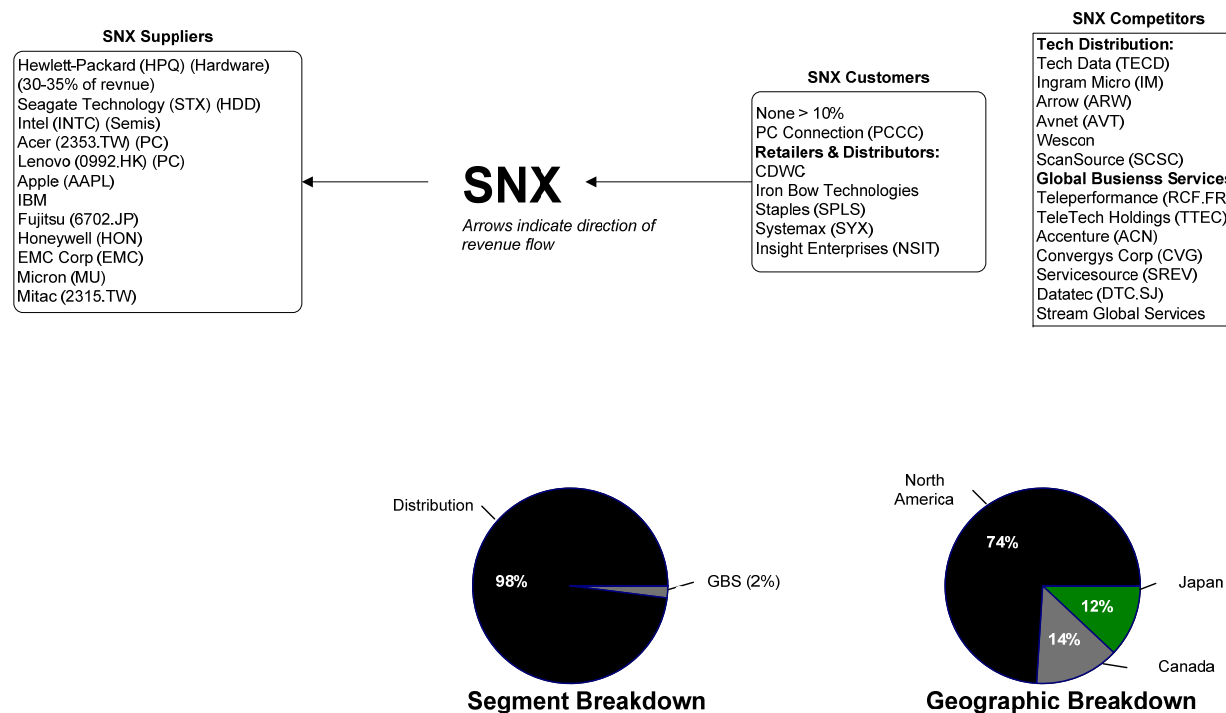
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 586. Synnex (SNX)

Sector: Wholesale IT Distribution

Synnex (SNX)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Yuta Fukasawa

Taiyo Yuden

Taiyo Yuden Co., Ltd. engages in manufacture and sale of electronic components. It operates through Electronic Component, and Recording Media Product and Other segments. The Electronic Component segment offers capacitors such as multilayer ceramic capacitor, axial leaded ceramic capacitor, and polyacene capacitor; ferrite and applied products such as multilayer chip inductor, winding chip inductor, and winding power inductor; modules such as power supply modules, high-frequency module, parts embedded wiring board; and surface acoustic wave filters. The Recording Media Product and Other segment provide recording media products and involves in the mounting business conducted by its subsidiaries and affiliates. The company was founded on March 23, 1950 and is headquartered in Tokyo, Japan.

Figure 587. Taiyo Yuden (6976.JP) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	238274.0	185452.0	195690.0	210401.0	183795.0	195144.0	193729.0	200000.0	212595.0
- y/y growth	7.7%	-22.2%	5.5%	7.5%	-12.6%	6.2%	5.4%	2.5%	9.7%
Gross Margins	24.7%	11.9%	18.7%	21.8%	14.5%	19.5%		22.3%	
Operating Margins	8.9%	-6.9%	2.1%	4.2%	-4.4%	2.9%		6.0%	
EPS	82.08	-121.52	-5.78	-46.81	-183.71	31.79	29.06	59.53	79.56
- y/y growth	-21.2%	-248.1%	95.2%	-709.9%	-292.4%	117.3%	115.8%	87.3%	173.7%
Cash	38304.0	37105.0	41785.0	39957.0	27912.0	32928.2		40744.6	
Debt	46307.0	60907.0	51938.0	45004.0	58475.0	64677.0		64677.0	
Net Cash/Shr	90.6	-25.5	-1.9	89.2	19.1	-45.1		21.4	
Tangible Book Value/Shr	1390.4	1155.3	1153.8	1057.0	866.1	925.6		973.7	

(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 588. Taiyo Yuden (6976.JP)

Sector: Electronic Components

Taiyo Yuden (6976.JP)

Taiyo Yuden

Arrows indicate direction of revenue flow

Taiyo Yuden Customers

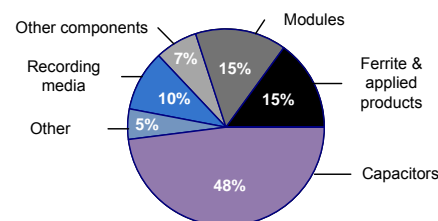
Capacitors (Consumer products : 15%, PC&tablet :30%, mobile phone:40%, components and others : 15%)

Ferrite products (Consumer products : 25%, PC&tablet :20%, mobile phone:30%, components and others : 25%)

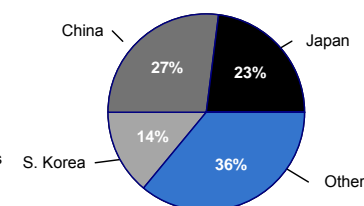
RF components (smartphone & tablet makers)nents and others : 25%)

Taiyo Yuden Competitors

Murata (6981.JP)
TDK (6762.JP)
SEMCO (009150.KS)
Kyocera (6971.JP)
Yageo (2327.TW)
Avago (AVGO)
Skyworks (SWKS)
TriQuint (TQNT)



Product Breakdown



Geographic Breakdown

Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Masahiro Shibano

Tamron Co Ltd

Tamron Co., Ltd. engages in the manufacture and sale of precision optical equipment. It operates through the following business segments: Photographic Products, Optical Components, and Commercial and Industrial-use Optics. The Photographic Products segment manufactures and sells interchangeable lenses for single-lens reflex (SLR) camera. The Optical Components segment develops and markets camcorder lenses, digital still camera lenses, cellular phone camera lenses, and optical device units. The Commercial and Industrial-use Optics segment includes lenses for closed-circuit television (CCTV) cameras and automotive lenses. The company was founded by Takeyuki Arai on November 1, 1950 and is headquartered in Saitama, Japan.

Figure 589. Tamron (7740.JP) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	62538.0	49892.6	56650.8	58507.0	64353.0	70560.0	72943.0	75350.0	77013.0
- y/y growth	-8.3%	-20.2%	13.5%	3.3%	10.0%	9.6%	13.3%	6.8%	5.6%
Gross Margins	30.2%	28.6%	33.5%	33.5%	31.9%	32.4%		33.0%	
Operating Margins	9.9%	4.6%	9.6%	9.7%	8.6%	10.3%		12.2%	
EPS	107.27	22.76	130.67	136.57	141.60	188.36	156.27	238.91	187.37
- y/y growth	-36.5%	-78.8%	474.2%	4.5%	3.7%	33.0%	10.4%	26.8%	19.9%
Cash	10752.1	11887.0	10996.2	12773.0	10822.0	13584.0		14404.0	
Debt	6056.8	6396.6	6528.6	6329.0	5475.0	4700.0		1000.0	
Net Cash/Shr	335.7	382.7	338.4	392.5	337.3	439.4		487.4	
Tangible Book Value/Shr	1113.5	1125.3	1177.9	1291.5	1457.6	1595.5		1779.5	

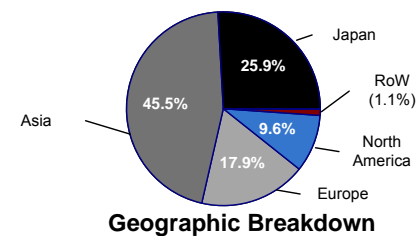
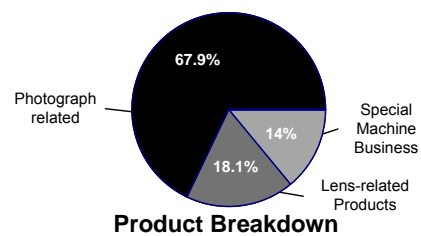
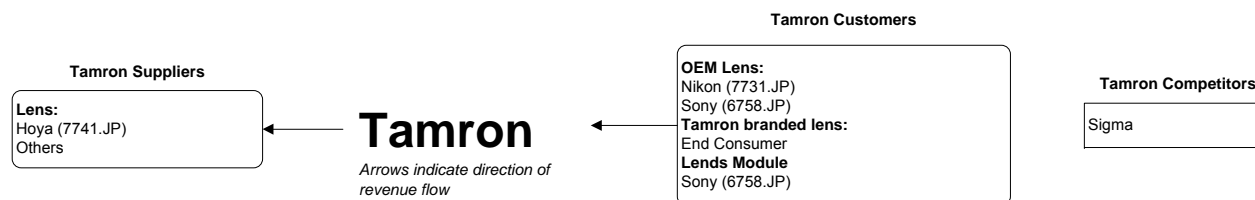
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 590. Tamron (7740.JP)

Sector: Hardware

Tamron Co Ltd (7740.JP)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Yuta Fukasawa

TDK

TDK Corp. engages in the manufacture, distribution, and sale of electronic components such as magnetic tape products. It operates through the following business segments: Passive Components, Magnetic Application Products, and Others. The Passive Components segment offers ceramic capacitors, aluminum electrolytic capacitors, film capacitors, inductive devices, high-frequency components, piezoelectric material components, circuit protection devices, and sensors. The Magnetic Application Products segment offers recording devices, power supplies, magnets, and recording media. The Other segment offers energy devices, flash memory application devices, displays, and mechatronics. The company was founded on December 7, 1935 and is headquartered in Tokyo, Japan.

Figure 591. TDK (6762.JP) Results and Forecasts

	2009	2010	2011	2012	2013	CIR 2014E	Street 2014E	CIR 2015E	Street 2015E
Revenues	727400.0	808858.0	871943.0	814497.0	824948.0	842900.0	894116.0	853060.0	929499.0
- y/y growth	-16.0%	11.2%	7.8%	-6.6%	1.3%	2.2%	8.4%	1.2%	4.0%
Gross Margins	16.7%	23.6%	25.0%	22.1%	20.5%	21.6%		21.2%	
Operating Margins	-7.5%	3.2%	7.4%	2.3%	2.7%	4.3%		4.5%	
EPS	-489.71	104.74	350.57	-19.06	38.26	152.80	219.97	162.79	279.30
- y/y growth	-188.8%	121.4%	234.7%	-105.4%	300.8%	299.3%	474.9%	6.5%	27.0%
Cash	207666.0	223262.0	197630.0	174210.0	261066.2	272937.0		286529.6	
Debt	284629.0	270054.0	244969.0	272840.0	288480.0	288480.0		288480.0	
Net Cash/Shr	-18.7	338.6	828.1	343.8	834.6	919.4		1016.4	
Tangible Book Value/Shr	3172.2	3177.1	3210.9	3006.3	3407.4	3499.8		3598.0	

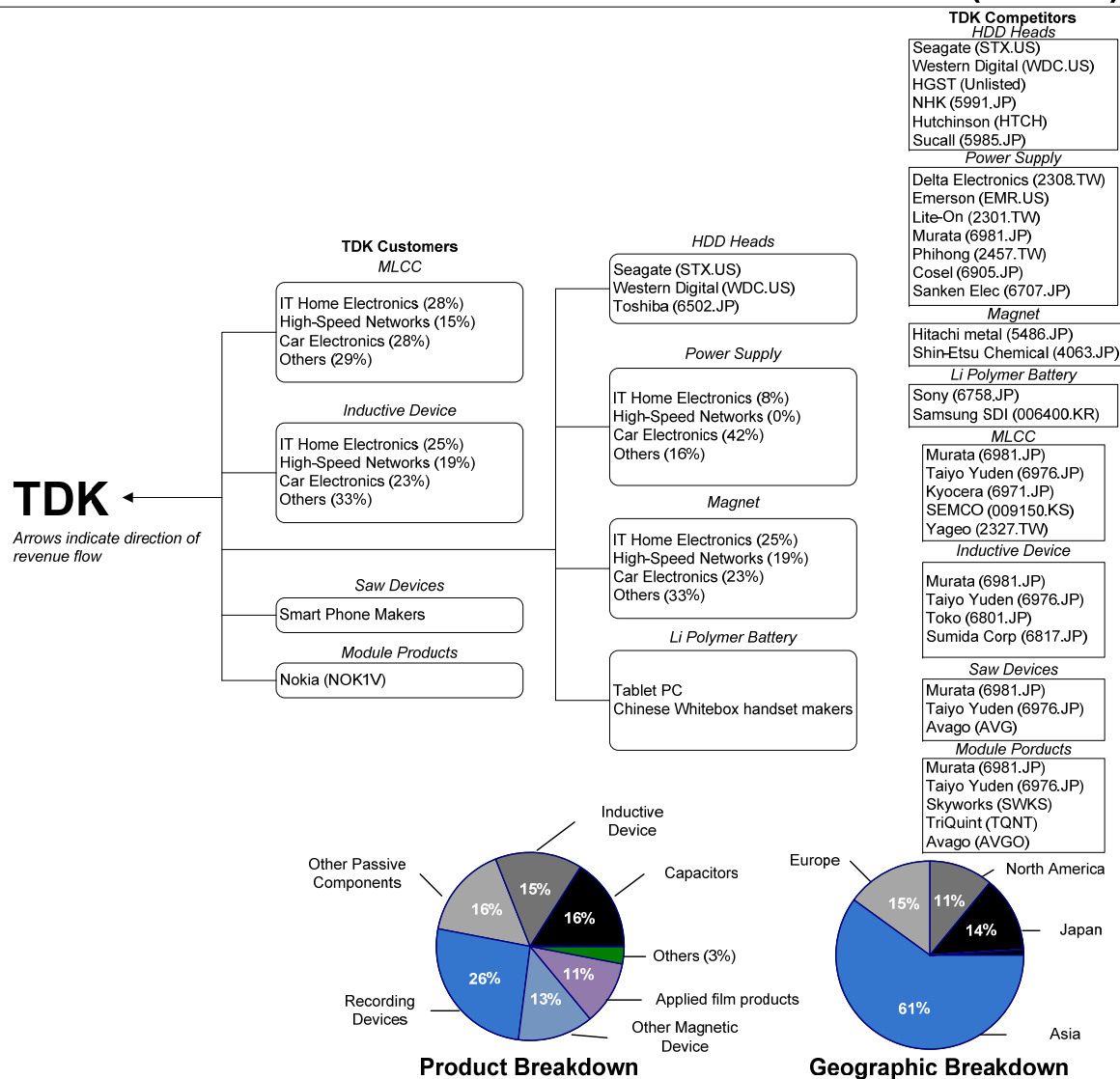
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 592. TDK (6762.JP)

Sector: Electronic Components

TDK (6762.JP)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jim Suva, CPA

TE Connectivity Ltd.

TE Connectivity (TEL) is the world's largest electronics connector company and is a spin-out company (effective July 2, 2007) of parent company Tyco International (TYC). TE Connectivity designs, manufactures, and markets about 500,000 different products for consumers within automotive, appliance, and aerospace and defense telecommunications, as well as computer and consumer electronic industries. It stands as a leading global provider of engineered electronic components, network solutions, and wireless systems, serving customers in over 150 countries with no customer accounting for more than 5% of sales (top 25 customers account for 30% of the company's total sales). TE Connectivity supports over 8,000 engineers and 16 manufacturing facilities in 25 countries, creating 76% of operations outside of the United States. TE Connectivity had \$13 billion in net sales (+10% y/y) in fiscal 2007, \$14.8 billion (+15% y/y) in fiscal 2008, \$10.2 billion (-29% y/y due to auto production issues in North America) in fiscal 2009, \$12 billion (+18 y/y) in fiscal 2010, \$14.1b in fiscal 2011 (+19%y/y), and \$13.3b in fiscal 2012 (-6% y/y). Sales by segment include: 45% transportation, 25% network solutions, 30% communications & industrial. A sample of customers consists of HP, Cisco, Toyota, IBM, Verizon, Samsung, Sony, Volkswagen, Mercedes-Benz, and Ford.

Figure 593. TE Connectivity (TEL) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	14373.0	10256.0	11879.0	14130.0	13282.0	13250.8	13262.0	14304.1	14050.1
- y/y growth		-28.6%	15.8%	18.9%	-6.0%	-0.2%	-0.2%	7.9%	5.9%
Gross Margins	29.1%	24.7%	30.2%	30.3%	31.0%	32.5%		33.5%	
Operating Margins	13.8%	5.8%	12.3%	12.5%	13.2%	13.8%		14.9%	
EPS	2.54	0.83	2.12	2.70	2.86	3.15	3.14	3.74	3.54
- y/y growth		-67.4%	156.6%	27.5%	5.8%	9.9%	9.9%	18.9%	12.5%
Cash	1086.0	1521.0	1990.0	1219.0	1589.0	1059.0		2082.5	
Debt	3181.0	2417.0	2413.0	2669.0	3711.0	3030.0		3030.0	
Net Cash/Shr	-4.3	-1.7	-0.7	-3.3	-2.6	-3.0		-0.6	
Tangible Book Value/Shr	7.3	7.5	7.6	7.4	5.4	6.0		8.7	

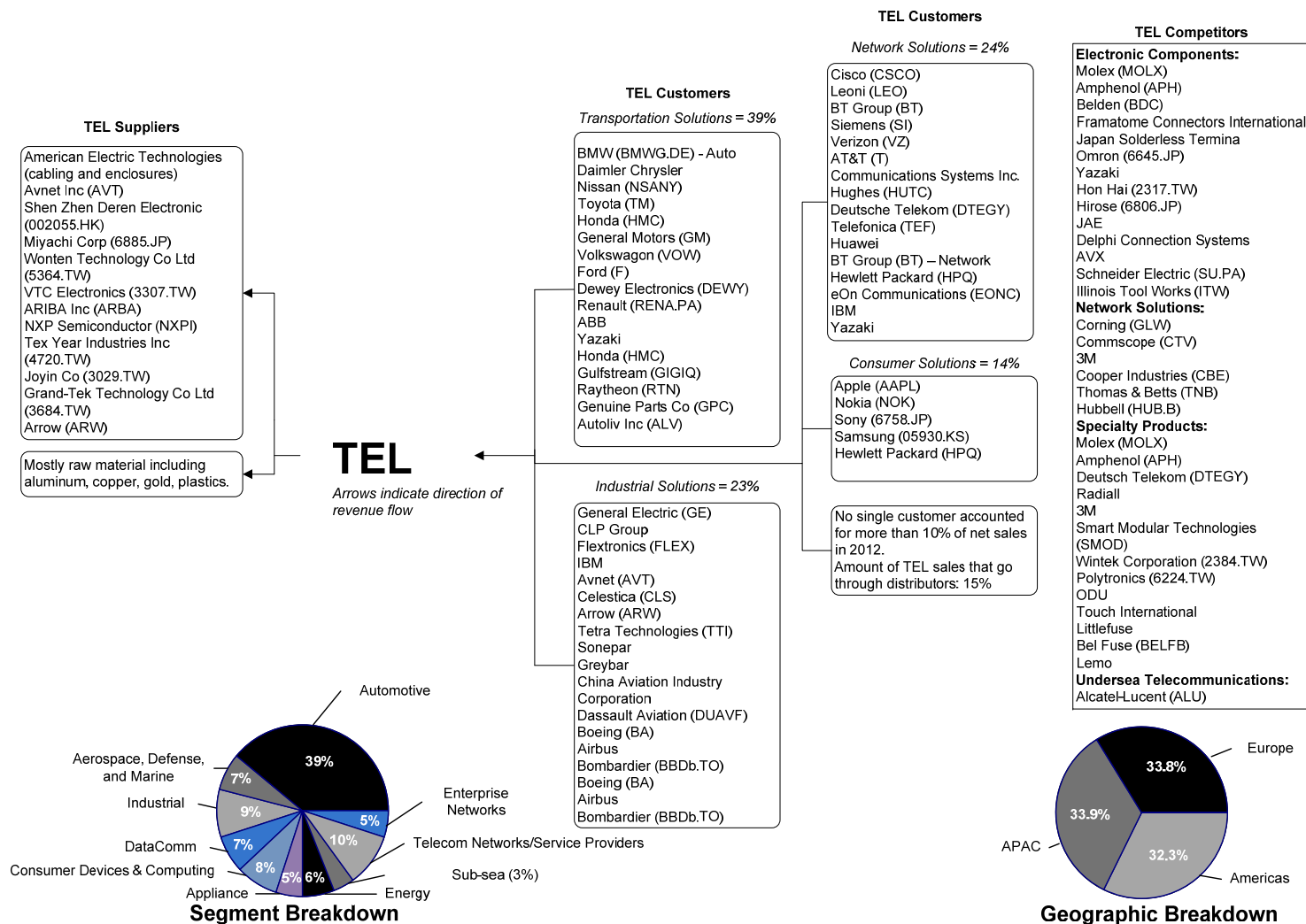
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 594. TE Connectivity (TEL)

Sector: Technology Supply Chain - Connectors

TE Connectivity (TEL)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jim Suva, CPA

Tech Data Corp

Tech Data is the second largest (in terms of revenues) wholesale distributor of IT products, logistics management, and other value-added services worldwide. Its primary competitors include Ingram Micro and Synnex. Tech Data does not sell any products or services directly to end users, but rather it distributes more than 100,000 IT products from 1,500 vendors to approximately 90,000 value-added resellers (VARs), direct marketers, retailers, and corporate resellers that generate demand for the products and manage the end-user relationship. Tech Data also provides services including training and technical support, financing, product configuration, marketing assistance, and e-commerce. In FY12 (ending January 2012), the company generated revenues of \$26.5 billion, and derived over 60% of total revenues from operations outside the US. Tech Data manages the business in two geographic segments: EMEA and the Americas (US, Canada, Latin America, Caribbean), which produced 59% and 41% of FY12 sales, respectively.

Figure 595. Tech Data (TECD) Results and Forecasts

	2009	2010	2011	2012	2013	CIR 2014E	Street 2014E	CIR 2015E	Street 2015E
Revenues	24080.5	22099.9	24376.0	26488.1	25361.0	26939.5	27348.0	27893.2	28210.5
- y/y growth	2.8%	-8.2%	10.3%	8.7%	-4.3%	6.2%	7.8%	3.5%	3.2%
Gross Margins	5.0%	5.2%	5.3%	5.3%	5.2%	5.1%		5.1%	
Operating Margins	1.0%	1.2%	1.4%	1.3%	1.2%	1.1%		1.2%	
EPS	2.40	3.43	4.36	5.09	4.81	4.94	5.30	5.68	5.74
- y/y growth	-7.9%	42.9%	27.2%	16.6%	-5.4%	2.6%	10.2%	15.1%	8.2%
Cash	528.0	1116.6	839.9	505.2	392.1	459.0		535.0	
Debt	419.7	403.5	494.5	105.7	518.8	518.8		518.8	
Net Cash/Shr	3.2	15.3	15.9	10.1	1.0	2.8		4.9	
Tangible Book Value/Shr	32.4	39.1	41.4	41.9	38.5	41.8		45.9	

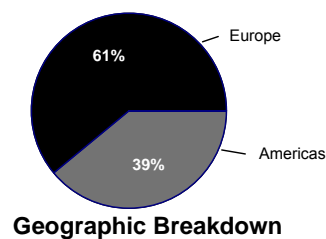
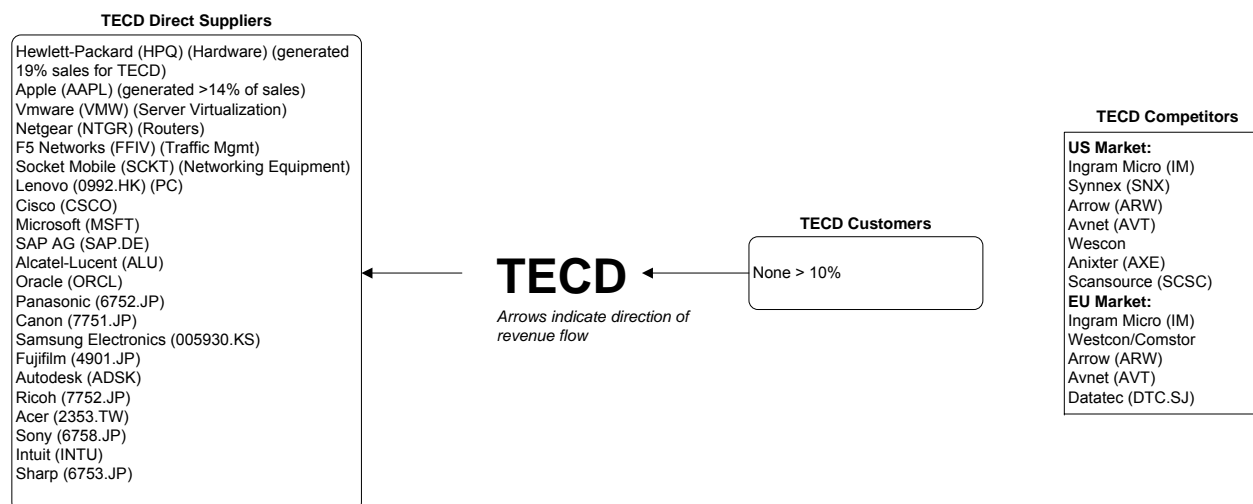
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 596. Tech Data (TECD)

Sector: Wholesale IT Distribution

Tech Data (TECD)



Segment Breakdown – 100% IT Products

Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Kevin Dennean, CFA

Tellabs Inc

Tellabs, Inc., incorporated in 1975 and headquartered in Naperville, Illinois, designs, develops, deploys, and supports telecommunications networking products for telecommunications service providers including wireline, wireless and competitive service providers as well as government agencies. Its products include solutions for wireline and wireless transport and delivery of bundled voice, video, and high-speed Internet/data services on copper-based and/or fiber-based networks. Sales to the North American region represented ~54% of sales in 2011 and the largest domestic carriers, Verizon and ATT, accounted for 22% and just under 10% of total revenues, respectively.

The company operates in four segments: Optical (~42% of 3Q12 revenues) which consist primarily of metro optical transport solutions including the 7000 series of optical solutions and the 5000 and 6300 series; Data (~25% of 3Q12 revenues) products used in mobile backhaul, business Ethernet and edge routing applications including the 8600 Managed Edge System, the 8800 Multiservice Router, 9200 Content Aware Router, and the 8100 Managed Access series; Access (~16.0% of 3Q12 revenues) products used to deliver triple play solutions over optical networks, including the 1000 and 1100 series of Multi-service Access systems and the 1600 ONT series; and Services (~18% of 3Q12 revenues) which delivers deployment, training, support and professional consulting to Tellabs customers.

Following a recent reorganization and change in strategic direction Tellabs will focus more on Packet Optical and Mobile Backhaul solutions.

Most Relevant Relationships: Verizon and AT&T represent Tellabs largest customers

Figure 597. Tellabs (TLAB) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	1729.0	1525.7	1642.1	1285.7	1052.6	858.7	862.8	862.0	851.2
- y/y growth	-9.6%	-11.8%	7.6%	-21.7%	-18.1%	-18.4%	-18.0%	0.4%	-1.3%
Gross Margins	38.2%	43.6%	48.1%	39.5%	38.7%	36.6%		38.5%	
Operating Margins	5.1%	8.5%	13.0%	-4.6%	-0.4%	-2.4%		2.2%	
EPS	0.21	0.25	0.41	-0.05	-0.02	-0.03	-0.02	0.04	0.05
- y/y growth	19.8%	22.0%	62.4%	-111.9%	61.5%	-70.1%	-29.1%	230.0%	N/A
Cash	1331.2	1357.6	1348.1	1167.5	799.5	787.2		794.1	
Debt	179.1	252.8	213.6	190.9	195.1	209.6		209.6	
Net Cash/Shr	3.3	3.4	3.5	3.2	2.2	2.2		2.2	
Tangible Book Value/Shr	4.2	4.1	4.3	4.0	2.7	2.4		2.4	

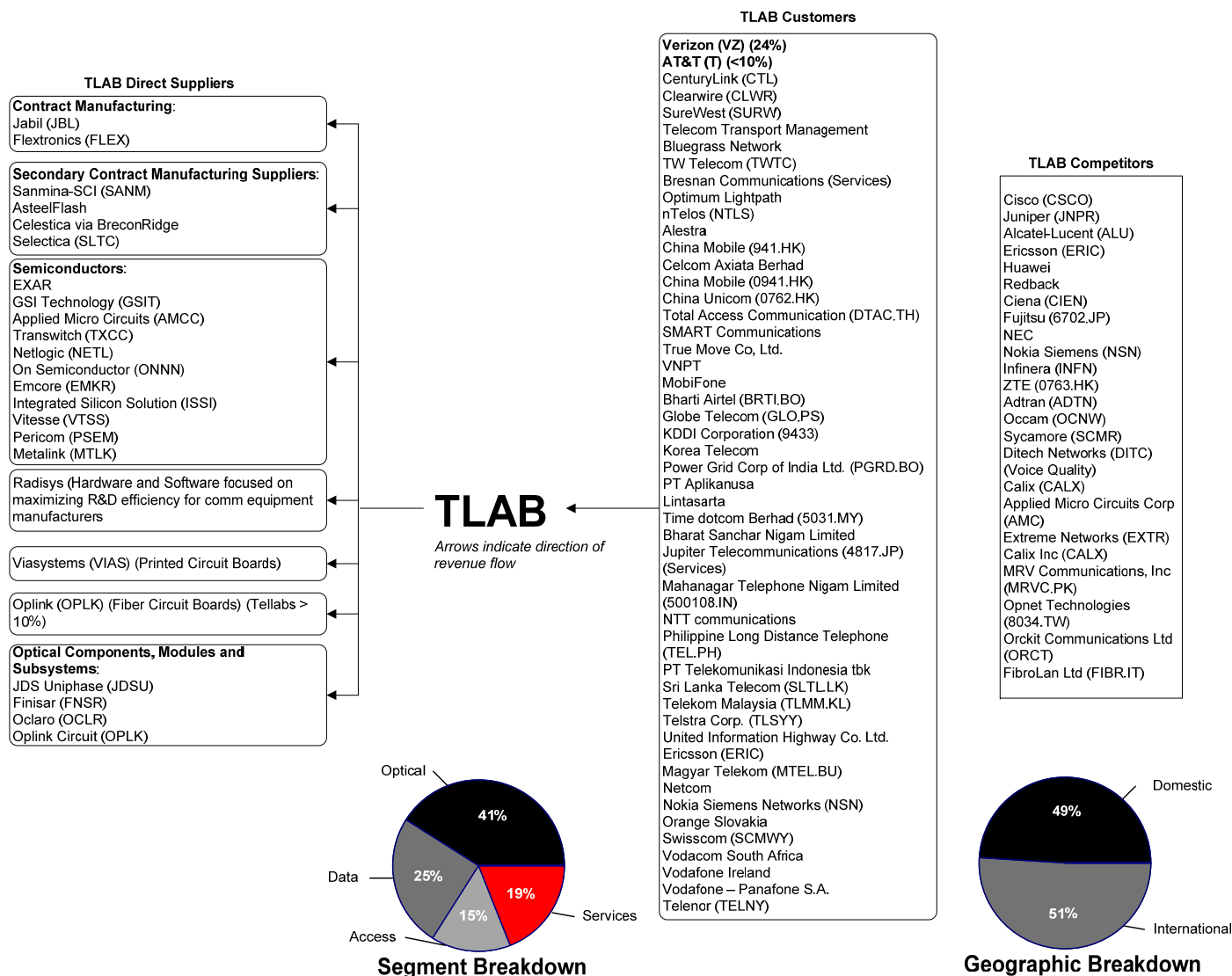
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 598. Tellabs (TLAB)

Sector: Communications Equipment

Tellabs, Inc. (TLAB)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Terence Whalen

Teradyne Inc

Teradyne Inc. (TER) is a leading provider of automated test equipment (ATE) and services for the electronics and communications industry. The company has two operating segments: Semiconductor Test and Systems Test. The Semiconductor Test division offers test equipment and services used for wafer level and device package testing for a range of devices including SoCs, memory, analog, RF and logic devices sold into the automotive, communications, consumer, computing and industrial markets. Customers include integrated device manufacturers (IDMs), outsource assembly and test companies (OSATs), wafer foundries, and fabless design companies. The company's Systems Test Group provides circuit board test and inspection, military and aerospace test, automotive diagnostic and test and hard disk drive test products and services. Teradyne was founded in 1960 and is headquartered in North Reading, Massachusetts, with manufacturing, service, and sales facilities throughout the United States, Europe, and Asia.

Figure 599. Teradyne (TER) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	1107.0	819.4	1566.2	1429.1	1656.0	1626.9	1615.5	1956.7	1867.4
- y/y growth	0.4%	-26.0%	91.1%	-8.8%	15.9%	-1.8%	-2.4%	20.3%	15.6%
Gross Margins	45.0%	38.0%	54.7%	49.9%	53.5%	55.2%		56.6%	
Operating Margins	-26.9%	-6.5%	27.8%	19.9%	21.3%	20.0%		24.4%	
EPS	-1.82	-0.33	1.91	1.92	1.36	1.34	1.36	1.93	1.88
- y/y growth	-518.4%	81.8%	676.5%	0.6%	-29.2%	-1.4%	0.3%	44.1%	37.9%
Cash	322.7	463.7	806.8	670.2	770.4	810.3		1338.7	
Debt	122.5	143.3	152.6	162.5	173.4	192.5		192.5	
Net Cash/Shr	1.9	1.9	2.9	2.2	2.7	3.7		6.2	
Tangible Book Value/Shr	3.1	2.9	5.5	4.1	5.9	7.5		10.1	

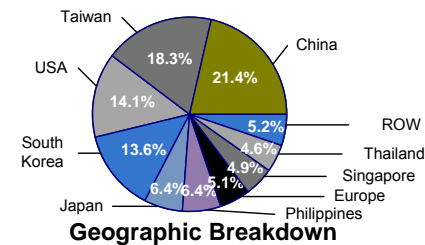
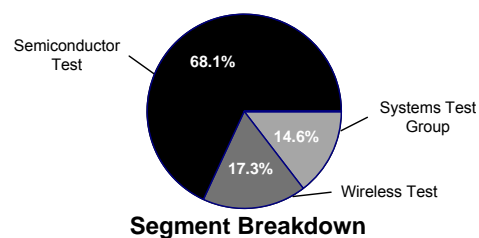
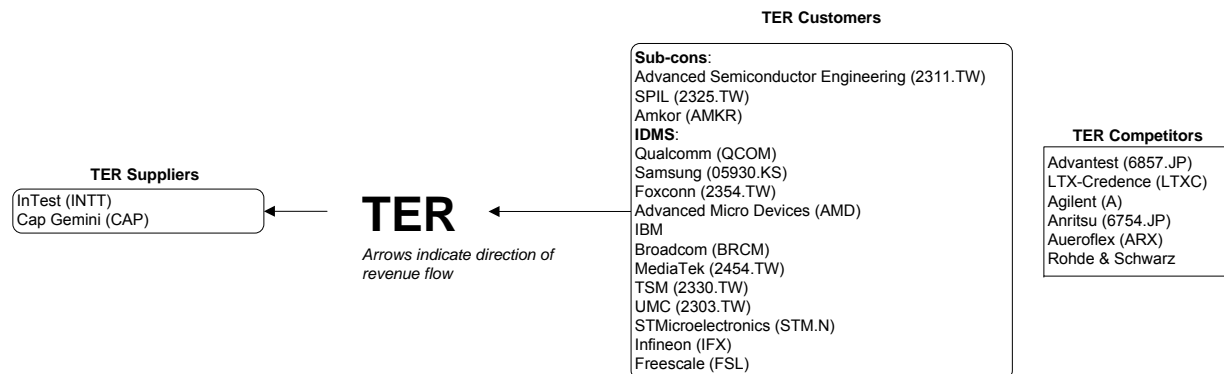
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 600. Teradyne (TER)

Sector: Semiconductor Equipment: Back End

Teradyne (TER)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Glen Yeung

Texas Instruments Inc

Texas Instruments (TXN) is the largest supplier of digital signal processors (DSPs), which are microprocessors used to process signals in real time. In addition, Texas Instruments is one of the largest suppliers of analog/mixed signal semiconductors. With the acquisition of National Semiconductor, we estimate in 2012 about 53% of the company's sales are Analog (HPA, HVA, Power, SVA); 14% Embedded Processing (catalog, communications infrastructure, automotive), 15% Wireless (baseband, OMAP, connectivity), and 18% Other (DLP, Education & Productivity, RISC, ASIC, royalties).

Figure 601. Texas Instruments (TXN) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	12501.0	10428.0	13966.0	13736.0	12825.0	12233.2	12220.8	12573.4	12878.7
- y/y growth	-9.6%	-16.6%	33.9%	-1.6%	-6.6%	-4.6%	-4.7%	2.8%	5.4%
Gross Margins	52.5%	47.9%	53.6%	49.3%	49.6%	50.5%		52.7%	
Operating Margins	22.0%	19.1%	31.3%	21.8%	15.4%	20.9%		24.9%	
EPS	1.66	1.14	2.63	2.28	1.53	1.87	1.70	2.30	2.10
- y/y growth	-7.6%	-31.1%	130.5%	-13.3%	-33.0%	22.3%	11.3%	23.0%	23.4%
Cash	2540.0	2925.0	3072.0	2935.0	3965.0	3215.6		2604.3	
Debt	0.0	0.0	0.0	5592.0	5686.0	5683.0		5683.0	
Net Cash/Shr	1.9	2.3	2.5	-1.1	-0.2	-0.8		-1.4	
Tangible Book Value/Shr	5.5	6.0	6.9	2.6	2.9	2.2		1.2	

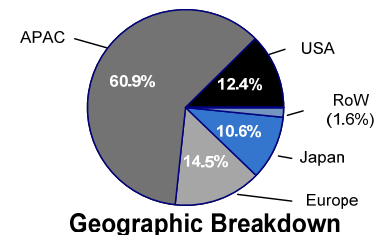
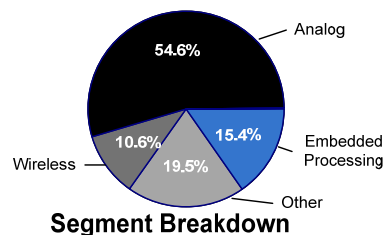
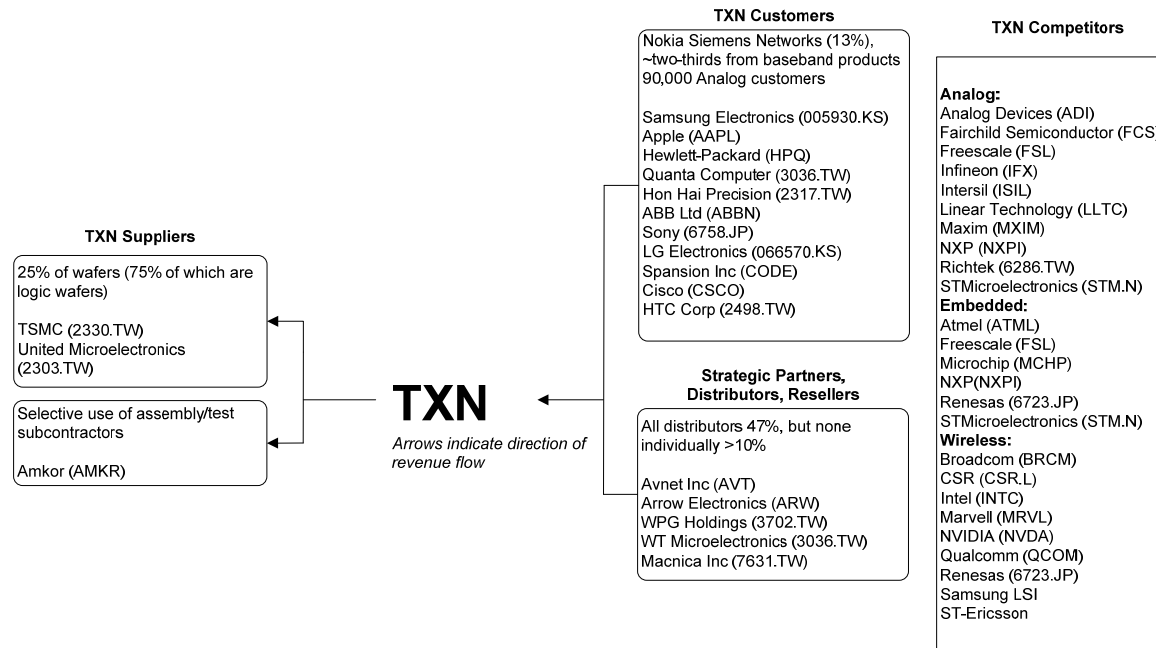
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 602. Texas Instruments (TXN)

Sector: Semiconductors

Texas Instruments (TXN)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Masahiro Shibano

Tokyo Electron

Tokyo Electron Ltd. engages in the development, manufacture, and sale of semiconductor production equipment, flat panel display and photovoltaic cell production equipment, electronic parts, and telecommunications equipment. Its operations are carried out through the following segments: Semiconductor Production Equipment (SPE), Flat Panel Display and Photovoltaic Production Equipment (FPD/PV), Electronic Components and Computer Networks, and Others. The SPE segment provides the development, manufacture, service, and distribution of coaters/developers, plasma etch systems, thermal processing systems, single wafer deposition systems, cleaning systems, wafer probers, and other semiconductor production equipment. The FPD/PV Production Equipment segment handles the development, manufacture, service, and distribution of coaters/developers, plasma etch/ash system used in the manufacture of flat panel displays, and plasma CVD (Chemical Vapor Deposition) systems used in the manufacture of thin film silicon PV cells. The Electronic Components and Computer Networks segment manages the design, development, procurement, and distribution of semiconductor products centering on integrated circuits (IC), other electronic components, computer networks and software. The Others segment includes logistics, facilities management, and insurance businesses. The company was founded in November 11, 1963 and is headquartered in Tokyo, Japan.

Figure 603. Tokyo Electron (8035.JP) Results and Forecasts

	2009	2010	2011	2012	2013	CIR 2014E	Street 2014E	CIR 2015E	Street 2015E
Revenues	508082.0	418636.0	668722.0	633091.0	497299.0	553000.0	547255.0	607000.0	617667.0
- y/y growth	-43.9%	-17.6%	59.7%	-5.3%	-21.4%	11.2%	10.0%	9.8%	12.9%
Gross Margins	27.0%	25.9%	35.1%	33.4%	31.9%	31.6%		34.3%	
Operating Margins	2.9%	-0.5%	14.6%	9.5%	2.5%	4.5%		8.7%	
EPS	42.15	-50.46	401.75	205.04	33.91	95.15	97.04	196.72	202.46
- y/y growth	-92.9%	-219.7%	896.1%	-49.0%	-83.5%	180.6%	186.2%	106.7%	108.6%
Cash	210157.0	243939.0	285049.0	247624.0	240129.0	252431.3		280863.4	
Debt	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Net Cash/Shr	1174.4	1362.9	1592.2	1382.5	1340.2	1408.8		1567.4	
Tangible Book Value/Shr	2903.0	2868.2	3207.0	3281.6	3317.2	3360.0		3499.6	

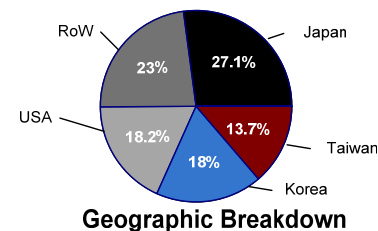
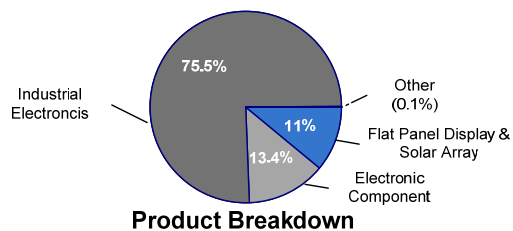
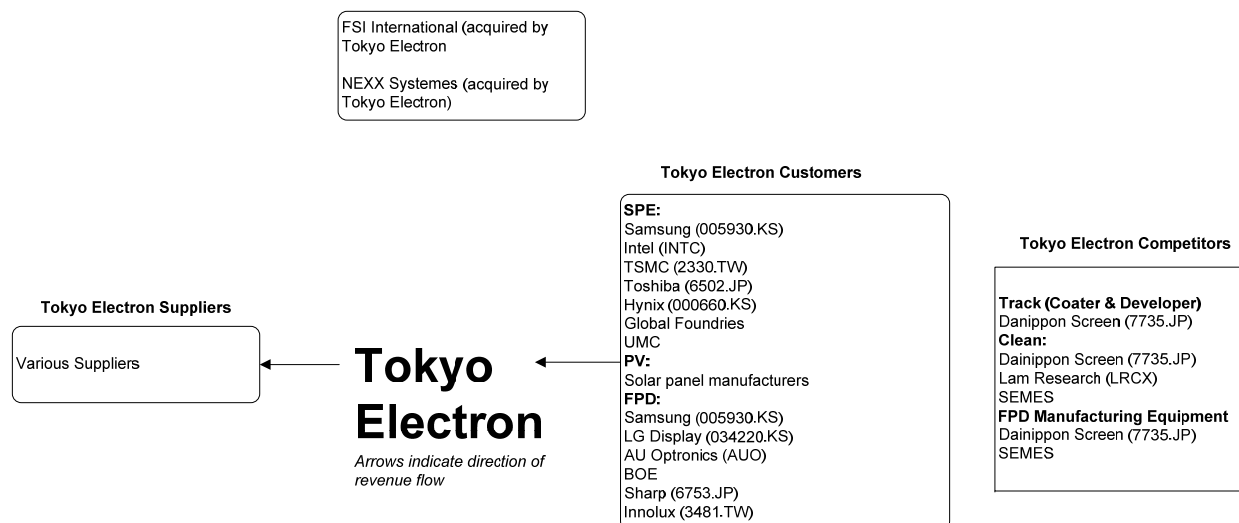
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 604. Tokyo Electron (8035.JP)

Sector: Hardware

Tokyo Electron (8035.JP)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Kota Ezawa

Toshiba

TOSHIBA Corp. engages in the manufacture and sale of advanced electronic and electrical products. It operates through the following segments: Digital Products, Electronic Devices, Social Infrastructure, Home Appliances, and Other. The Digital Products segment includes personal computers, visual products, and multi-functional peripherals. The Electronic Devices segment handles semiconductors, power devices, hard disk drives, and liquid crystal displays. The Social Infrastructure segment deals with energy-related, medical, and transportation equipment; information technology solutions, broadcasting and environment systems, and elevators. The Home Appliances segment covers refrigerators, washing and drying machines, light fixtures, air-conditioners, and compressors. The Other segment includes logistics services. The company was founded by Hisashige Tanaka in July 1875 and is headquartered in Tokyo, Japan.

Figure 605. Toshiba (6502.JP) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	7665332.0	6654518.0	6381599.0	6398505.0	6100262.0	5914000.0	5950378.0	6200000.0	6304949.0
- y/y growth	7.7%	-13.2%	-4.1%	0.3%	-4.7%	-3.1%	-2.5%	4.8%	6.0%
Gross Margins	24.9%	19.4%	22.9%	23.5%	24.0%	25.9%		27.1%	
Operating Margins	3.2%	-3.8%	1.8%	3.8%	3.4%	4.2%		5.8%	
EPS	36.59	-98.68	-4.48	31.25	17.17	26.56	26.40	44.27	41.01
- y/y growth	-7.3%	-369.7%	95.5%	798.3%	-45.1%	54.7%	53.7%	66.7%	55.4%
Cash	248649.0	343793.0	267449.0	258840.0	214305.0	225007.6		257059.6	
Debt	1260963.0	1810652.0	1218302.0	1081306.0	1235761.0	1122914.0		1022914.0	
Net Cash/Shr	-141.3	-124.4	-157.2	-115.8	-162.0	-166.7		-143.7	
Tangible Book Value/Shr	-20.6	-205.5	-69.4	-36.2	-84.8	-86.2		-50.0	

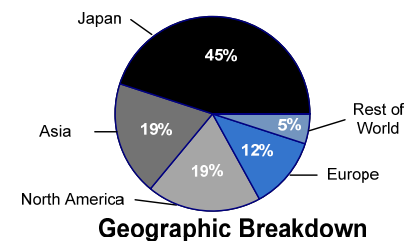
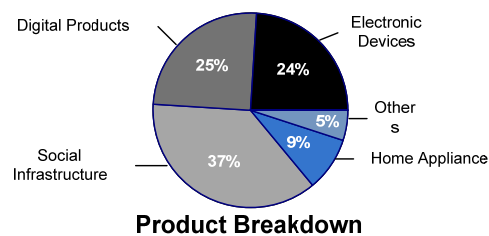
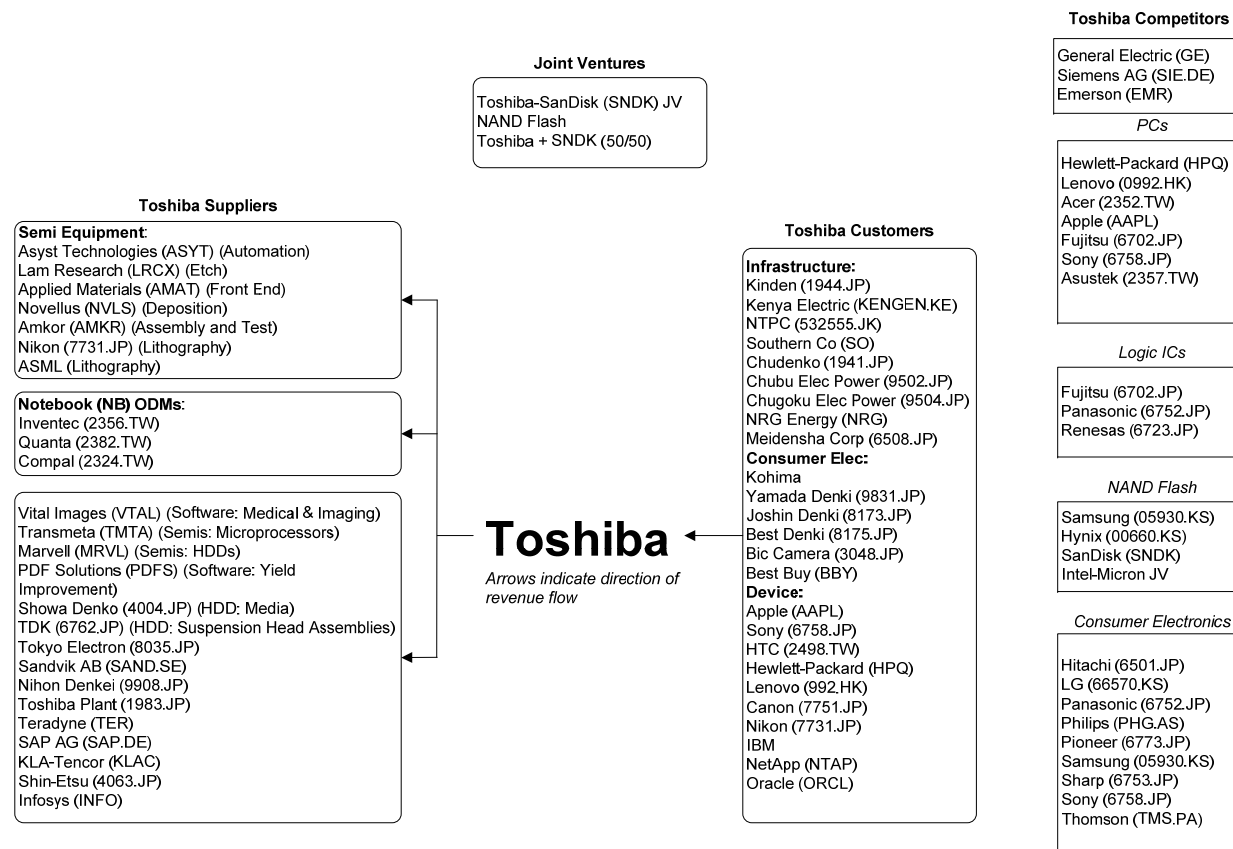
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 606. Toshiba (6502.JP)

Sector: Diversified Technology

Toshiba (6502.JP)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Arthur Lai

TPK

TPK was established in 2003 and is now one of the world's leading touch module suppliers, particularly renowned for its early development in Apple's products. The company runs production facilities in Xiamen City in Fujian, China. Its product lines range from cover glass to touch sensors and modules, providing touch solutions for a variety of mobile applications including smartphones, tablets, e-books, and industrial displays.

Figure 607. TPK (3673.TW) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	12942.3	18708.8	59598.8	143371.6	173659.4	195034.8	213127.3	212034.1	249518.6
- y/y growth	123.7%	44.6%	218.6%	140.6%	21.1%	12.3%	22.7%	8.7%	17.1%
Gross Margins	13.6%	22.6%	16.8%	16.9%	17.1%	16.8%		15.3%	
Operating Margins	3.8%	14.0%	10.5%	11.4%	11.6%	11.4%		9.5%	
EPS	2.16	12.87	17.62	37.21	44.34	52.25	55.31	47.89	60.56
- y/y growth	140.7%	496.4%	36.9%	111.2%	19.2%	17.9%	24.7%	-8.4%	9.5%
Cash	561.8	1670.9	5564.0	10382.7	23237.9	18835.1		27774.3	
Debt	2221.5	2244.8	7261.1	24681.9	37233.4	38835.3		42126.7	
Net Cash/Shr	3.1	6.0	7.3	-29.0	-4.7	-25.0		-6.8	
Tangible Book Value/Shr	18.0	29.5	48.5	95.8	139.3	163.3		185.2	

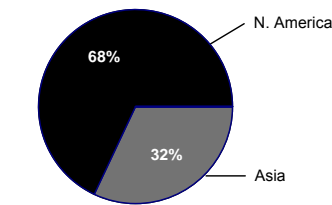
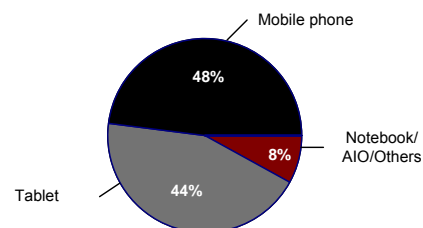
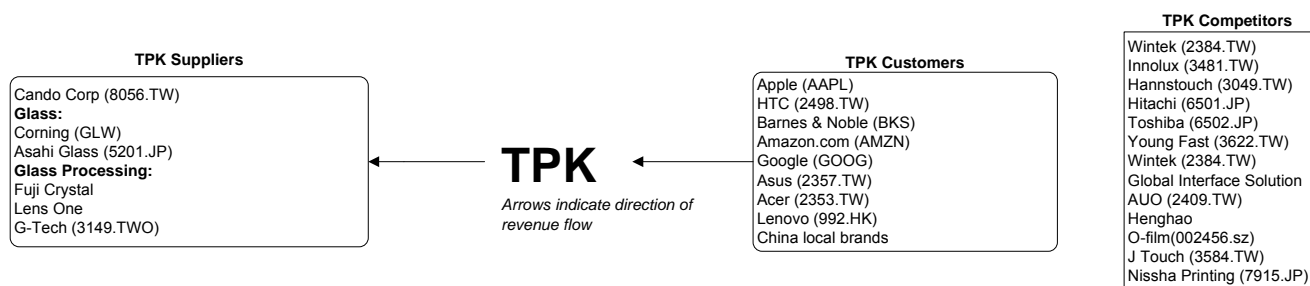
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 608. TPK (3673.TW)

Sector: Semiconductors and Components

TPK (3673.TW)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Eric Lau

TPV Technology

TPV Technology started as Admiral Overseas Corporation (AOC) in 1967, a major color TV manufacturer in Taiwan. It shifted to designing and manufacturing computer monitors in 1987, and in 1990 set up a manufacturing facility in Fuqing, Xiamen. TPV dual-listed in Hong Kong and Singapore in 1999, and became the second-largest monitor maker in 2001 and largest in 2005. TPV consolidated its leadership in computer monitors and secured major OEM customers for LCD TVs after it acquired the display operation of Philips in September 2005. CEC is the largest shareholder with 35%, followed by Mitsui 15%, CMO 6.4% and Philips 2.69%.

Figure 609. TPV (903.HK) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	71999.5	62260.7	90364.1	85938.8	96416.7	103772.6	95787.6	111827.1	99748.4
- y/y growth	9.1%	-13.5%	45.1%	-4.9%	12.2%	7.6%	-0.7%	7.8%	4.1%
Gross Margins	4.6%	5.8%	5.4%	6.0%	5.8%	5.9%		6.0%	
Operating Margins	1.7%	2.3%	1.8%	1.4%	0.9%	1.1%		1.3%	
EPS	0.35	0.48	0.55	0.31	0.29	0.35	0.35	0.42	0.40
- y/y growth	-45.5%	37.0%	13.6%	-43.3%	-6.9%	21.4%	20.3%	18.1%	13.3%
Cash	1327.4	2096.9	1451.6	2411.9	7335.4	6387.0		4802.5	
Debt	4675.4	1669.7	3673.1	3418.6	9300.3	8535.5		9311.4	
Net Cash/Shr	-0.1	0.8	0.6	0.8	1.1	1.7		0.7	
Tangible Book Value/Shr	3.6	4.0	4.7	4.6	4.8	5.1		5.4	

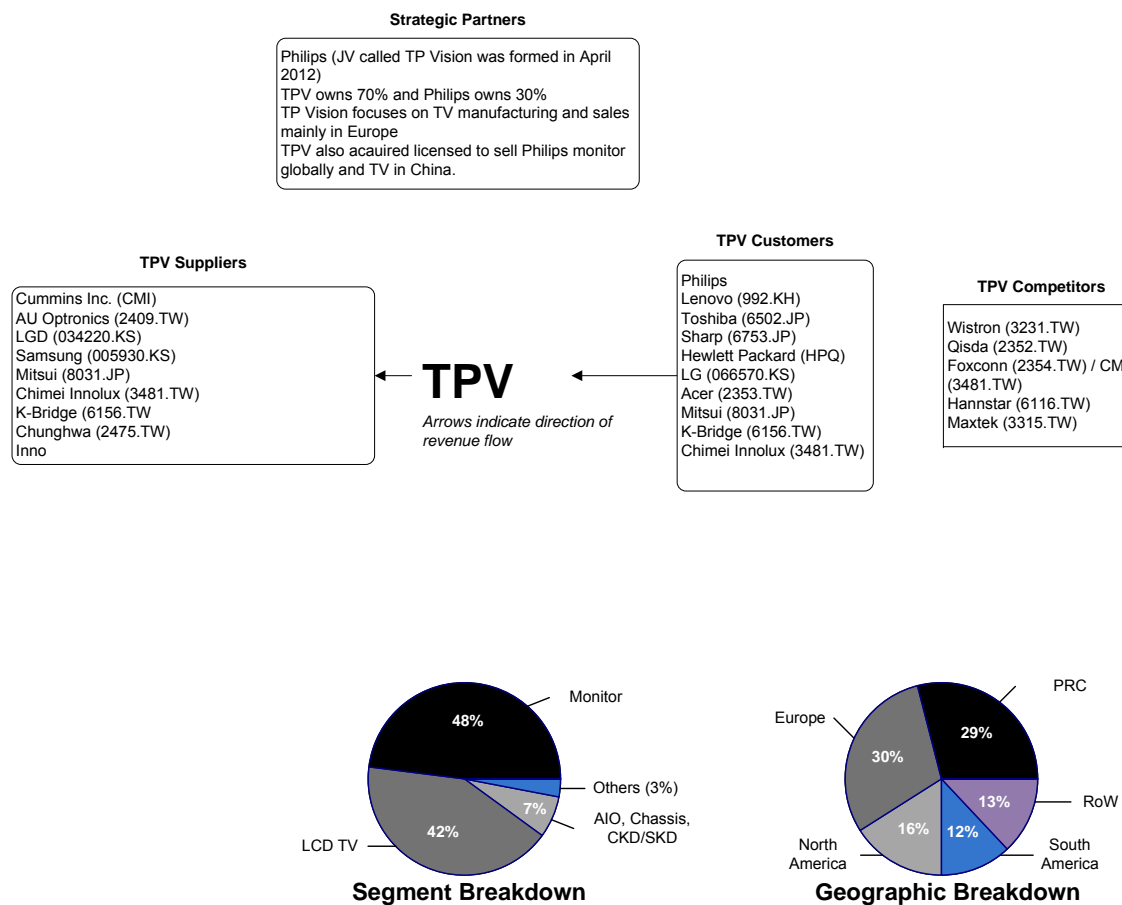
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 610. TPV Technology (903.HK)

Sector: Computer Storage and Peripherals

TPV Technology (0903.HK)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Shahriar Pourreza, CFA

Trina Solar

Based in China, Trina Solar is a vertically-integrated manufacturer of silicon-based solar modules for the photovoltaic (PV) industry. From ingot to module, Trina's manufacturing operations cover nearly every portion of the solar value chain while its growing systems business also provides direct exposure to the project development and installation segment. Trina markets its products in key solar regions across the globe including Germany, U.S., and China through wholesalers, distributors, as well as direct sales to PV system integrators primarily targeting applications in the traditional rooftop and ground-mount end markets.

Figure 611. Trina Solar (TSL) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	831.9	845.1	1857.7	2047.9	1296.7	1584.3	1488.3	1885.9	1907.3
- y/y growth	175.6%	1.6%	119.8%	10.2%	-36.7%	22.2%	14.8%	19.0%	28.2%
Gross Margins	19.8%	28.1%	31.5%	16.4%	8.5%	8.8%		11.8%	
Operating Margins	12.7%	16.5%	22.7%	3.3%	-10.2%	-4.2%		0.3%	
EPS	1.18	1.56	4.13	-0.18	-2.25	-1.53	-1.99	-0.79	-0.76
- y/y growth	62.4%	31.8%	164.8%	-104.5%	-1118.9%	32.1%	11.4%	48.4%	61.7%
Cash	132.2	410.1	753.0	816.8	807.3	574.9		598.5	
Debt	396.4	583.0	594.9	1037.4	1291.0	1207.4		1457.4	
Net Cash/Shr	-0.3	1.5	4.1	2.3	5.5	3.4		0.2	
Tangible Book Value/Shr	7.6	11.5	14.4	15.7	12.4	10.5		9.4	

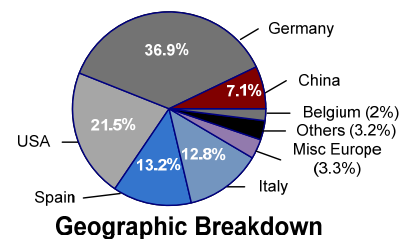
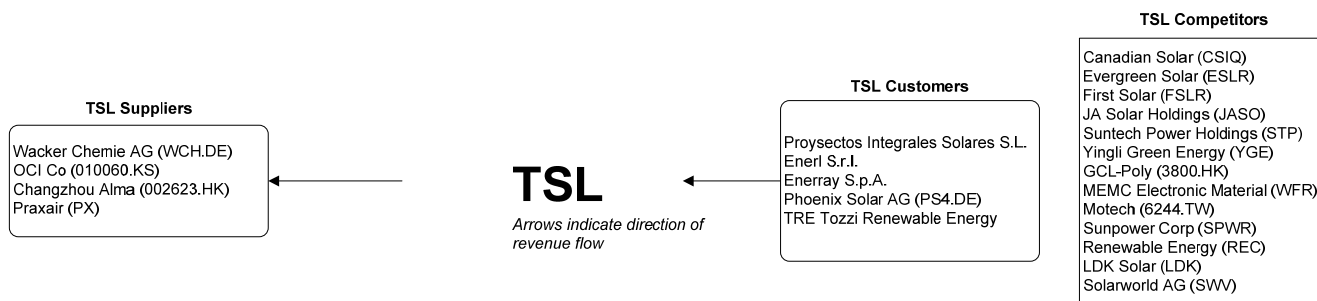
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 612. Trina Solar (TSL)

Sector: Alternative Energy

Trina Solar Limited (TSL)



Segment Breakdown – 100% Solar Modules

Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Roland Shu

Tripod Technology

Established in 1997, Tripod is a major Printed Circuit Board (PCB) supplier, ranking as the global No. 6 PCB maker, and No. 1 PCB maker in China, according to Prismark. Tripod has manufacturing sites in Taiwan and Wuxi, China. The company has a diversified product portfolio including DRAM, TFT-LCD, HDD, HDI, PC, server and automotive.

Figure 613. Tripod (3044.TW) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	30331.5	33423.6	43015.9	40898.6	39120.5	40913.9	42329.0	42906.2	45055.3
- y/y growth	10.9%	10.2%	28.7%	-4.9%	-4.3%	4.6%	8.2%	4.9%	6.4%
Gross Margins	18.6%	20.1%	22.0%	19.7%	17.0%	17.4%		17.8%	
Operating Margins	9.5%	11.5%	13.5%	11.4%	8.3%	8.6%		9.1%	
EPS	5.47	6.10	9.67	8.00	5.58	5.41	5.84	6.06	6.47
- y/y growth	-30.7%	11.4%	58.6%	-17.3%	-30.3%	-3.0%	4.7%	12.0%	10.8%
Cash	6468.5	7576.6	13284.7	10885.4	10152.6	11481.1		12808.4	
Debt	9945.6	6453.9	8194.2	5039.0	7567.0	7512.7		7664.7	
Net Cash/Shr	0.4	6.1	24.3	20.7	19.3	21.8		24.4	
Tangible Book Value/Shr	30.1	33.7	37.7	44.8	45.6	47.9		51.0	

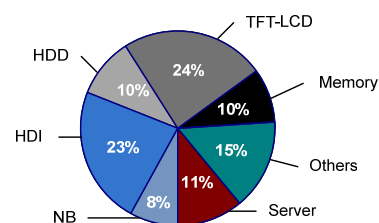
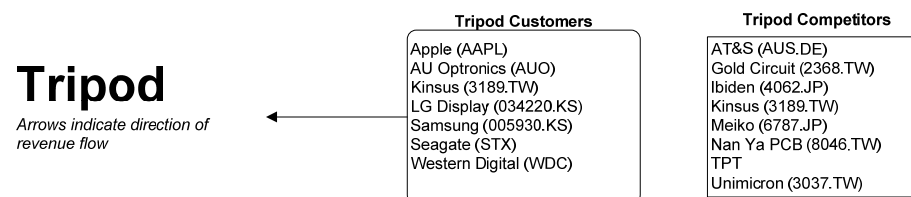
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

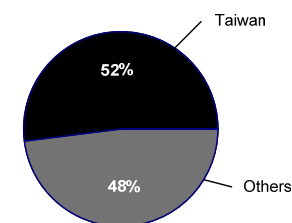
Figure 614. Tripod Technology (3044.TW)

Sector: Electronic Components

Tripod Technology (3044.TW)



Geographic Breakdown



Geographic Breakdown

Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

TriQuint Semiconductor Inc

TriQuint Semiconductor, Inc. provides high performance radio frequency (RF) solutions and foundry services. It designs, develops and manufactures high-performance RF solutions with Gallium Arsenide, Gallium Nitride, Surface Acoustic Wave and Bulk Acoustic Wave technologies for customers worldwide. The company offers a broad array of filtering, switching and amplification products for RF, microwave and millimeter-wave applications. It serves customers worldwide in mobile device, networks and defense & aerospace markets. In the mobile devices end market, it utilizes a broad technology portfolio to simplify increasing RF complexity and enable a faster time to market for customers. The company sells products that support the transfer of voice, video and data across wireless and wired infrastructure. Its largest customers in the defense & aerospace end markets are military contractors serving the U.S. government and this markets rely on dependable microwave monolithic integrated circuits in die-level and packaged forms, as well as surface acoustic wave and bulk acoustic wave filters. TriQuint Semiconductor was founded in 1985 and is headquartered in Hillsboro, OR.

Figure 615. TriQuint (TQNT) Results and Forecasts

	2008	2009	2010	2011	2012	Street 2013E	Street 2014E
Revenues	573.4	654.3	878.7	896.1	829.2	866.76	992.2
- y/y growth	20.5%	14.1%	34.3%	2.0%	-7.5%	4.5%	14.5%
Gross Margins	32.4%	31.9%	39.9%	35.9%	28.7%		
Operating Margins	3.6%	3.0%	14.3%	8.7%	-3.6%		
EPS	0.19	0.25	0.83	0.51	-0.01	-0.08	0.35
- y/y growth	-9.5%	31.6%	232.0%	-38.6%	-102.0%	-740.0%	510.7%
Cash	86.08	153.94	223.66	162.31	138.96		
Debt	0.00	0.00	0.00	0.00	0.00		
Net Cash/Shr	0.21	0.56	0.76	0.58	0.49		
Tangible Book Value/Shr	3.35	3.53	4.97	5.48	5.48		

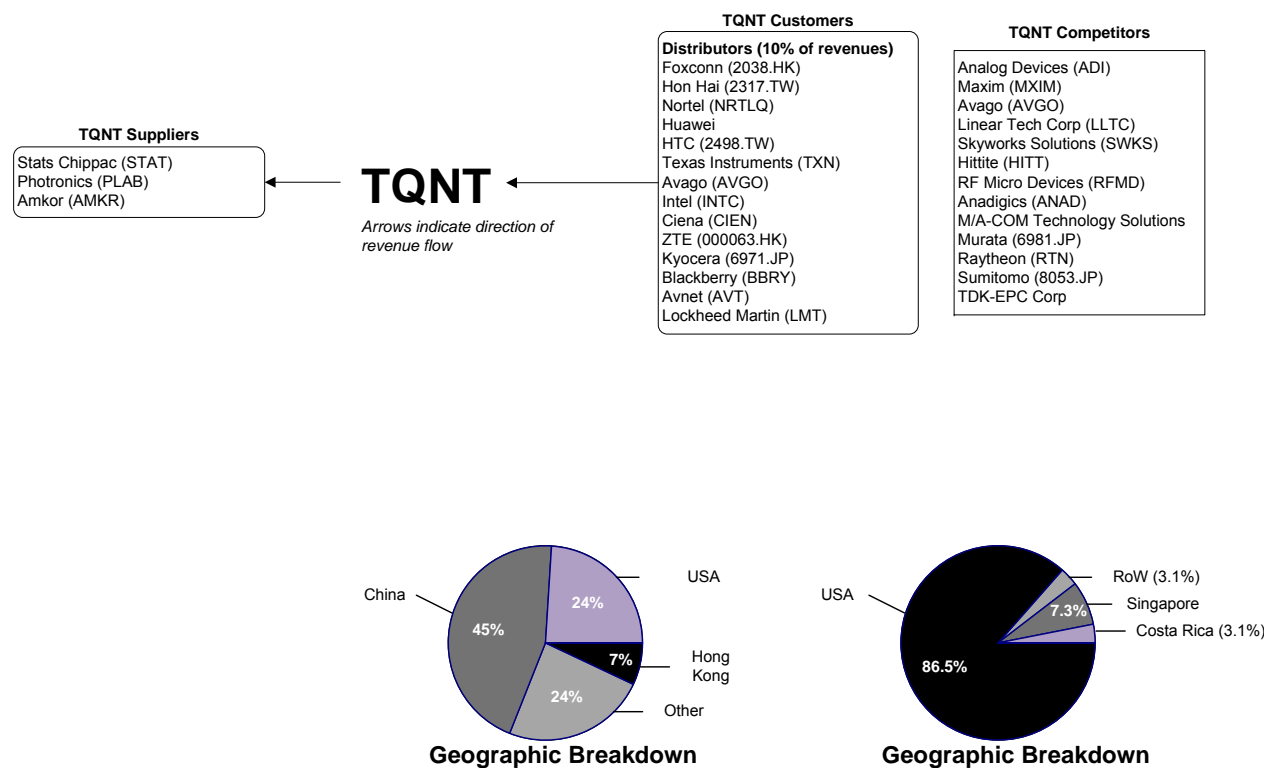
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, FactSet

Figure 616. TriQuint (TQNT)

Sector: Specialty Semiconductor

TriQuint Semiconductor Inc. (TQNT)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Roland Shu

TSMC

Taiwan Semiconductor Manufacturing Company (TSMC) manufactures and markets integrated circuits. It provides wafer manufacturing, wafer probing, assembly and testing, mask production, and design services. TSMC's ICs are used in computer, communication, consumer electronics, automotive, and industrial equipment.

Figure 617. TSMC (2330.TW) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	333157.7	295742.2	419537.9	427080.6	506248.6	608546.0	603409.9	697963.7	696361.2
- y/y growth	3.3%	-11.2%	41.9%	1.8%	18.5%	20.2%	19.2%	14.7%	15.4%
Gross Margins	42.5%	43.7%	49.4%	45.4%	48.1%	49.0%		47.3%	
Operating Margins	31.3%	31.1%	37.9%	33.1%	35.8%	36.7%		34.9%	
EPS	3.83	3.45	6.24	5.18	6.41	7.48	7.26	8.09	8.22
- y/y growth	-7.1%	-9.9%	80.6%	-17.0%	23.8%	16.7%	13.4%	8.1%	13.1%
Cash	211450.2	195797.2	181574.2	150622.1	150917.8	195396.7		202293.7	
Debt	25540.0	16343.1	44912.7	54347.4	117918.0	164519.3		212830.1	
Net Cash/Shr	7.5	7.1	6.5	5.0	2.7	2.7		1.4	
Tangible Book Value/Shr	18.7	19.3	22.3	24.4	28.0	32.6		37.7	

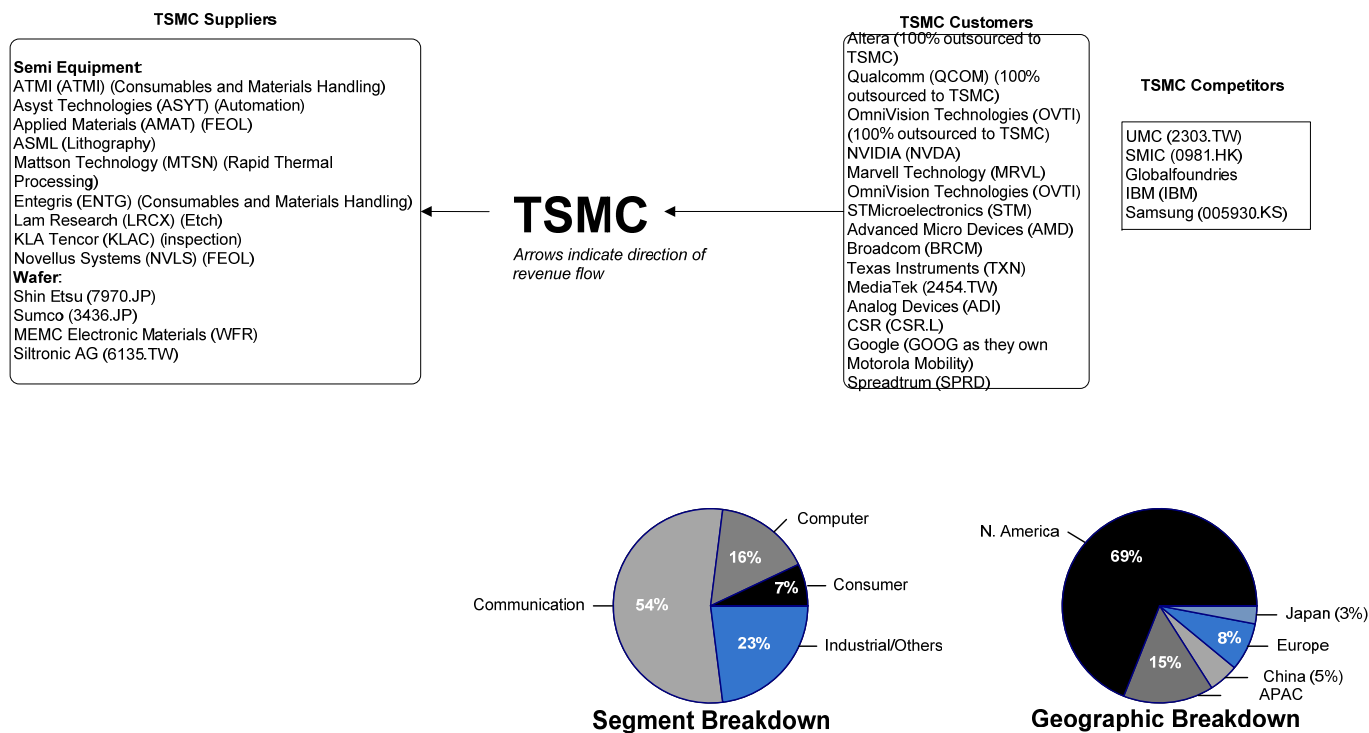
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 618. Taiwan Semi (2330.TW)

Sector: Semiconductors

Taiwan Semi (2330.TW; TSMC)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Roland Shu

UMC

United Microelectronics Corporation (UMC) designs, manufactures, and markets integrated circuits (ICs) and related electronic products. The company's main products are consumer electronic ICs, memory ICs, personal computer peripheral ICs, and communication ICs.

Figure 619. UMC (2303.TW) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	92530.1	88617.6	120430.7	105879.7	105998.3	123877.0	121899.6	133221.0	134611.7
- y/y growth	-13.3%	-4.2%	35.9%	-12.1%	0.1%	16.9%	15.0%	7.5%	10.4%
Gross Margins	13.9%	17.9%	29.9%	22.7%	21.2%	14.3%		15.8%	
Operating Margins	-0.6%	3.8%	18.8%	9.6%	8.6%	1.2%		3.4%	
EPS	-1.68	0.31	1.91	0.84	0.62	0.47	0.80	0.37	1.02
- y/y growth	-238.7%	118.2%	527.1%	-55.9%	-26.0%	-25.3%	27.8%	-21.0%	27.8%
Cash	37864.8	61138.9	41119.3	36650.1	36744.0	45963.3		42811.4	
Debt	8197.1	13567.1	8884.0	25630.5	37039.0	52331.5		52510.1	
Net Cash/Shr	2.2	4.8	3.2	1.7	0.6	0.2		-0.1	
Tangible Book Value/Shr	14.2	16.8	17.5	16.5	16.0	16.1		16.2	

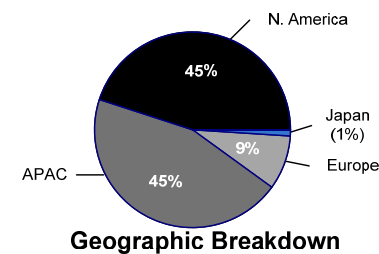
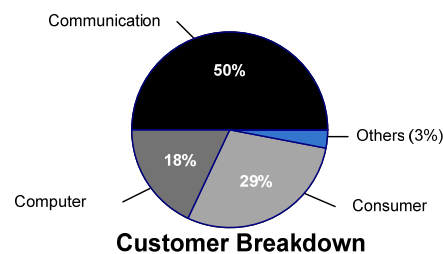
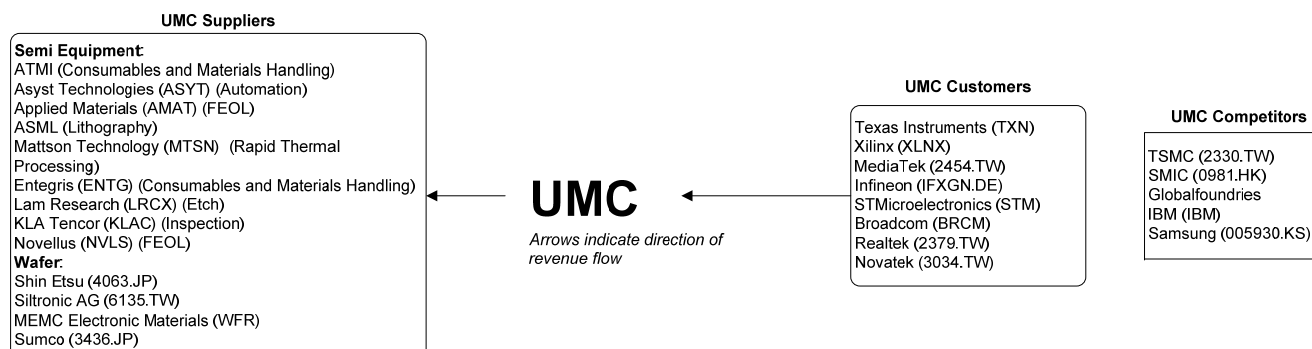
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 620. UMC (2303.TW)

Sector: Semiconductors: Foundry

United Micro Electronics (2303.TW; UMC)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Roland Shu

Unimicron

Established in 1990, Unimicron is the world's No.1 PCB maker and HDI board maker. After the acquisition of PPT in late 2009, its revenue exposure to substrate has surpassed 40%, with the rest almost equally shared by conventional PCB and HDI. Unimicron has manufacturing sites in Taiwan and China (Suzhou, Kunshan, Shenzhen). UMC is the largest shareholder with ~13% shareholding.

Figure 621. Unimicron (3037.TW) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	45676.0	43697.1	65047.9	66147.0	67490.2	66792.6	67825.2	76967.8	74426.9
- y/y growth	-3.4%	-4.3%	48.9%	1.7%	2.0%	-1.0%	0.5%	15.2%	9.7%
Gross Margins	13.3%	16.1%	18.1%	15.8%	14.5%	14.8%		14.2%	
Operating Margins	7.0%	9.4%	12.1%	9.0%	6.6%	6.0%		6.2%	
EPS	2.25	3.10	4.60	3.25	2.25	2.28	2.55	2.67	3.06
- y/y growth	-58.7%	37.5%	48.4%	-29.2%	-31.0%	1.4%	13.5%	17.1%	20.1%
Cash	10446.1	22205.0	19524.1	23458.0	27901.4	28467.8		31642.7	
Debt	19882.1	27423.7	23667.9	29646.3	33190.5	34598.6		33216.6	
Net Cash/Shr	-1.0	3.5	3.3	1.1	6.3	6.1		8.7	
Tangible Book Value/Shr	25.8	25.8	28.2	29.4	29.7	30.9		32.5	

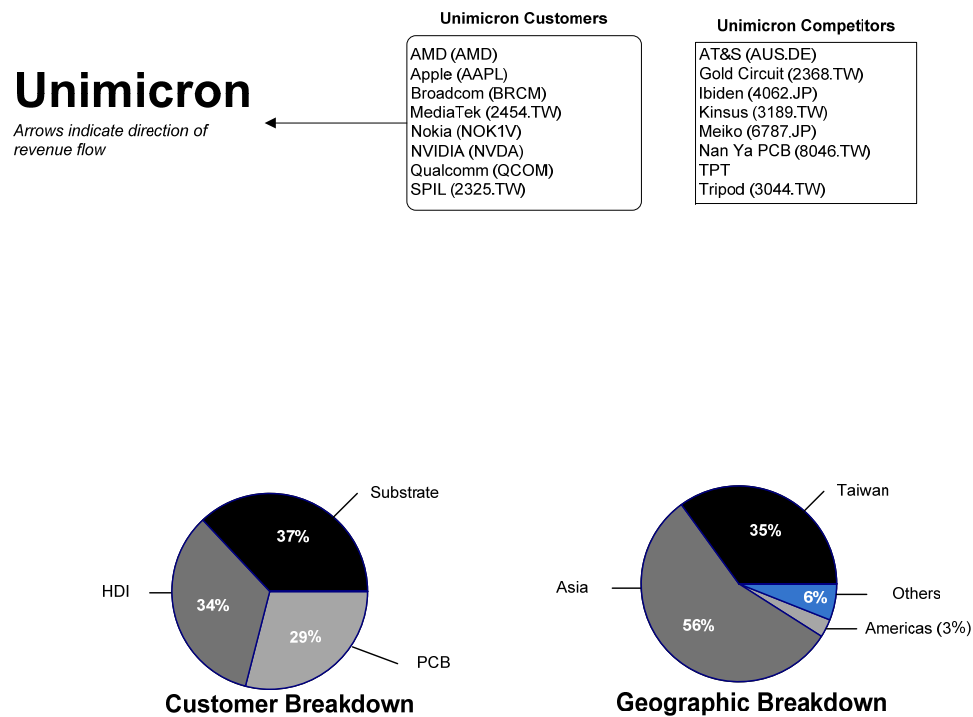
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 622. Unimicron (3037.TW)

Sector: Electronic Components

Unimicron (3037.TW)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Roland Shu

Vanguard International Semiconductor

Vanguard International Semiconductor Corporation (VIS) is a leading specialty IC foundry service provider. VIS offers a wide range of process technologies, including 0.18um Logic, Mixed-Signal, Analog, High Voltage, Low Power, CMOS RF, Flash, Embedded Memory, and Bipolar CMOS DMOS (BCD).

Figure 623. Vanguard International (5347.TW) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	16120.2	12588.0	16033.9	15190.4	17162.5	19681.4	20540.8	19678.1	22094.4
- <i>y/y growth</i>	0.9%	-21.9%	27.4%	-5.3%	13.0%	14.7%	19.7%	0.0%	7.6%
Gross Margins	16.2%	9.9%	20.2%	14.8%	23.8%	30.2%		28.1%	
Operating Margins	6.4%	-0.4%	11.3%	6.0%	13.9%	20.6%		18.6%	
EPS	0.61	0.05	1.17	0.53	1.48	2.38	2.47	2.18	2.65
- <i>y/y growth</i>	-76.2%	-91.3%	2097.7%	-54.2%	177.5%	60.6%	66.9%	-8.5%	7.0%
Cash	4455.9	7188.4	8419.2	8210.6	11239.2	16184.0		20496.1	
Debt	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Net Cash/Shr	2.6	4.3	5.0	5.0	7.1	10.4		13.1	
Tangible Book Value/Shr	11.9	11.9	12.6	12.5	12.9	15.3		17.4	

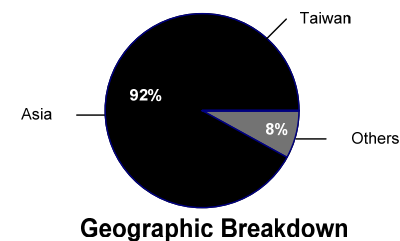
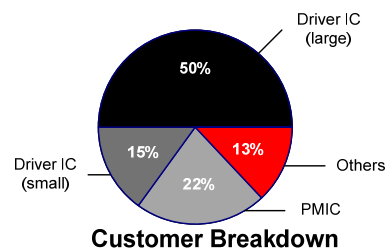
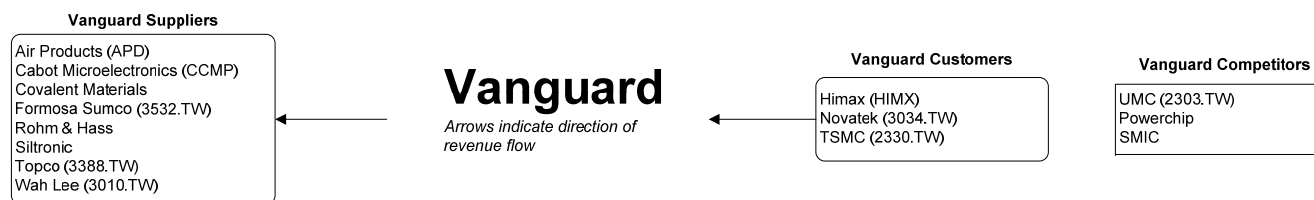
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 624. Vanguard International (5347.TW)

Sector: Semiconductors

Vanguard International Semiconductor (5347.TWO)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Veeco Instruments Inc

Veeco Instruments, Inc. designs, manufactures and markets equipment to make light emitting diodes, solar panels, hard-disk drives and other devices as well as for emerging applications such as concentrator photovoltaic's, power semiconductors, wireless components, microelectromechanical systems, and other next-generation devices. The company operates its business through following segments: LED & Solar and Data Storage. The LED & Solar segment designs and manufactures metal organic chemical vapor deposition and molecular beam epitaxy systems and components sold to manufacturers of LEDs, wireless devices, power semiconductors, and concentrator photovoltaics, as well as to R&D applications. The Data Storage segment designs and manufactures ion beam etch, ion beam deposition, diamond-like carbon, physical vapor deposition, chemical vapor deposition, and dicing and slicing systems that are primarily used to create thin film magnetic heads that read and write data on hard disk drives. Veeco Instruments was founded in 1989 and is headquartered in Plainview, NY.

Figure 625. Veeco (VECO) Results and Forecasts

	2007	2008	2009	2010	2011	Street 2012E	Street 2013E
Revenues	402.5	442.8	380.1	933.2	979.1	508.85	428.9
- y/y growth	-8.7%	10.0%	-14.2%	145.5%	4.9%	-48.0%	-15.7%
Gross Margins	36.6%	38.1%	40.3%	47.0%	48.0%		
Operating Margins	-0.9%	3.6%	0.9%	29.6%	28.4%		
EPS	0.17	0.51	0.27	4.42	5.01	1.30	0.56
- y/y growth	-77.0%	200.0%	-47.1%	1537.0%	13.3%	-74.1%	-57.0%
Cash	117.08	103.80	283.79	715.43	492.09		
Debt	146.59	108.87	101.18	104.02	2.65		
Net Cash/Shr	1.26	1.41	1.77	4.57	2.81		
Tangible Book Value/Shr	3.55	3.63	6.92	17.20	17.51		

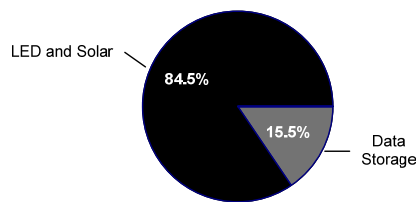
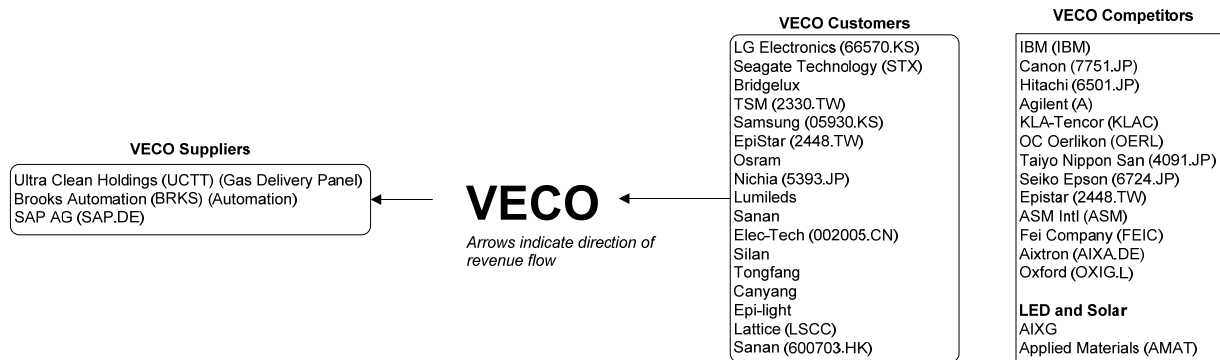
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

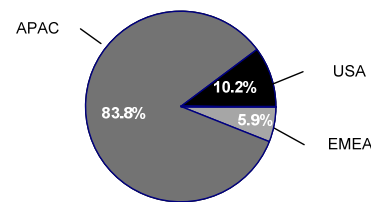
Figure 626. Veeco Instruments (VECO)

Sector: Semiconductor Equipment

Veeco Instruments Inc. (VECO)



Segment Breakdown



Geographic Breakdown

Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Patrick Yau, CFA

Venture

Venture Corp. Ltd. (listed on the SGX) is a global electronics services provider. We believe the company offers a combination of strong management, world-class technical capability, innovative manufacturing technology, reliable testing capability and ultra-modern facilities. Founded in 1984, the Venture group comprises more than 20 companies with operations in Asia, North America and Europe.

Figure 627. Venture (VENM.SG) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	3784.1	3412.2	2675.8	2432.4	2387.7	2545.1	2493.2	2708.8	2671.6
- y/y growth	-2.3%	-9.8%	-21.6%	-9.1%	-1.8%	6.6%	4.4%	6.4%	7.2%
Gross Margins	20.1%	16.0%	22.9%	23.6%	22.2%	22.9%		22.9%	
Operating Margins	7.4%	4.6%	7.2%	6.2%	5.6%	6.3%		6.4%	
EPS	1.04	0.59	0.69	0.57	0.51	0.59	0.56	0.64	0.63
- y/y growth	-8.0%	-43.4%	16.3%	-16.9%	-10.7%	16.5%	9.6%	7.3%	12.2%
Cash	513.8	567.1	441.7	513.2	453.4	464.6		458.4	
Debt	321.5	223.7	203.2	204.1	167.4	157.4		147.4	
Net Cash/Shr	1.4	2.1	1.2	1.4	1.7	1.7		1.7	
Tangible Book Value/Shr	4.1	4.0	4.0	4.1	3.9	4.0		4.1	

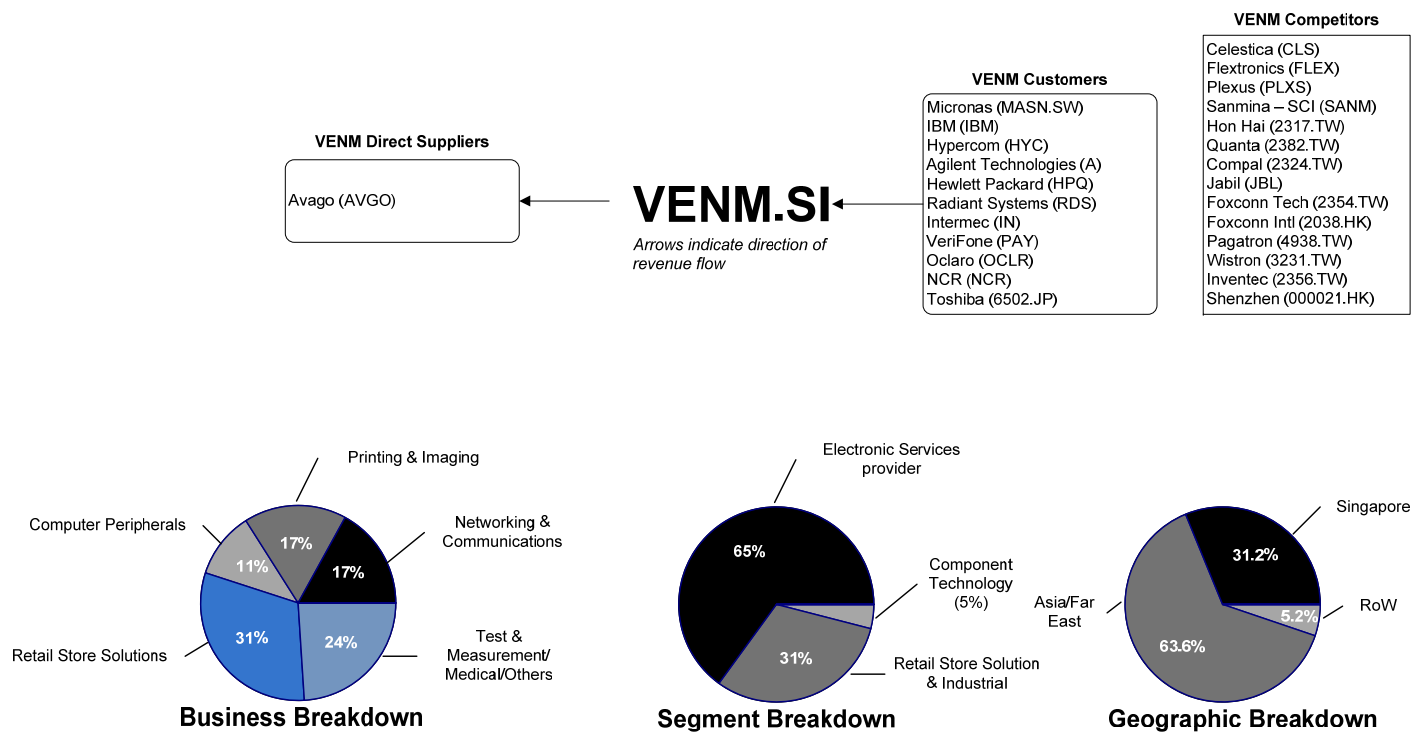
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 628. Venture (VENM.SI)

Sector: Electronic Manufacturing Services

Venture Corp. (VENM.SI)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jim Suva, CPA

Vishay Intertechnology Inc

Vishay Intertechnology, Inc. is a leading manufacturer of a broad line of passive and active electronic components, including discrete active electronic components, resistors, capacitors, inductors, diodes, and transistors. It has 63 manufacturing facilities worldwide, with about 76% of its employees in low-cost countries vs. 57% in 2000. Sales by end market are 29% industrial (factories, power plants, transit systems); 16% computer (server, desktop, notebooks); 19% automotive (electronic control systems, airbags, sensors); 11% telecommunications (base stations, cell phones, PDAs); 7% power supplies; 7% consumer products (digital cameras, MP3 players, video game consoles, white goods or microwaves, refrigerators, washers/dryers); 7% military/aerospace (commercial and military airplanes, space programs); and 4% medical (hearing aids, pace makers, medical equipment such as MRI, X-ray, CAT scan equipment). Vishay has a diversified customer base with no customers greater than 6% of revenues.

Figure 629. Vishay (VSH) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	2822.2	2042.0	2725.1	2594.0	2230.1	2349.0	2363.3	2592.1	2544.5
- y/y growth	-0.4%	-27.6%	33.4%	-4.8%	-14.0%	5.3%	6.0%	10.3%	7.7%
Gross Margins	21.2%	19.0%	29.6%	27.8%	23.6%	24.9%		26.5%	
Operating Margins	5.0%	1.4%	15.3%	13.6%	7.9%	8.8%		10.8%	
EPS	0.52	0.02	1.58	1.45	0.70	0.84	0.90	1.17	1.17
- y/y growth	-45.3%	-96.4%	8323.1%	-8.6%	-51.3%	19.0%	27.2%	39.9%	30.5%
Cash	324.2	579.2	897.3	998.2	992.5	1034.3		1150.5	
Debt	358.0	336.1	431.7	399.1	392.9	394.5		394.5	
Net Cash/Shr	-0.1	1.4	2.4	3.6	3.8	4.2		5.0	
Tangible Book Value/Shr	7.3	7.3	7.5	10.0	10.7	11.8		13.1	

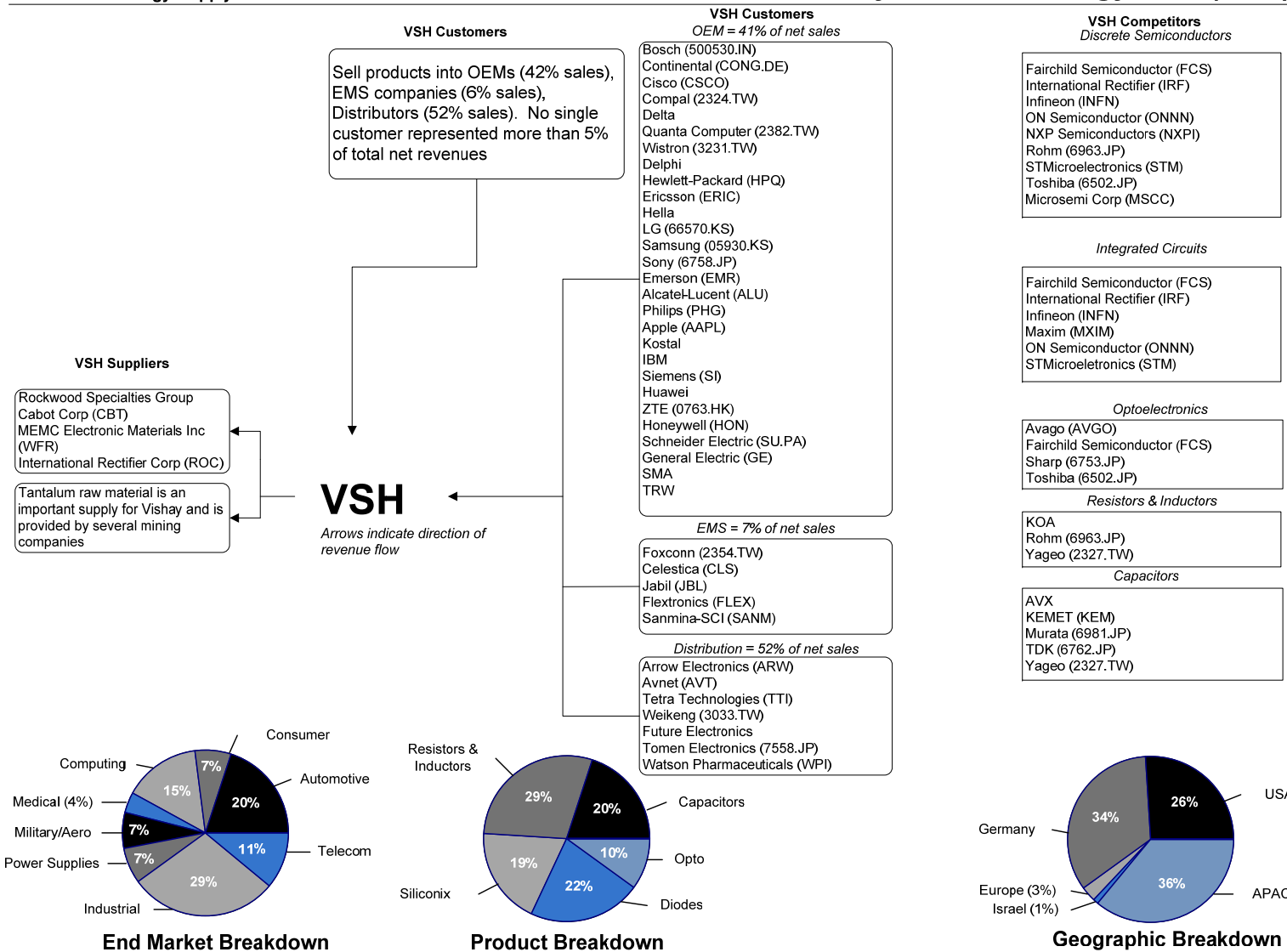
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 630. Vishay (VSH)

Sector: Technology Supply Chain - Passives

Vishay Intertechnology, Inc. (VSH)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Eric Lau

VTech Holdings

VTech is the world's largest cordless phone company on an ODM and OBM basis. It has 20% global share under brands VTech and AT&T and c50% share in the US. Besides, we estimate VTech is the largest player in the electronic toys product (ELP) industry based on turnover. Revenue breakdown for cordless phone, ELP and Contract Manufacturing Services (CMS) was 40%, 37% and 23% in FY12. Revenues from America, Europe, Asia and other regions were 51%, 40%, 5% and 4% of the total, respectively, in FY12. Mr. Allan Wong is co-founder and chairman, and is the largest shareholder with a 35% stake. Templeton Asset Management is the largest independent shareholder with a 16% stake.

Figure 631. VTech (303.HK) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	12103.5	11261.7	11881.3	13316.4	13878.9	14408.8	14299.1	15347.0	15122.2
- <i>y/y growth</i>	6.3%	-7.0%	5.5%	12.1%	4.2%	3.8%	3.0%	6.5%	5.8%
Gross Margins	37.6%	36.4%	36.5%	33.1%	32.0%	32.0%		32.5%	
Operating Margins	14.7%	10.7%	14.6%	12.8%	11.7%	11.8%		12.5%	
EPS	6.87	4.54	6.46	6.31	5.98	6.26	6.22	7.03	6.74
- <i>y/y growth</i>	17.7%	-34.0%	42.4%	-2.4%	-5.2%	4.7%	3.9%	12.2%	8.3%
Cash	2221.2	2225.9	2970.7	2591.2	2535.6	2532.9		2743.3	
Debt	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Net Cash/Shr	9.1	9.1	12.0	10.4	10.2	10.2		11.0	
Tangible Book Value/Shr	14.4	13.9	16.2	17.1	17.4	16.5		17.5	

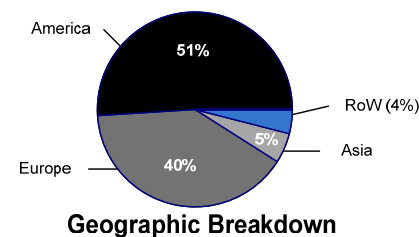
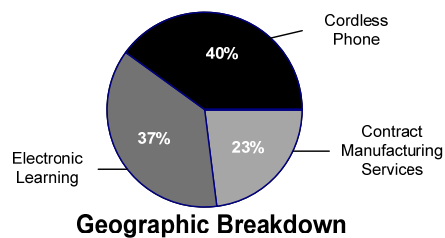
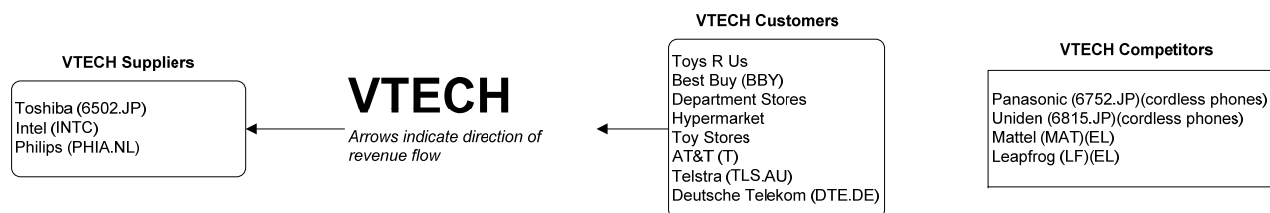
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 632. Vtech (303.HK)

Sector: Consumer Electronics

VTECH Holdings (0303.HK)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Joe Yoo

Western Digital Corp

Headquartered in Lake Forest, CA, Western Digital is the largest global manufacturer of hard disk drives. While the company was mostly a supplier to the desktop market until 2004, WD has successfully expanded into the notebook segment and currently holds the #1 share in the 2.5" HDD market. The company also serves the consumer electronics segment (DVR, game console, auto navigation) and is currently the leading supplier of branded external drives. Meanwhile, WD has quickly evolved into a vertically integrated company with acquisition of Read-Rite (heads), Komag (substrates and media), and Hoya (media), which has allowed them to dramatically lower their dependency on merchant vendors for critical components, while structurally improving margins.

Figure 633. Western Digital (WDC) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	8074.0	7452.0	9850.0	9526.0	12478.0	15236.5	15240.2	14683.4	14939.5
- y/y growth	47.6%	-7.7%	32.2%	-3.3%	31.0%	22.1%	22.1%	-3.6%	-2.0%
Gross Margins	21.5%	17.9%	24.4%	18.8%	30.3%	29.2%		28.4%	
Operating Margins	13.1%	8.4%	15.8%	8.7%	18.2%	14.8%		13.7%	
EPS	4.05	2.56	6.05	3.27	8.48	8.33	8.32	7.76	7.98
- y/y growth	55.7%	-36.7%	136.1%	-46.0%	159.2%	-1.8%	-2.0%	-6.8%	-4.1%
Cash	1107.0	1794.0	2734.0	3490.0	3208.0	4575.4		5711.7	
Debt	509.0	482.0	400.0	294.0	2185.0	1955.5		1725.5	
Net Cash/Shr	2.8	6.2	10.5	14.2	5.1	11.6		17.8	
Tangible Book Value/Shr	11.3	13.3	19.7	22.8	20.4	24.6		28.9	

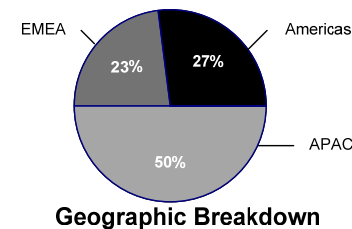
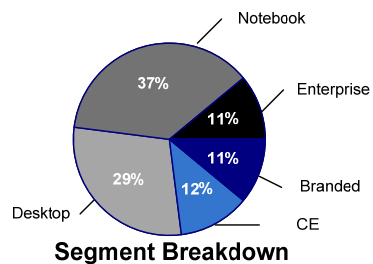
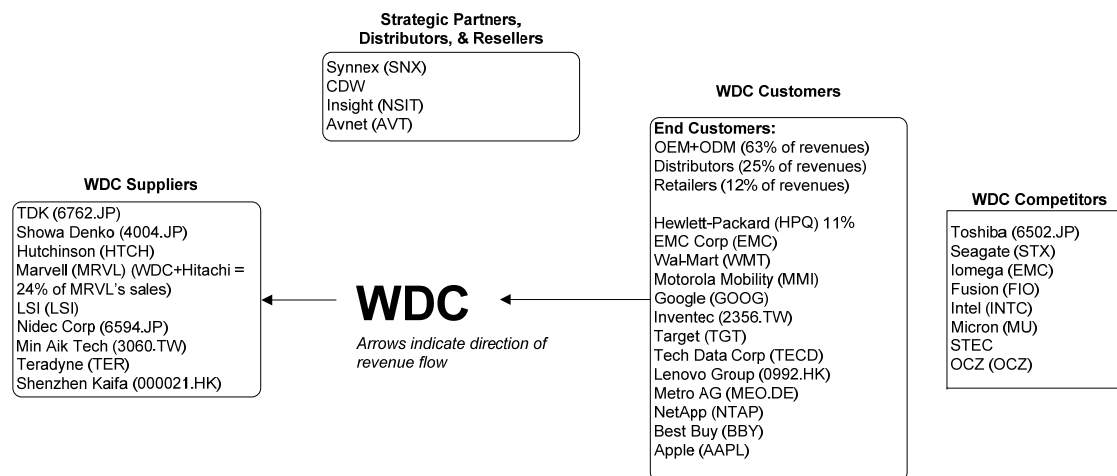
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 634. Western Digital (WDC)

Sector: Storage – Hard Disk Drive

Western Digital Corp (WDC)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Arthur Lai

Wintek

Wintek was founded in 1990 and was initially focused on the production of small and medium STN/TFT LCD and LCM for handset displays. The company began to focus on touch panel operation from 2007, and since then, it has evolved from a low-end S&M LCD supplier to a dedicated touch panel maker for high-end mobile and tablet applications. Currently, Wintek's revenue stream can be divided into two major categories: touch panel (c.85-90% of total revenue) and STN/TFT LCD displays.

Figure 635. Wintek (2384.TW) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	32279.7	27399.3	63886.2	93031.8	102178.1	89934.1	89144.7	96696.9	91589.8
- y/y growth	2.2%	-15.1%	133.2%	45.6%	9.8%	-12.0%	-12.8%	7.5%	2.7%
Gross Margins	4.4%	-0.1%	9.2%	2.6%	2.5%	3.7%		4.8%	
Operating Margins	-3.4%	-7.5%	4.3%	-1.7%	-1.1%	0.0%		0.9%	
EPS	-1.90	-2.10	1.51	-1.16	-1.15	-0.38	-0.56	0.04	-0.25
- y/y growth	-471.0%	-10.1%	172.2%	-176.7%	1.3%	66.7%	51.5%	111.5%	55.6%
Cash	4415.9	6153.1	6224.4	8094.7	9382.3	6650.9		7875.2	
Debt	26536.1	25024.7	24483.9	32953.8	40427.0	37117.2		36501.9	
Net Cash/Shr	-8.6	-6.3	-4.5	-3.9	-2.7	-4.1		-3.4	
Tangible Book Value/Shr	20.6	18.7	20.1	21.8	19.4	19.0		19.1	

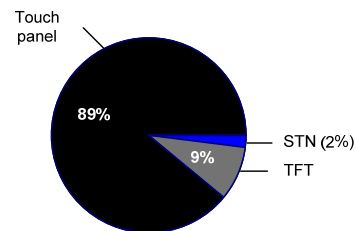
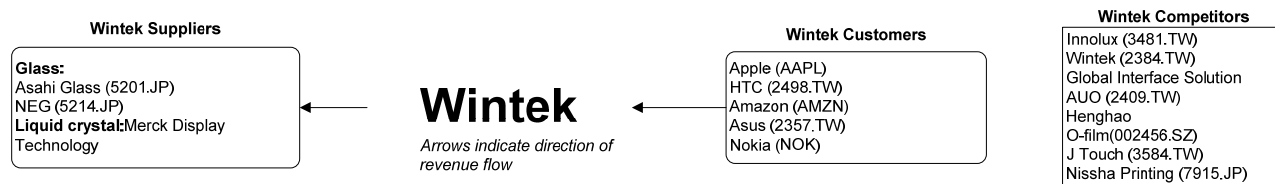
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

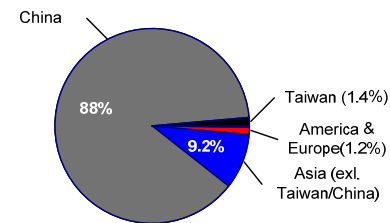
Figure 636. Wintek (2384.TW)

Sector: Semiconductors & Components

Wintek Corp. (2384.TW)



Business Breakdown



Geographic Breakdown

Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Wei Chen

Wistron

Wistron is a major Original Design Manufacturer (ODM) for notebook (NB) PCs in Taiwan. It was the manufacturing arm of Acer before being spun off in 2002. While Acer remains its major customer, Wistron has diversified its customer base to other NB PC brands including Lenovo and HPQ. Besides NBs, Wistron also makes desktop PCs, servers, LCD TVs, and handheld devices.

Figure 637. Wistron (3231.TW) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	445117.7	546665.7	615184.8	658366.7	657844.5	659275.4	679892.8	601275.4	722048.7
- <i>y/y growth</i>	55.2%	22.8%	12.5%	7.0%	-0.1%	0.2%	3.4%	-8.8%	6.2%
Gross Margins	5.6%	5.5%	5.6%	4.9%	4.9%	4.9%		5.0%	
Operating Margins	1.9%	2.0%	2.2%	1.6%	1.2%	1.3%		1.4%	
EPS	3.69	4.50	5.57	4.15	3.04	3.23	3.51	3.28	3.83
- <i>y/y growth</i>	-3.3%	22.1%	23.6%	-25.5%	-26.8%	6.3%	15.4%	1.6%	9.4%
Cash	13191.7	20795.5	40764.3	45568.7	72582.0	69623.5		73560.2	
Debt	12733.2	7650.4	41989.6	56502.5	88657.0	66646.0		69646.0	
Net Cash/Shr	1.8	7.4	18.8	20.6	27.8	26.3		27.9	
Tangible Book Value/Shr	19.1	24.6	26.1	28.1	28.2	30.2		32.3	

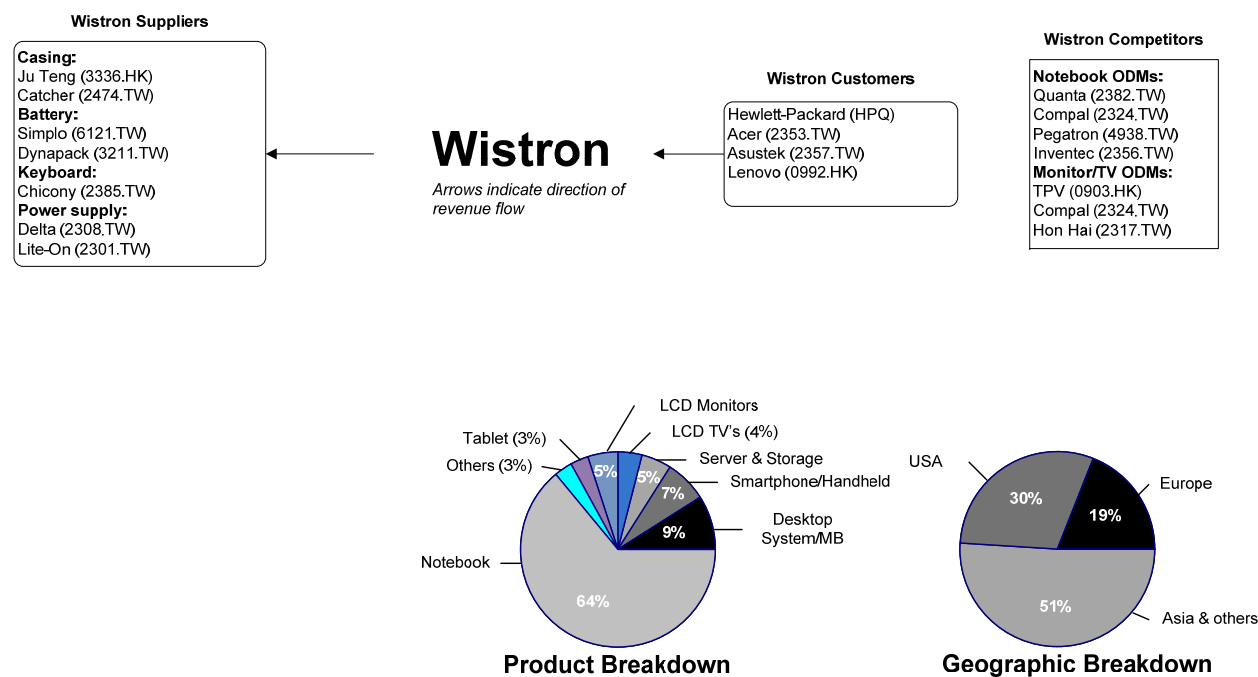
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 638. Wistron (3231.TW)

Sector: PC & Enterprise Hardware

Wistron (3231.TW)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Amit Harchandani

Wolfson

Wolfson is a mixed signal, fabless semi company that sells integrated circuits into the consumer electronics market. It focuses on three major end markets - consumer, portable and imaging. Wolfson was founded in 1985 as a spin-off from Edinburgh University. The company was listed on the LSE in Oct 2003.

Most Relevant Relationships: Samsung Electronics

Figure 639. Wolfson (WFL.L) Results and Forecasts

	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	77.7	101.9	97.9	113.4	149.3	147.2	167.7	170.7
- y/y growth		31.1%	-3.9%	15.8%	31.6%	29.8%	12.3%	16.0%
Gross Margins	50.7%	49.5%	48.5%	46.9%	44.9%		47.4%	
Operating Margins	-6.3%	-1.0%	-4.8%	-1.6%	5.5%		10.2%	
EPS	-0.02	0.00	-0.03	-0.01	0.06	0.05	0.12	0.13
- y/y growth		81.3%	-534.0%	78.5%	987.0%	848.7%	108.2%	175.2%
Cash	60.5	62.2	34.4	29.5	24.4		44.9	
Debt	0.0	0.0	0.0	0.0	0.0		0.0	
Net Cash/Shr	0.5	0.5	0.3	0.3	0.2		0.4	
Tangible Book Value/Shr	0.7	0.8	0.6	0.6	0.6		0.8	

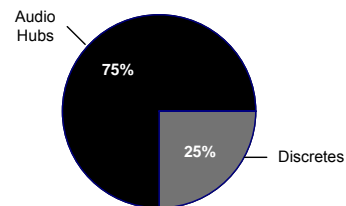
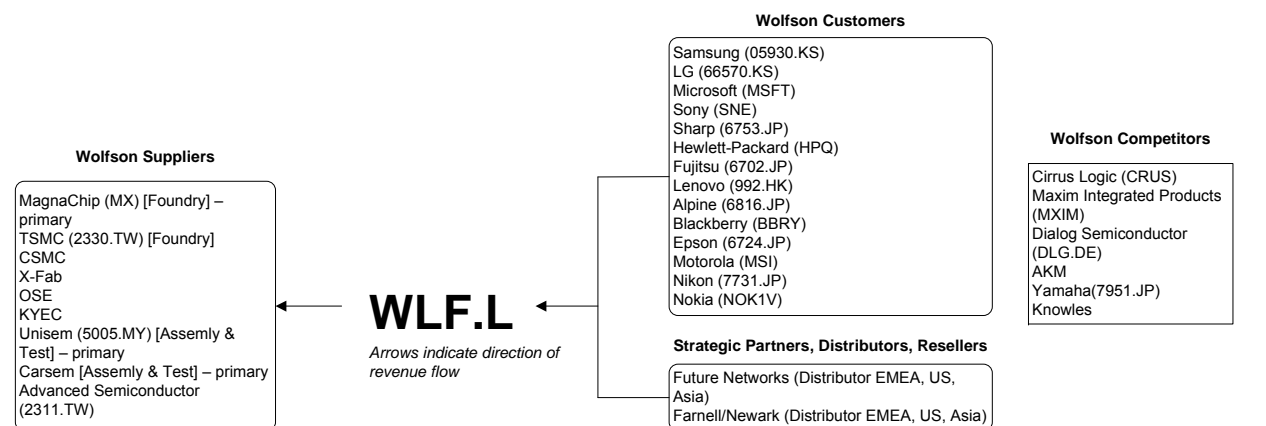
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

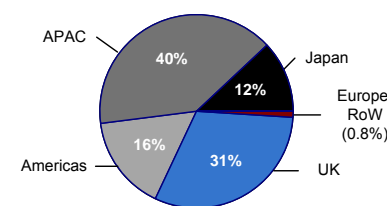
Figure 640. Wolfson (WLF.L)

Sector: Semiconductors

Wolfson (WLF.L)



Segment Breakdown



Geographic Breakdown

Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Roland Shu

WPG Holdings

WPG Holdings was formed with the merger of WPI group, SAC group and RichPower. WPI was founded in 1981, and was the No.1 semiconductor component vendor in Asia.

Figure 641. WPG (3702.TW) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	143217.2	196773.5	257217.2	332322.6	360614.2	392755.9	392715.4	418356.4	430403.3
- <i>y/y growth</i>	0.2%	37.4%	30.7%	29.2%	8.5%	8.9%	8.9%	6.5%	9.6%
Gross Margins	5.6%	5.6%	5.7%	5.4%	5.0%	4.6%		4.5%	
Operating Margins	2.1%	2.3%	2.3%	2.0%	1.7%	1.6%		1.6%	
EPS	1.89	3.16	4.12	3.21	2.71	2.89	3.10	3.09	3.52
- <i>y/y growth</i>	-30.4%	66.6%	30.5%	-22.2%	-15.5%	6.5%	14.3%	6.9%	13.5%
Cash	6137.3	6838.7	7768.7	7952.8	8952.1	2734.4		3474.4	
Debt	16912.1	16837.6	26907.6	35917.9	42550.1	46294.0		51294.0	
Net Cash/Shr	4.3	2.0	4.9	2.5	1.5	-4.9		-7.5	
Tangible Book Value/Shr	14.8	18.0	28.1	23.4	23.2	24.1		24.6	

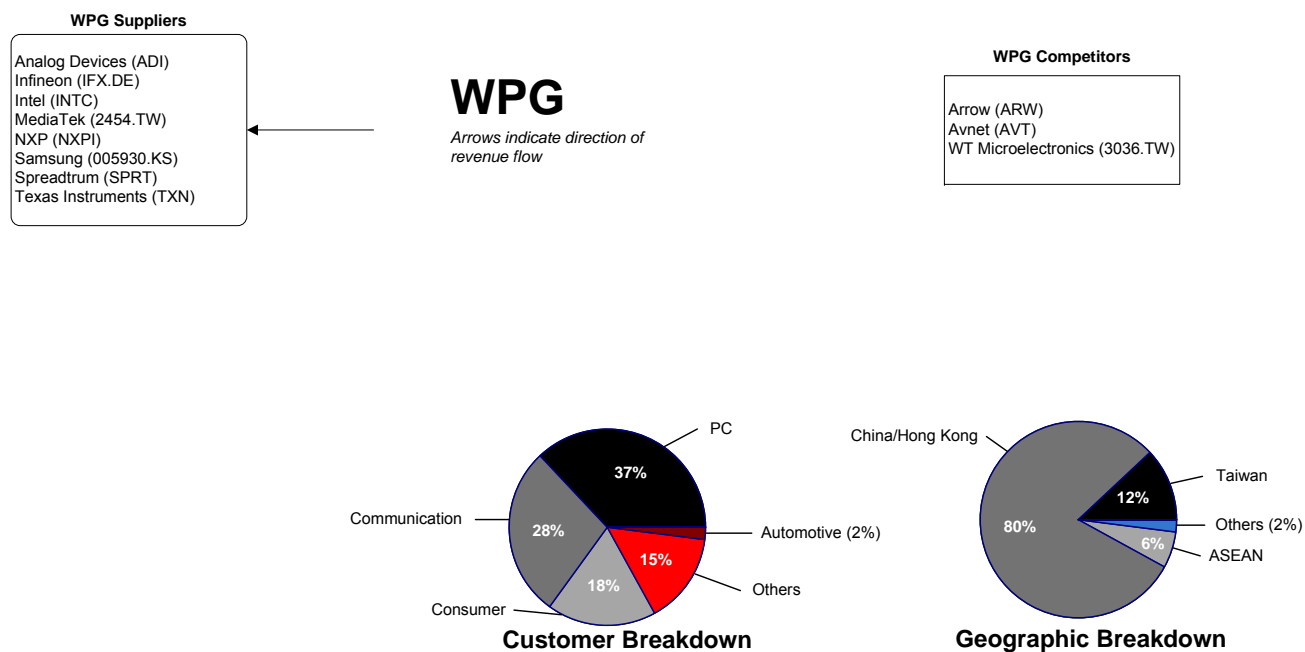
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 642. WPG Holdings (3702.TW)

Sector: Technology Distributors

WPG Holdings (3702.TW)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Jim Suva, CPA

Xerox Corp

Xerox (XRX) is one of the largest global providers of copiers, printers and related supplies, services and financing to Office and Production printing environments, and with its completion of the acquisition of ACS on February 8, 2010, the company is now one of the largest Business Process Outsourcing (BPO) companies in the world.

The company operates through two key segments: Technology (42% of total sales in 2012) and Services (52% of total sales in 2012). The Services segment is comprised of business process outsourcing, information technology outsourcing and document outsourcing. Its Business Process Outsourcing services include human resources services; finance and accounting services; healthcare payers and pharma; customer management solutions; government healthcare provider solutions; technology-based transactional services for retail, travel, and non-healthcare insurance companies; programs for federal, state, county, and town governments; transportation solutions; and government healthcare solutions. The Information Technology Outsourcing specializes in designing, developing and delivering effective IT solutions. Its services include mainframe server outsourcing, network outsourcing, desktop outsourcing. In addition, it provides remote infrastructure management, help desk/service desk management, managed storage, utility computing, disaster recovery and security services. Document Outsourcing includes the sale and support of a broad range of document systems from entry level to high-end.

The Technology segment is comprised of document technology and related supplies, technical service and equipment financing. Its strategic product groups within this segment include entry, mid-range and high-end products.

The remainder of the sales (6% of 2012 revenues) falls into the Other category which comprises of paper supplies, wide format systems, licensing revenues, GIS network integration solutions and electronic presentation systems and non-allocated corporate items. The company was founded in 1906 and is headquartered in Norwalk, CT. It employs 147,000 globally.

Figure 643. Xerox (XRX) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	17608.0	15179.0	21633.0	22626.0	22390.0	21915.5	22373.1	21953.3	22544.1
- y/y growth	2.2%	-13.8%	42.5%	4.6%	-1.0%	-2.1%	-0.1%	0.2%	0.8%
Gross Margins	39.2%	39.7%	34.4%	32.8%	31.4%	29.8%		29.4%	
Operating Margins	8.4%	6.8%	9.6%	9.8%	9.3%	9.6%		10.0%	
EPS	1.10	0.60	0.94	1.08	1.03	1.11	1.10	1.13	1.18
- y/y growth	-7.2%	-45.8%	58.2%	14.7%	-4.7%	7.8%	6.9%	1.6%	6.5%
Cash	1229.0	3799.0	1211.0	902.0	1246.0	2033.4		2590.4	
Debt	8384.0	9264.0	8607.0	8633.0	8489.0	8239.0		7839.0	
Net Cash/Shr	-6.2	-5.1	-4.4	-4.3	-4.6	-4.2		-3.8	
Tangible Book Value/Shr	2.8	2.3	0.1	0.1	-0.1	0.7		1.8	

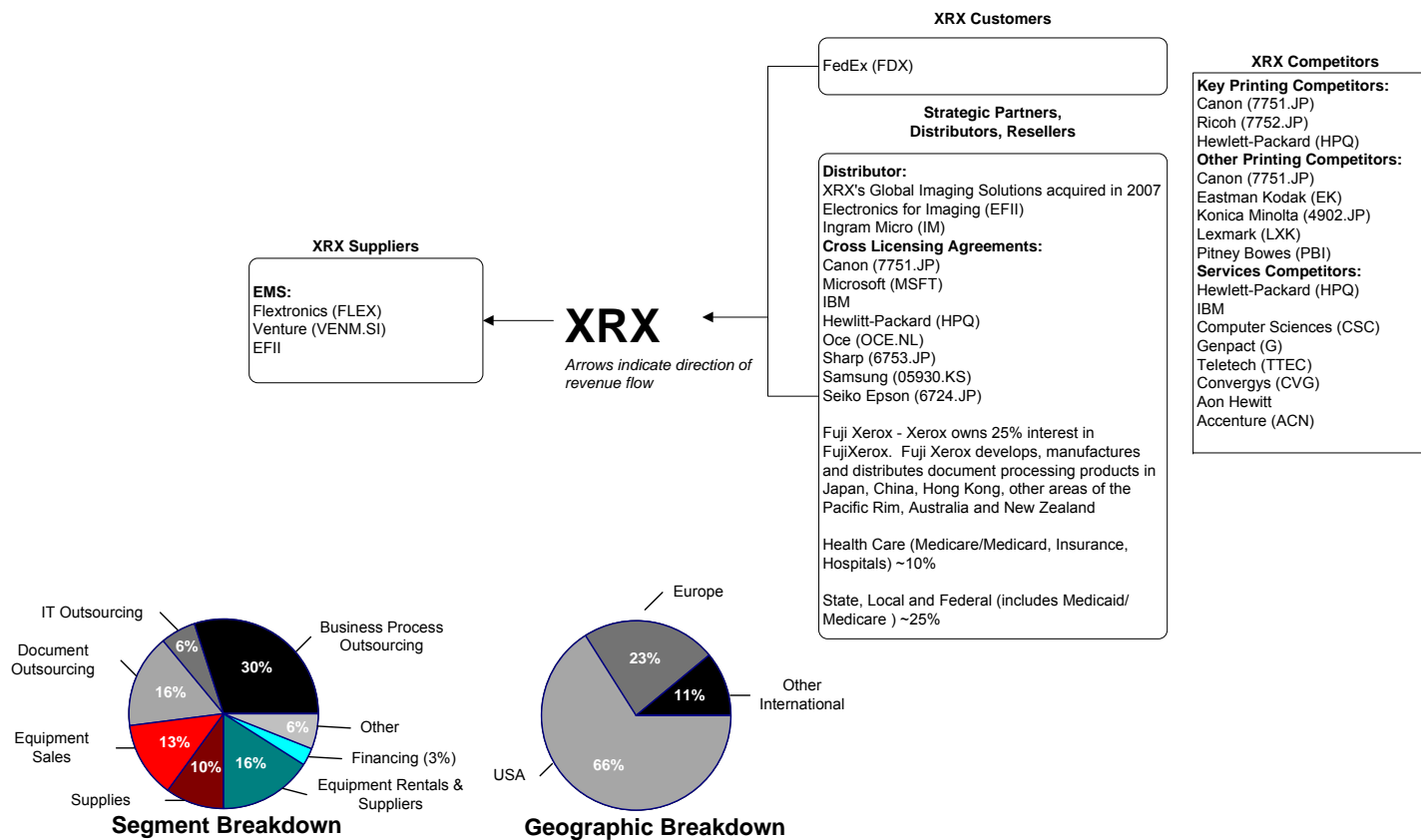
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 644. Xerox (XRX)

Sector: Imaging

Xerox Corp. (XRX)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Glen Yeung

Xilinx Inc

Xilinx (XLNX) is a leading supplier of Programmable Logic Devices (PLD). The company supplies PLDs for communications, storage and server systems, wireless base stations, and industrial products. Major product lines include Spartan, Artix, Kintex, Virtex, and Zynq device families. Xilinx's customers include the majority of the major networking, server, and storage companies. The communications market is the largest segment of the company's revenues, followed by industrial/other, consumer/automotive, and data processing.

Figure 645. Xilinx (XLNX) Results and Forecasts

	2009	2010	2011	2012	2013	CIR 2014E	Street 2014E	CIR 2015E	Street 2015E
Revenues	1825.2	1833.6	2369.4	2240.7	2168.7	2295.5	2294.3	2408.4	2531.1
- y/y growth	-0.9%	0.5%	29.2%	-5.4%	-3.2%	5.8%	5.8%	4.9%	10.3%
Gross Margins	63.3%	63.4%	65.4%	64.9%	66.0%	66.7%		66.0%	
Operating Margins	23.5%	23.6%	33.6%	28.7%	26.8%	29.9%		29.7%	
EPS	1.36	1.29	2.39	1.99	1.78	2.03	1.98	2.12	2.28
- y/y growth	7.3%	-5.1%	85.5%	-16.7%	-10.4%	13.8%	11.0%	4.6%	15.0%
Cash	1324.9	1386.6	1926.4	1917.6	1714.7	2193.9		2758.9	
Debt	690.1	354.8	891.0	1005.4	1021.5	1021.5		1021.5	
Net Cash/Shr	2.3	3.7	3.9	3.7	2.9	4.6		6.6	
Tangible Book Value/Shr	5.9	7.3	8.6	9.6	10.6	12.5		14.5	

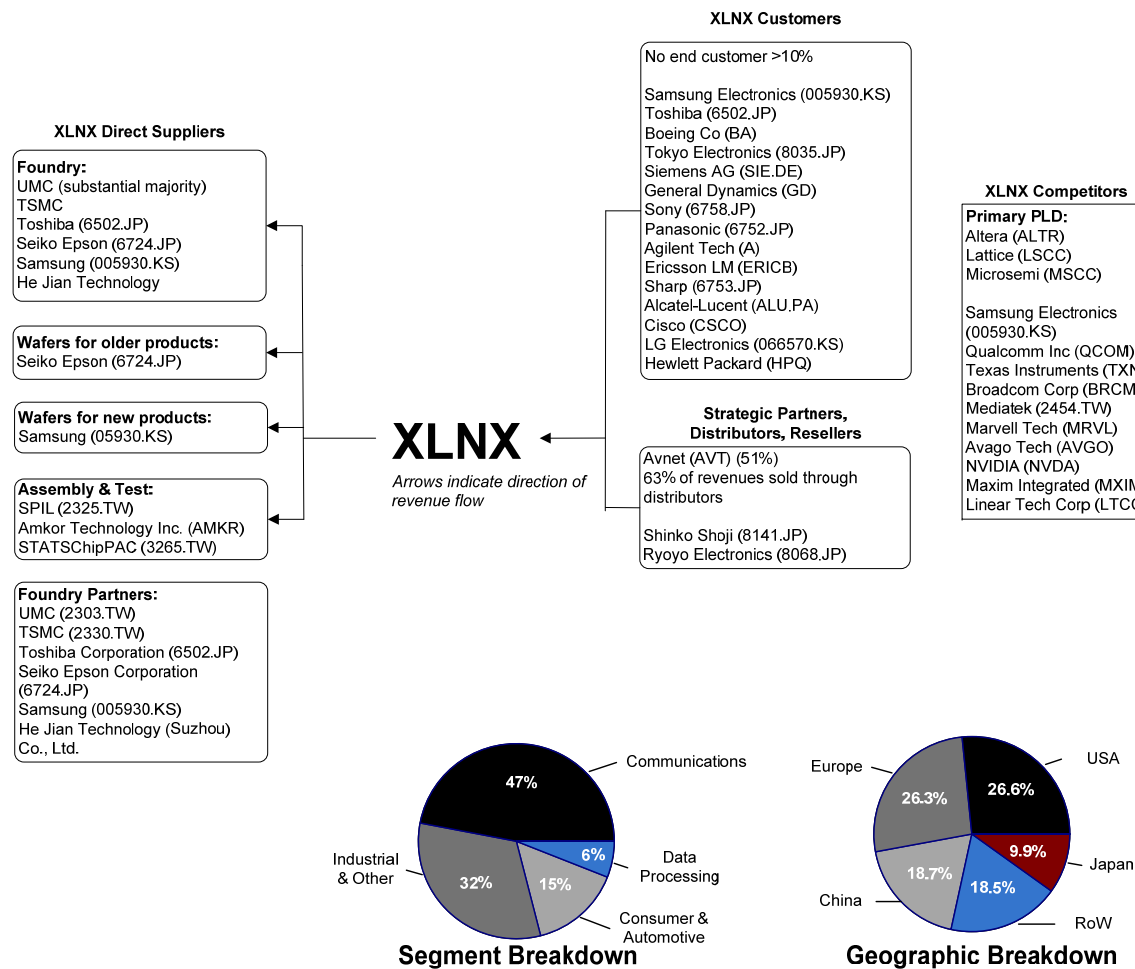
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 646. Xilinx (XLNX)

Sector: Semiconductors

Xilinx Corp. (XLNX)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Xyratex Ltd

Xyratex Ltd. provides enterprise class data storage subsystems and hard disk drive capital equipment. The company operates in two business segments: Networked Storage Solutions and Storage Infrastructure. The Networked Storage Solutions products are primarily hard disk drive based storage subsystems, which it provides to original equipment manufacturers, and Storage Infrastructure products consist of disk drive manufacturing process equipment, which it sells directly to manufacturers of disk drives and disk drive components. Xyratex was founded in 1994 and is headquartered in Havant, the United Kingdom.

Figure 647. Xyratex (XRTX) Results and Forecasts

	2008	2009	2010	2011	2012	Street 2013E	Street 2014E
Revenues	1049.7	867.9	1601.9	1448.5	1158.9	861.07	856.8
- <i>y/y growth</i>	12.7%	-17.3%	84.6%	-9.6%	-20.0%	-25.7%	-0.5%
Gross Margins	14.6%	14.0%	17.2%	15.0%	16.6%		
Operating Margins	0.4%	-0.7%	7.7%	2.5%	1.8%		
EPS	0.30	0.05	4.34	1.27	0.87	0.08	0.22
- <i>y/y growth</i>	-72.0%	-83.3%	8580.0%	-70.7%	-31.5%	-91.2%	187.0%
Cash	28.01	51.94	90.84	132.63	117.17		
Debt	0.00	0.00	0.00	0.00	0.00		
Net Cash/Shr	-0.44	1.34	1.91	3.49	0.91		
Tangible Book Value/Shr	6.95	7.20	11.82	12.73	13.30		

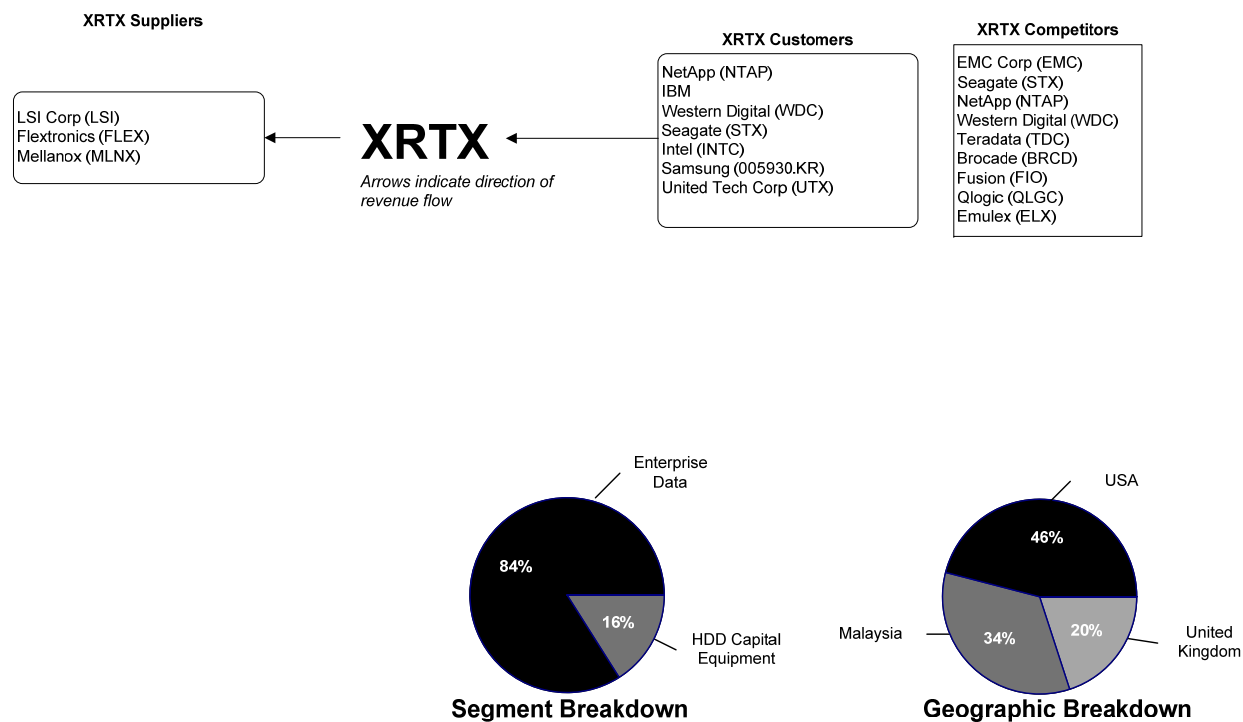
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, FactSet

Figure 648. Xyratex (XRTX)

Sector: Data Storage

Xyratex Ltd (XRTX)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Shahriar Pourreza, CFA

Yingli Green Energy Holding Co. Ltd

Based in China, Yingli Green Energy is a vertically-integrated manufacturer of raw materials and end products for the photovoltaic (PV) industry. Its operations cover every aspect of the solar value chain including raw material production of polysilicon, ingots, and wafers to the manufacture and installation of silicon-based solar modules/systems. Yingli markets its products in key solar regions across the globe including Germany, U.S., and China through value-added resellers, distributors, and direct sales primarily targeting applications in the traditional rooftop and ground-mount end markets.

Figure 649. Yingli Green Energy (YGE) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	1107.1	1062.5	1864.0	2283.5	1801.0	1639.3	1877.3	1764.4	2214.4
- y/y growth	98.9%	-4.0%	75.4%	22.5%	-21.1%	-9.0%	4.2%	7.6%	18.0%
Gross Margins	21.7%	22.6%	33.3%	18.1%	5.3%	6.6%		10.0%	
Operating Margins	15.9%	9.3%	22.8%	6.6%	-9.1%	-5.2%		-0.7%	
EPS	0.77	-0.35	1.36	0.38	-1.70	-1.39	-1.54	-1.03	-1.01
- y/y growth	92.7%	-144.9%	492.8%	-71.9%	-546.0%	18.1%	9.5%	25.8%	34.5%
Cash	178.5	507.4	985.0	891.9	721.4	456.3		403.1	
Debt	578.8	827.1	1385.9	2259.8	2497.1	2465.8		2616.3	
Net Cash/Shr	-0.8	2.8	2.8	-0.2	-3.8	-6.5		-7.7	
Tangible Book Value/Shr	4.7	5.4	7.4	5.2	2.9	1.7		0.7	

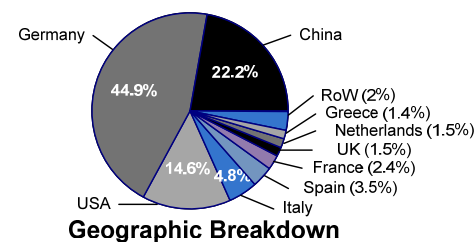
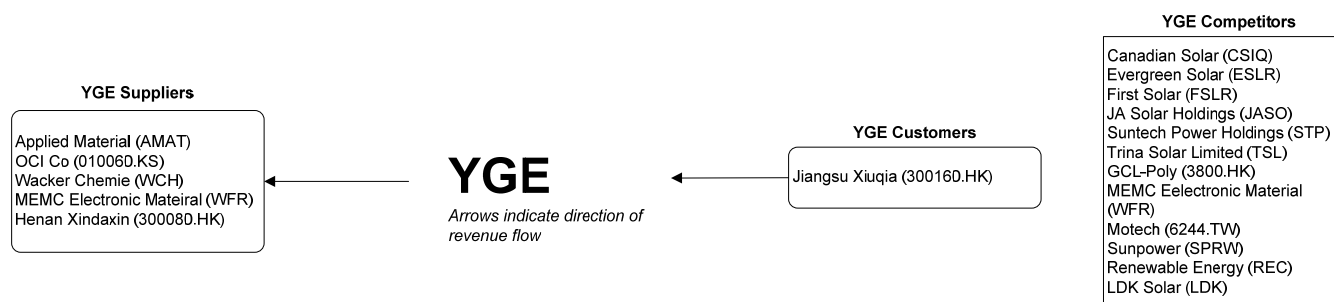
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 650. Yingli Green Energy (YGE)

Sector: Alternative Energy

Yingli Green Energy Hold. Co. Ltd. (YGE)



Segment Breakdown – 100% PV Modules

Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Arthur Lai

Young Fast

Young Fast is the leading manufacture of film-based touch panel, specializing in the lamination process. Since 2008, it experienced a major shift in product and with its customer mix evolving from China's white-box makers to major smartphone brands including Samsung, HTC, LG, and Nokia. These top 4 clients represent >80% of the current business.

Figure 651. Young Fast (3622.TW) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	6886.4	12757.2	17384.8	16517.1	13100.9	16496.7	14822.0	18546.2	17005.6
- <i>y/y growth</i>	911.3%	85.3%	36.3%	-5.0%	-20.7%	25.9%	13.1%	12.4%	14.7%
Gross Margins	27.9%	35.5%	28.1%	10.9%	8.2%	9.4%		9.9%	
Operating Margins	19.0%	25.5%	19.4%	2.6%	-1.8%	1.6%		2.0%	
EPS	9.52	21.95	18.82	2.81	-2.36	2.17	2.13	2.52	2.49
- <i>y/y growth</i>	11.3%	130.5%	-14.2%	-85.1%	-183.9%	192.2%	190.4%	15.7%	16.9%
Cash	1973.3	4190.4	7179.2	3895.5	3026.0	2586.5		2736.4	
Debt	42.4	43.0	19.0	4.0	26.0	869.0		883.5	
Net Cash/Shr	16.2	31.0	50.7	26.1	20.1	17.1		18.1	
Tangible Book Value/Shr	28.5	49.7	71.4	70.3	66.0	68.1		70.0	

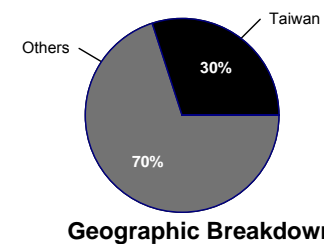
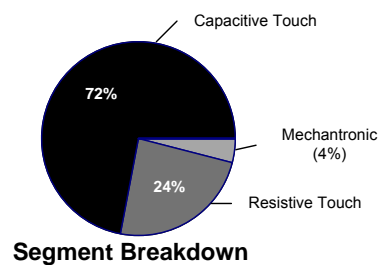
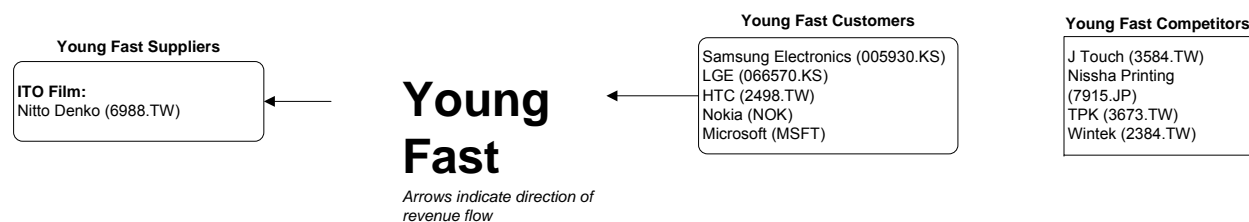
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 652. Young Fast (3622.TW)

Sector: Semiconductors and Components

Young Fast (3622.TW)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Analyst: Bin Liu

ZTE

ZTE is a leading provider of telecommunications equipment and mobile telecoms handsets in China. Products cover second-generation wireless telecoms equipment on the GSM and CDMA standards, as well as third-generation wireless equipment such as WCDMA, CDMA2000 and China's home-grown TD-SCDMA standard. The company also has a significant presence in fixed-line switching and access networks, fiber-optic transmission and NGN networks. Besides sales in China, ZTE has expanded its footprint aggressively in Africa, North Europe and Asia.

Figure 653. ZTE (763.HK) Results and Forecasts

	2008	2009	2010	2011	2012	CIR 2013E	Street 2013E	CIR 2014E	Street 2014E
Revenues	49642.9	68395.4	80248.1	103903.2	103550.6	122778.4	124381.5	140739.8	138080.6
- y/y growth	39.1%	37.8%	17.3%	29.5%	-0.3%	18.6%	20.1%	14.6%	11.0%
Gross Margins	32.5%	30.9%	31.0%	28.0%	22.2%	25.3%		26.1%	
Operating Margins	6.4%	6.5%	7.1%	4.2%	-0.3%	4.6%		4.6%	
EPS	0.58	0.85	1.10	0.73	-1.02	0.89	0.75	1.09	0.98
- y/y growth	42.7%	47.5%	29.2%	-33.5%	-239.4%	187.2%	174.0%	22.3%	29.5%
Cash	13040.6	16464.6	18059.8	26391.1	29904.6	31999.0		33961.7	
Debt	14635.2	21254.7	25199.6	37817.9	41940.5	42423.6		42423.6	
Net Cash/Shr	2.1	1.9	1.7	2.3	4.7	5.2		5.8	
Tangible Book Value/Shr	4.9	5.7	7.6	8.0	6.8	8.3		9.3	

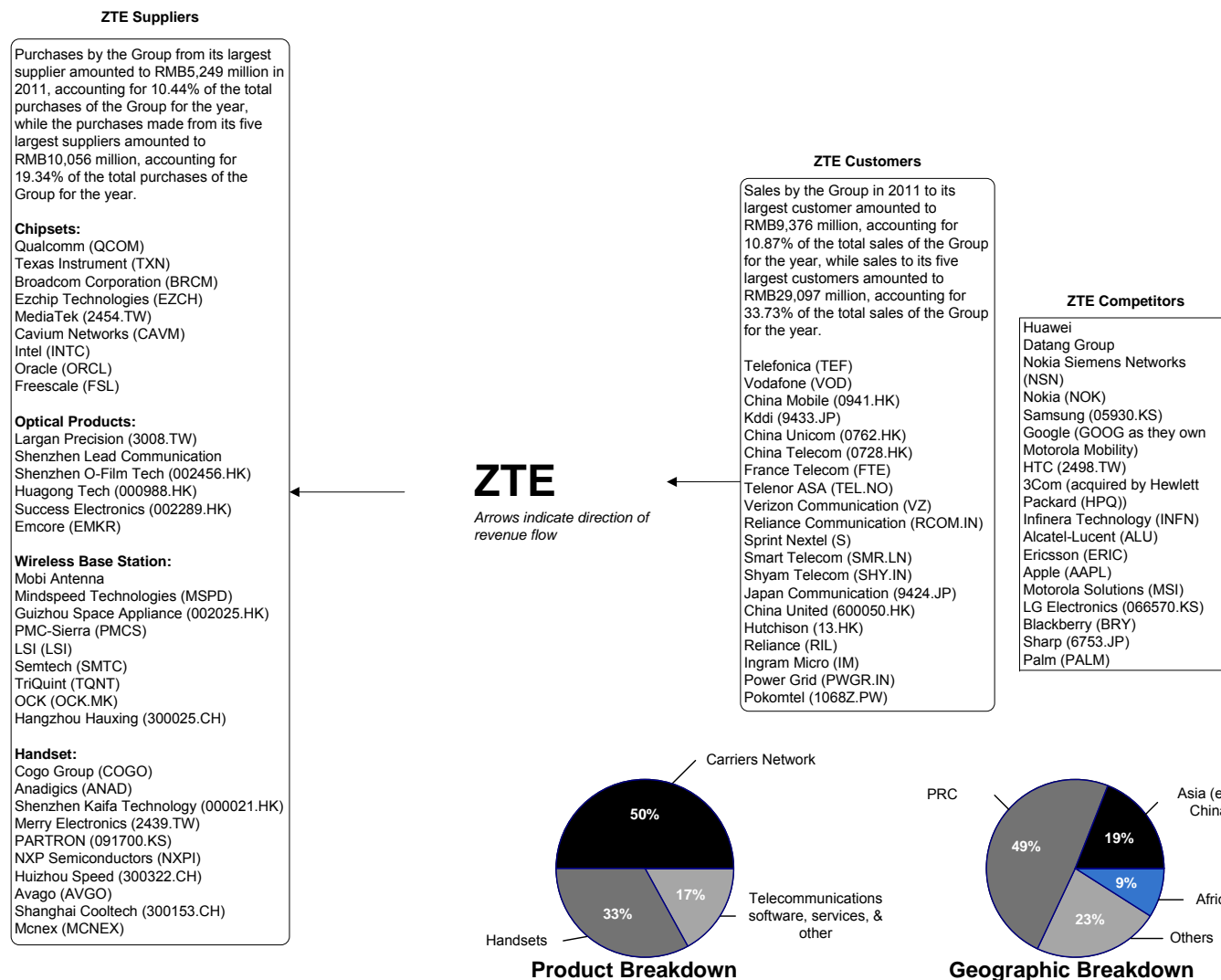
(Revenues, Cash and Debt in Millions in Local Currency)

Source: Citi Research, Company Reports, FirstCall

Figure 654. ZTE (763.HK)

Sector: Telecom Equipment

ZTE Corp. (0763.HK)



Source: Company reports, Citi Research estimates. This list is not exhaustive, and percentage relationships may be approximate in some cases.

Source: Citi Research, Company Reports

Citi Global Eye on Tech

The following tables are taken from the most recent version of Citi Global Eye on Tech. This is an internally developed model and provides price performance, comparable valuations and fundamental metrics for all technology stocks under Citi's global coverage.

The following tables segment technology stocks by:

- Sector (Consumer Electronics, Hardware, Infrastructure/Service Providers, Internet, IT Services, Imaging, Semiconductors, Software, Technology – General, and Telecommunications Equipment);
- Geography (Asia, Japan, Latin America, North America, Europe, Australia/New Zealand and CEEMEA); and
- Company within geography and sector by the following metrics: a. Price Performance b. Valuation c. Growth Rates and Ratios.

This product is updated every Monday morning. If you wish to receive updates weekly, please send us an email at jim.suva@citi.com to be added to our distribution list.

Figure 655. Sector Performance for Consumer Electronic Stocks

	Company Name	Reuters Code	B'berg Code	Market Cap (\$M)	Citi Rating	Local CCY	3-May-13 Price	Dividend Yield (%)	Target Price	ETR (%)	Performance (%)					52 Weeks		Analyst Name
											1 Wk	1 Mo	3 Mo	12 Mo	YTD	High	Low	
Consumer Electronics																		
Asia	VTech Holdings	0303.HK	303 HK	3354	1	HKD	103.90	5.8	106.00	7.9	1.3	4.3	16.5	19.8	19.6	110.00	78.35	Eric Lau
Japan	Casio Computer	6952.T	6952 JP	2116	2	JPY	771	1.9	810	7.0	(4.5)	6.2	(0.8)	48.0	2.4	833	436.00	Kota Ezawa
	Funai Electric	6839.OS	6839 JP	425	2	JPY	1,219	3.3	1,250	5.8	(0.9)	7.4	(0.4)	(17.2)	8.8	1,550	883	Kota Ezawa
	Panasonic	6752.T	6752 JP	16565	1	JPY	702	0.0	740	5.4	(1.0)	15.1	18.6	16.6	34.5	781	376.00	Kota Ezawa
	Pioneer	6773.T	6773 JP	633	2	JPY	193.00	0.0	170.00	(11.9)	(8.1)	12.9	(13.1)	(50.6)	(9.8)	381.00	153.00	Kota Ezawa
	Sharp	6753.T	6753 JP	4012	3	JPY	337.00	0.0	150.00	(55.5)	(1.7)	37.0	2.4	(24.8)	11.2	460.00	142.00	Kota Ezawa
	Sony	6758.T	6758 JP	16789	1	JPY	1,627	1.5	2,100	30.6	(0.2)	3.6	20.1	28.1	69.8	1,735	772	Kota Ezawa

Source: Citi Research

Figure 656. Sector Performance for Hardware Stocks

	Company Name	Reuters Code	B'berg Code	Market Cap (\$M)	Citi Rating	Local CCY	3-May-13 Price	Dividend Yield (%)	Target Price	ETR (%)	Performance (%)					52 Weeks		Analyst Name
											1 Wk	1 Mo	3 Mo	12 Mo	YTD	High	Low	
Hardware																		
Asia	Acer	2353.TW	2353 TT	2263	3	TWD	23.60	0.4	21.00	(11.0)	(2.1)	(8.7)	(8.3)	(32.2)	(6.3)	35.80	22.30	Kevin Chang
	ASUSTeK Computer	2357.TW	2357 TT	8786	3	TWD	345.00	5.3	280.00	(13.2)	6.2	(1.3)	1.3	11.5	5.7	382.00	256.50	Kevin Chang
	Catcher Technology	2474.TW	2474 TT	3835	2H	TWD	151.00	3.6	155.00	6.5	4.9	4.9	14.4	(23.7)	4.9	207.00	117.50	Wei Chen
	Compal Electronics	2324.TW	2324 TT	2791	3	TWD	18.70	4.3	17.00	(5.2)	(1.8)	(11.8)	(12.4)	(47.2)	(4.3)	35.70	17.30	Wei Chen
	Flextronics International Ltd	FLEX.O	FLEX US	4551	2	USD	6.94	0.0	8.00	15.3	1.0	4.2	9.8	0.9	11.8	7.15	5.47	Jim Suva, CPA
	HTC	2498.TW	2498 TT	8056	3	TWD	279.50	2.4	205.00	(22.8)	0.7	13.4	(3.6)	(38.2)	(7.0)	474.00	191.00	Kevin Chang
	Kingboard Laminates Holdings	1888.HK	1888 HK	1369	1	HKD	3.54	5.6	5.50	61.0	6.6	4.7	(8.8)	1.7	(0.6)	4.32	2.55	Eric Lau
	Largan Precision	3008.TW	3008 TT	3676	3	TWD	810	2.5	663	(16.0)	10.1	4.1	1.6	71.6	4.1	899	451.00	Kevin Chang
	Lenovo Group	0992.HK	992 HK	9189	3	HKD	6.83	2.0	6.50	(2.8)	(3.1)	(10.5)	(17.1)	(7.7)	(2.7)	9.07	5.35	Wei Chen
	Pegatron	4938.TW	4938 TT	3823	1	TWD	49.35	5.7	60.00	24.6	5.8	7.8	24.8	15.6	31.4	49.40	33.80	Wei Chen
	Quanta Computer	2382.TW	2382 TT	7892	3	TWD	60.60	5.3	55.00	(3.2)	1.2	(6.0)	(12.0)	(25.4)	(11.3)	86.40	56.40	Wei Chen
	TPV Technology	0903.HK	903 HK	599	1	HKD	1.98	5.3	2.30	20.6	(9.2)	(4.8)	(16.5)	6.5	(5.3)	2.87	1.35	Eric Lau
	Wistron	3231.TW	3231 TT	2182	3	TWD	29.35	5.5	28.00	0.5	(0.2)	(11.5)	(14.4)	(31.1)	(2.5)	43.38	26.70	Wei Chen
Europe	Seagate Technology	STX.O	STX US	14783	3	USD	41.23	3.4	28.00	(28.4)	13.3	14.3	22.5	32.0	35.5	41.52	21.62	Joe Yoo
	Sensata Technologies Holding	IST.N	ST US	6064	2	USD	34.67	0.0	34.00	(1.9)	3.6	8.2	1.3	6.3	6.7	35.14	25.84	Jim Suva, CPA
	TE Connectivity Ltd.	TEL.N	TEL US	18462	1	USD	44.44	1.6	47.00	8.0	4.7	7.5	12.9	25.3	19.7	44.75	30.18	Jim Suva, CPA
Japan	Brother Industries	6448.T	6448 JP	2929	1	JPY	1,072	2.2	1,100	4.9	(3.7)	18.1	9.8	2.0	16.5	1,150	668	Masahiro Shibano
	Canon	7751.T	7751 JP	40539	1	JPY	3,445	3.8	3,900	17.0	(3.2)	5.4	3.8	(4.3)	3.1	3,840	2,308	Masahiro Shibano
	Dainippon Screen Mfg	7735.T	7735 JP	1156	1	JPY	477.00	0.0	500	5.9	(2.3)	12.8	5.5	(30.9)	(8.8)	690	361.00	Masahiro Shibano
	Fujifilm Holdings	4901.T	4901 JP	10113	1	JPY	2,056	1.9	2,100	4.1	0.3	15.6	11.9	20.8	19.3	2,148	1,240	Masahiro Shibano
	Hoya	7741.T	7741 JP	8545	2	JPY	1,940	3.4	1,800	(3.9)	(0.2)	10.7	10.1	5.8	14.7	1,998	1,517	Masahiro Shibano
	Konica Minolta	4902.T	4902 JP	3670	2	JPY	678	2.2	750	12.8	(4.6)	5.9	(8.7)	5.3	10.1	784	491.00	Masahiro Shibano
	Nikon	7731.T	7731 JP	8554	2	JPY	2,113	1.5	2,100	0.9	(1.9)	(0.8)	(18.0)	(8.6)	(16.3)	2,750	1,786	Masahiro Shibano
	Olympus	7733.T	7733 JP	7728	2H	JPY	2,513	0.0	2,200	(12.5)	1.2	17.2	23.1	107.7	50.9	2,527	1,061	Masahiro Shibano
	Ricoh	7752.T	7752 JP	7727	1	JPY	1,044	2.8	1,200	17.7	(11.9)	7.3	5.1	55.1	15.1	1,239	486.00	Masahiro Shibano
	Seiko Epson	6724.T	6724 JP	1890	2	JPY	1,035	1.9	1,050	4.0	(4.6)	23.2	5.3	3.2	48.5	1,135	431.00	Masahiro Shibano
	Tamron Co Ltd	7740.T	7740 JP	592	1	JPY	2,114	2.4	2,400	15.9	4.3	5.2	(18.0)	(16.5)	(13.2)	2,675	1,900	Masahiro Shibano
	Tokyo Electron	8035.T	8035 JP	8542	2	JPY	4,670	1.1	4,100	(11.1)	(7.2)	12.8	19.3	15.0	18.7	5,120	3,155	Masahiro Shibano
North America	Amphenol Corp	APH.N	APH US	12314	1	USD	77.16	0.5	83.00	8.1	3.8	5.2	12.7	36.1	19.3	77.24	50.90	Jim Suva, CPA
	Apple, Inc.	AAPL.O	AAPL US	422373	2	USD	449.98	2.5	430.00	(1.7)	7.9	4.2	(0.8)	(22.7)	(15.4)	705	385.10	Glen Yeung
	Arrow Electronics Inc	ARW.N	ARW US	3918	1	USD	37.43	0.0	45.00	20.2	(0.6)	(3.5)	(5.3)	(1.4)	(1.7)	42.26	30.84	Jim Suva, CPA
	Avnet Inc	AVT.N	AVT US	4491	1	USD	32.77	0.0	38.50	17.5	2.8	(4.4)	(8.9)	(6.7)	7.1	36.86	25.44	Jim Suva, CPA
	AVX Corp	AVX.N	AVX US	1923	2	USD	11.39	2.6	11.50	3.8	1.2	(2.5)	(0.9)	(7.5)	5.7	12.24	9.11	Jim Suva, CPA
	Benchmark Electronics Inc	BHE.N	BHE US	990	3	USD	18.03	0.0	15.00	(16.8)	3.1	4.3	0.7	17.1	8.5	18.43	12.77	Jim Suva, CPA
	BlackBerry	BBRY.O	BBRY US	8193	3H	USD	15.63	0.0	10.00	(36.0)	4.1	4.0	20.0	29.8	31.7	18.32	6.22	Jim Suva, CPA
	Celestica Inc	CLS.N	CLS US	1932	3	USD	8.44	0.0	6.75	(20.0)	(0.6)	3.7	7.5	(1.2)	3.6	8.81	6.64	Jim Suva, CPA
	Cisco Systems Inc.	CSCO.O	CSCO US	111065	1	USD	20.83	2.7	24.00	17.9	0.8	(1.7)	0.0	5.6	6.0	21.98	14.96	Kevin J Dennean, CFA
	Electronics for Imaging Inc	EFII.O	EFII US	1234	2	USD	26.58	0.0	22.00	(17.2)	0.0	8.8	17.3	50.4	40.0	27.65	13.95	Jim Suva, CPA
	EMC Corp	EMC.N	EMC US	49118	2	USD	23.38	0.0	25.00	6.9	4.4	(0.9)	(5.9)	(17.2)	(7.6)	28.18	21.45	Jim Suva, CPA
	F5 Networks Inc	FFIV.O	FFIV US	5923	2H	USD	75.37	0.0	80.00	6.1	1.6	(16.7)	(28.9)	(44.7)	(22.4)	135.82	70.60	Kevin J Dennean, CFA
	Hewlett-Packard Co	HPQ.N	HPQ US	40105	3	USD	20.63	2.5	12.00	(39.3)	3.3	(5.8)	25.3	(15.7)	44.8	24.59	11.35	Jim Suva, CPA
	International Business Machine	IBM.N	IBM US	226760	1	USD	204.51	1.5	250.00	23.7	5.2	(3.8)	(0.3)	(1.3)	6.8	215.90	181.87	Jim Suva, CPA
	Jabil Circuit Inc	JBL.N	JBL US	3694	2	USD	18.23	1.8	23.00	27.9	5.3	0.2	(5.8)	(20.3)	(5.5)	23.94	16.39	Jim Suva, CPA
	Juniper Networks, Inc.	JNPR.N	JNPR US	8420	1H	USD	16.48	0.0	24.00	45.6	4.4	(9.8)	(26.2)	(18.9)	(16.2)	22.97	14.01	Kevin J Dennean, CFA
	Lexmark International Inc	LXK.N	LXK US	1950	3	USD	30.67	3.9	21.00	(27.6)	5.7	16.3	29.5	3.4	32.3	30.86	16.11	Jim Suva, CPA
	Molex Inc	MOLX.O	MOLX US	4683	2	USD	28.53	3.2	27.00	(2.0)	6.1	0.0	4.1	6.1	4.4	29.56	21.89	Jim Suva, CPA
	Motorola Solutions Inc	MSI.N	MSI US	15563	2	USD	57.29	1.8	58.00	3.1	0.9	(8.8)	(2.7)	12.8	2.9	64.72	44.49	Jim Suva, CPA
	NetApp Inc	NTAP.O	NTAP US	12578	2	USD	34.90	0.0	37.00	6.0	0.1	1.3	(3.7)	(9.3)	4.0	38.79	26.26	Jim Suva, CPA
	Plexus Corp	PLXS.O	PLXS US	928	2	USD	27.21	0.0	29.00	6.6	3.2	11.6	5.5	(13.6)	5.5	34.24	19.63	Jim Suva, CPA
	Riverbed Technology Inc.	RVBD.O	RVBD US	2532	2H	USD	15.53	0.0	15.00	(3.4)	4.3	4.0	(19.7)	(18.4)	(21.2)	24.23	13.30	Kevin J Dennean, CFA
	Sanmina-SCI Corporation	SANM.O	SANM US	1062	2H	USD	12.83	0.0	11.00	(14.3)	3.5	18.6	32.1	48.5	15.9	12.98	6.62	Jim Suva, CPA
	Vishay Intertechnology Inc	VSH.N	VSH US	1783	2	USD	13.56	0.0	15.00	10.6	8.0	6.9	21.5	14.6	27.6	14.18	8.10	Jim Suva, CPA
	Western Digital Corp	WDC.O	WDC US	13754	3	USD	57.15	1.3	37.00	(33.4)	7.2	12.9	22.2	45.6	34.5	57.98	28.31	Joe Yoo
	Xerox Corp	XRX.N	XRX US	10486	2	USD	8.54	2.7	8.00	(3.6)	1.9	(0.2)	6.5	10.8	25.2	9.37	6.10	Jim Suva, CPA

Source: Citi Research

Figure 657. Sector Performance for Infrastructure/Service Providers Stocks

	Company Name	Reuters Code	B'berg Code	Market Cap (\$M)	Citi Rating	Local CCY	3-May-13 Price	Dividend Yield (%)	Target Price	ETR (%)	Performance (%)					52 Weeks		Analyst Name
											1 Wk	1 Mo	3 Mo	12 Mo	YTD	High	Low	
Infrastructure/Service Providers																		
Europe	Wirecard	WDIG.DE	WDI GR	3003	2	EUR	20.49	0.6	21.30	4.5	(0.8)	(5.5)	19.0	47.4	10.2	22.08	12.86	Hugo Mills

Source: Citi Research

Figure 658. Sector Performance for Internet Stocks

	Company	Reuters	B'berg	Market	Citi	Local	3-May-13	Dividend	Target	ETR	Performance (%)					52 Weeks		Latest	Analyst
	Name	Code	Code	Cap (\$M)	Rating	CCY	Price	Yield (%)	Price	(%)	1 Wk	1 Mo	3 Mo	12 Mo	YTD	High	Low		
Internet																			
Asia	Baidu.com	BIDU.O	BIDU US	29550	3	USD	84.51	0.0	80.00	(5.3)	(0.6)	(1.7)	(22.2)	(36.5)	(15.7)	134.71	82.98	[Open]	Muzhi Li
	Bitauto Holdings	BITA.N	BITA US	473	1H	USD	11.44	0.0	13.00	13.6	1.7	14.4	20.4	153.1	56.7	11.56	3.51	[Open]	Ravi Sarathy
	Ctrip.com International	CTRP.O	CTRP US	2933	3	USD	22.60	1.1	11.40	(49.6)	1.7	13.3	10.5	12.6	(0.3)	24.86	12.36	[Open]	Muzhi Li
	Daum Communications	035720.KQ	035720 KS	1119	2	KRW	91,000	2.0	105,000	17.4	0.2	1.2	(13.3)	(9.9)	(0.1)	115,700	81,800	[Open]	Sean Lee, CFA
	Giant Interactive Group	GA.N	GA US	1834	1	USD	7.66	6.2	7.20	(0.5)	5.7	14.5	25.2	42.4	41.6	7.67	4.21	[Open]	Muzhi Li
	Info Edge	INED.BO	INFOE IN	719	1	INR	354.40	0.1	443.00	25.1	1.0	(2.0)	1.9	(6.1)	2.4	405.20	277.60	[Open]	Gaurav Malhotra, CFA
	Jiayuan.com International	DATE.O	DATE US	162	2	USD	5.04	0.0	na	na	(1.2)	(2.5)	(9.0)	(7.7)	(9.2)	6.68	3.60	[Open]	Ravi Sarathy
	NCsoft	036570.KS	036570 KS	3458	3	KRW	174,000	0.6	110,000	(36.2)	5.1	11.9	24.3	(36.3)	15.6	288,000	125,000	[Open]	Sean Lee, CFA
	NetEase.com	NTES.O	NTES US	7444	2H	USD	57.33	0.0	54.80	(4.4)	4.4	5.5	21.6	(4.3)	34.8	65.54	37.00	[Open]	Muzhi Li
	NHN	035420.KS	035420 KS	13052	3	KRW	299,000	0.2	215,000	(27.9)	4.4	4.0	21.5	17.3	31.7	307,000	215,000	[Open]	Sean Lee, CFA
	Perfect World	PWRD.O	PWRD US	625	2H	USD	11.85	0.6	13.20	15.2	0.8	11.0	(0.7)	(2.1)	11.0	12.95	8.92	[Open]	Muzhi Li
	Qihoo 360 Technology	QIHU.N	QIHU US	4223	1H	USD	34.40	0.0	39.00	13.4	1.6	19.9	12.8	43.5	15.9	34.90	13.81	[Open]	Bin Liu
	Renren	RENN.N	RENN US	1057	3	USD	2.79	0.0	2.94	5.4	(2.4)	0.7	(17.0)	(56.0)	(19.1)	6.80	2.52	[Open]	Muzhi Li
	Shanda Games	GAME.O	GAME US	787	1	USD	2.91	0.0	3.90	34.0	(2.0)	(3.0)	(4.3)	(44.0)	(4.3)	5.16	2.68	[Open]	Muzhi Li
	Sina	SINA.O	SINA US	3754	3	USD	56.23	0.0	35.00	(37.8)	11.8	11.9	(0.5)	(3.0)	12.0	70.00	41.14	[Open]	Ravi Sarathy
	Sky-mobi	MOBI.O	MOBI US	58	1H	USD	1.81	0.0	7.50	314.4	7.7	1.1	(7.2)	(46.4)	(9.0)	3.40	1.54	[Open]	Bin Liu
	Soufun Holdings	SFUN.N	SFUN US	2023	1	USD	25.04	0.0	32.40	29.4	(0.6)	13.1	(5.9)	45.2	0.2	28.62	11.61	[Open]	Ravi Sarathy
	Tencent Holdings	0700.HK	700 HK	64737	1	HKD	271.00	0.5	325.00	20.3	4.6	11.6	0.9	9.8	8.8	286.00	203.60	[Open]	Ravi Sarathy
	Youku	YOKU.N	YOKU US	3278	1	USD	19.88	0.0	36.40	83.1	5.1	24.3	(14.5)	(18.4)	9.0	25.54	13.83	[Open]	Muzhi Li
	YY	YY.O	YY US	995	1H	USD	18.30	0.0	24.00	31.1	5.4	11.2	31.7	na	28.3	20.89	10.50	[Open]	Ravi Sarathy
Australia/NZ	SEEK Ltd	SEK.AX	SEK AU	3705	2	AUD	10.70	1.9	9.30	(11.2)	(4.3)	4.3	25.9	46.6	52.9	11.54	5.87	[Open]	Justin Diddams
Europe	CDON Group	CDON.ST	CDON SS	303	2	SEK	29.90	0.0	na	na	0.3	(18.1)	(16.9)	(37.4)	(25.3)	49.20	26.40	[Open]	Dan F Homan
	Delticom	DEXGn.DE	DEX GR	533	2	EUR	34.41	5.3	37.00	13.0	(5.7)	(9.5)	(3.7)	(50.8)	6.5	70.86	30.29	[Open]	Philip Watkins
	Moneysupermarket	MONY.L	MONY LN	1723	1	GBP	2.05	3.4	2.14	8.0	1.7	2.0	7.7	51.9	30.3	2.11	1.08	[Open]	Hugo Mills
	Rightmove	RMV.L	RMV LN	3081	1	GBP	19.32	1.1	22.00	14.9	5.7	8.7	13.8	20.8	34.5	19.46	14.14	[Open]	Ruchi Malaiya, CFA
	United Internet AG	UTDI.DE	UTDI GR	5366	2	EUR	21.17	1.8	20.00	(3.8)	4.1	10.0	21.2	42.8	29.8	21.24	12.49	[Open]	Laurie Fitzjohn-Sykes, CFA
	Zooplus	ZOIG.DE	ZO1 GR	329	2	EUR	41.27	0.0	na	na	(0.8)	1.7	(5.3)	17.8	29.2	46.00	23.02	[Open]	Dan F Homan
Japan	CyberAgent	4751.T	4751 JP	1213	2	JPY	190,800	1.8	215,000	14.5	3.5	13.1	(5.6)	(24.6)	7.8	244,000	141,200	[Open]	Hideki Takoh
	DeNA	2432.T	2432 JP	3729	1	JPY	2,723	1.8	4,500	66.6	0.6	16.4	(4.7)	9.4	(4.2)	3,430	1,392	[Open]	Soichiro Fukuda
	Dwango	3715.T	3715 JP	1116	1H	JPY	536,000	0.4	234,000	(56.0)	27.0	55.4	166.0	345.2	221.2	573,000	92,500	[Open]	Soichiro Fukuda
	Gree	3632.T	3632 JP	2945	1H	JPY	1,248	2.4	1,600	30.6	1.9	13.9	(9.6)	(42.0)	(6.7)	1,772	1,032	[Open]	Soichiro Fukuda
	Kakaku.Com	2371.T	2371 JP	2937	1	JPY	2,568	0.7	1,850	(27.3)	6.4	15.8	49.5	116.8	80.0	2,598	1,101	[Open]	Hideki Takoh
	Mixi	2121.T	2121 JP	251	2	JPY	1,645	1.1	na	na	0.3	9.7	(8.0)	(18.6)	(15.1)	2,360	1,080	[Open]	Soichiro Fukuda
	Rakuten	4755.OS	4755 JP	14768	2	JPY	1,100	0.4	1,000	(8.8)	6.6	14.6	30.3	24.7	63.2	1,100	641	[Open]	Hideki Takoh
	Yahoo Japan	4689.T	4689 JP	28672	1	JPY	48,850	0.8	41,500	(14.2)	1.8	16.3	32.2	97.9	75.3	51,600	21,650	[Open]	Hideki Takoh

Source: Citi Research

Figure 659. Sector Performance for IT Stocks

	Company Name	Reuters Code	B'berg Code	Market Cap (\$M)	Citi Rating	Local CCY	3-May-13 Price	Dividend Yield (%)	Target Price	ETR (%)	Performance (%)					52 Weeks		Analyst Name
											1 Wk	1 Mo	3 Mo	12 Mo	YTD	High	Low	
IT Services																		
Asia	CSE Global	CSES.SI	CSE SP	355	1	SGD	0.85	4.7	0.95	16.5	1.2	(1.7)	(1.2)	11.8	9.0	0.94	0.69 Horng Han Low	
	HCL Technologies	HCLT.BO	HCLT IN	9700	1	INR	750	1.3	895	20.8	9.7	(3.9)	9.0	45.9	21.1	809	453.90 Surendra Goyal, CFA	
	Infosys	INFY.BO	INFO IN	24495	1	INR	2,308	1.8	2,695	18.9	4.3	(22.1)	(16.7)	(7.1)	(0.5)	3,010	2,102 Surendra Goyal, CFA	
	MindTree	MINT.BO	MTCL IN	655	1	INR	849	1.4	1,010	20.4	4.8	(6.3)	6.3	45.3	24.4	925	565 Surendra Goyal, CFA	
	SK C&C	034730.KS	034730 KS	4485	1	KRW	98,900	1.4	125,000	27.5	4.2	2.6	(5.4)	3.5	(4.0)	115,000	81,200 Ss Kim	
	Tata Consultancy Services	TCS.BO	TCS IN	51580	2	INR	1,419	1.6	1,625	15.9	3.7	(8.1)	5.4	10.8	12.7	1,598	1,176 Surendra Goyal, CFA	
	Tech Mahindra	TEML.BO	TECHM IN	2342	2	INR	982	0.6	1,120	14.7	6.0	0.4	(2.3)	42.4	5.4	1,124	591 Surendra Goyal, CFA	
	Wipro	WIPR.BO	WPRO IN	16266	1	INR	355.55	2.0	420.00	20.4	7.7	(9.8)	(0.8)	(1.9)	2.6	418.25	286.13 Surendra Goyal, CFA	
Europe	Accenture Ltd	ACN.N	ACN US	55177	1	USD	79.50	2.3	82.50	5.9	1.1	3.8	7.7	23.8	19.5	82.17	54.94 Ashwin Shirvaikar, CFA	
	ATOS	ATOS.PA	ATO FP	5966	1	EUR	53.28	1.3	67.00	27.1	(1.5)	(1.9)	(3.4)	10.8	0.8	59.22	41.34 Amit B Harchandani	
	Capgemini SA	CAPP.PA	CAP FP	7951	1	EUR	38.01	2.9	43.00	16.0	8.6	7.2	5.2	27.4	15.7	39.01	25.24 Amit B Harchandani	
	Dassault Systemes SA	DAST.PA	DSY FP	15012	1	EUR	91.64	1.0	102.00	12.4	0.2	0.8	10.6	24.9	8.8	93.15	68.73 Amit B Harchandani	
	Fidessa	FDSA.L	FDSA LN	1065	2	GBP	18.38	2.1	17.00	(5.4)	2.6	(5.3)	20.4	17.5	21.6	20.03	12.55 Hugo Mills	
	Sage Group PLC	SGE.L	SGE LN	6141	1	GBP	3.39	3.2	3.45	5.1	(0.6)	(0.1)	4.0	16.9	15.1	3.56	2.45 Hugo Mills	
	SAP AG	SAPG.DE	SAP GR	99220	2	EUR	61.82	1.5	58.00	(4.6)	3.5	(1.6)	1.5	24.8	1.9	65.00	43.62 Walter H Pritchard, CFA	
	SDL	SDL.L	SDL LN	454	1H	GBP	3.64	1.7	4.85	34.9	(1.6)	(11.0)	(31.6)	(49.5)	(29.0)	7.24	3.55 Hugo Mills	
Software AG	SOWG.DE	SOW GR	3036	2	EUR	26.74	1.8	29.00	10.4	(2.7)	(10.9)	(7.7)	3.1	(16.7)	35.45	21.80 Amit B Harchandani		
Japan	Nomura Research Institute	4307.T	4307 JP	5937	1	JPY	2,943	1.8	2,600	(9.9)	3.3	24.5	41.7	58.3	64.2	3,040	1,566 Soichiro Fukuda	
	NTT Data	9613.T	9613 JP	8762	2	JPY	306,000	2.0	266,000	(11.1)	(0.8)	0.7	7.3	10.9	13.9	321,000	213,300 Soichiro Fukuda	
	Oracle Japan	4716.T	4716 JP	5462	2	JPY	4,210	2.1	na	na	(0.2)	4.6	9.8	36.2	17.3	4,380	2,764 Soichiro Fukuda	
	Secom	9735.T	9735 JP	12009	1	JPY	5,390	1.9	4,800	(9.1)	(1.3)	14.0	17.4	42.0	24.3	5,520	3,325 Soichiro Fukuda	
	Trend Micro	4704.T	4704 JP	3778	2	JPY	2,821	3.1	2,250	(17.3)	2.2	10.6	3.6	17.0	8.8	2,890	2,010 Soichiro Fukuda	
North America	Alliance Data Systems Corp	ADS.N	ADS US	8676	2	USD	173.95	0.0	171.00	(1.7)	4.2	9.8	11.0	35.6	20.2	175.43	119.59 Philip Stiller, CFA	
	Automatic Data Processing Inc	ADP.O	ADP US	33578	2	USD	69.23	2.5	68.50	1.6	4.0	6.9	14.1	27.1	21.6	69.28	50.89 Ashwin Shirvaikar, CFA	
	Computer Sciences Corporation	CSC.N	CSC US	7257	2H	USD	47.28	1.7	47.00	0.7	3.7	(1.1)	10.7	68.9	18.1	50.59	22.19 Ashwin Shirvaikar, CFA	
	EPAM Systems, Inc.	EPAM.N	EPAM US	1014	1	USD	22.39	0.0	25.00	11.7	4.9	(3.9)	2.6	6.4	23.7	23.80	13.95 Ashwin Shirvaikar, CFA	
	Fidelity National Info Svcs, Inc	FIS.N	FIS US	12498	1	USD	42.72	2.1	47.00	12.1	4.7	7.1	13.4	28.2	22.7	42.95	30.46 Ashwin Shirvaikar, CFA	
	Fiserv, Inc.	FISV.O	FISV US	11559	2	USD	86.80	0.0	89.00	2.5	(3.7)	1.1	6.7	25.7	9.8	91.16	64.48 Ashwin Shirvaikar, CFA	
	FleetCor Technologies Inc	FLT.N	FLT US	6539	1	USD	80.34	0.0	89.00	10.8	6.4	4.0	33.8	97.6	49.7	84.85	33.73 Philip Stiller, CFA	
	Global Payments, Inc.	GPN.N	GPN US	3575	1	USD	46.90	0.2	52.00	11.0	2.1	5.3	(4.8)	3.6	3.5	51.23	39.37 Ashwin Shirvaikar, CFA	
	Green Dot Corp	GDOT.N	GDOT US	643	2	USD	17.83	0.0	na	na	12.0	9.1	31.1	(30.8)	46.1	25.85	9.05 Ashwin Shirvaikar, CFA	
	NetSpend Holdings	NTSP.O	NTSP US	1122	2	USD	15.97	0.0	16.00	0.2	0.1	0.1	47.7	110.4	35.1	16.01	6.41 Ashwin Shirvaikar, CFA	
	Paychex Inc	PAYX.O	PAYX US	13599	3	USD	37.37	3.5	30.00	(17.0)	4.2	5.4	13.7	22.0	20.2	37.47	29.12 Ashwin Shirvaikar, CFA	
	Total System Services	TSS.N	TSS US	4463	1	USD	23.92	1.7	26.00	10.4	2.9	(0.4)	3.1	2.2	11.7	25.04	21.10 Ashwin Shirvaikar, CFA	
	Vantiv, Inc.	VNTV.N	VNTV US	4890	1	USD	23.01	0.0	26.00	13.0	5.1	0.6	9.6	5.0	12.7	24.40	18.85 Ashwin Shirvaikar, CFA	
	VeriFone Systems Inc	PAY.N	PAY US	2389	2	USD	22.05	0.0	23.00	4.3	4.7	8.0	(37.4)	(54.4)	(25.7)	48.09	17.93 Philip Stiller, CFA	
	West Corp	WSTC.O	WSTC US	1810	1	USD	21.69	3.1	25.00	19.4	4.5	10.9	na	na	na	23.74	18.38 Ashwin Shirvaikar, CFA	
	Western Union Co.	WU.N	WU US	8748	2	USD	15.64	3.3	15.00	(0.7)	7.3	6.2	8.8	(12.5)	14.9	19.13	11.94 Ashwin Shirvaikar, CFA	
	WEX Inc	WEX.N	WEX US	2744	2	USD	70.75	0.0	74.00	4.6	(5.6)	(5.1)	(11.5)	20.3	(6.1)	80.51	53.14 Philip Stiller, CFA	

Source: Citi Research

Figure 660. Sector Performance for Semiconductors & Components Stocks

	Company Name	Reuters Code	B'berg Code	Market Cap (\$M)	Citi Rating	Local CCY	3-May-13 Price	Dividend Yield (%)	Target Price	ETR (%)	Performance (%)					52 Weeks		Analyst Name
											1 Wk	1 Mo	3 Mo	12 Mo	YTD	High	Low	
Semiconductors & Components																		
Asia	ASE	2311.TW	2311 TT	6674	1	TWD	25.95	3.5	30.00	19.7	0.4	5.7	8.4	(1.4)	3.0	27.00	18.99	Roland Shu
	AU Optronics	2409.TW	2409 TT	4076	1	TWD	13.65	0.0	17.00	24.5	3.4	3.4	16.2	(1.1)	5.0	14.45	8.19	Arthur Lai
	Avago Technologies	AVGO.O	AVGO US	7852	1	USD	31.88	2.3	45.00	43.6	(0.7)	(7.1)	(12.1)	(4.4)	0.7	37.88	29.70	Terence Whalen
	Chipbond Technology	6147.TWO	6147 TT	1507	1	TWD	74.70	4.4	84.00	15.9	5.1	14.9	21.9	80.4	30.8	79.50	34.50	Roland Shu
	E Ink Holdings	8069.TWO	8069 TT	801	3	TWD	21.90	0.3	18.00	(17.8)	(1.8)	(8.8)	2.1	(32.9)	(1.1)	34.90	18.75	Arthur Lai
	Innolux Corp	3481.TW	3481 TT	5804	1	TWD	18.85	0.0	21.50	14.1	5.9	0.0	27.8	45.7	20.8	19.15	8.44	Arthur Lai
	Kinsus Interconnect Technology	3189.TW	3189 TT	1524	3	TWD	101.00	3.3	73.00	(24.8)	2.1	9.0	8.5	7.1	10.9	104.50	77.00	Roland Shu
	LG Display	034220.KS	034220 KS	9558	2	KRW	29,450	0.0	32,000	8.7	(3.6)	(5.5)	3.0	25.3	(5.2)	36,950	19,600	Henry H Kim, CFA
	MagnaChip Semiconductor	MX.N	MX US	565	1	USD	15.96	0.0	25.00	56.6	4.4	3.2	0.3	43.8	0.3	18.25	8.38	Terence Whalen
	Novatek	3034.TW	3034 TT	3140	2	TWD	153.00	3.9	112.00	(23.2)	7.7	10.9	31.9	68.1	30.2	153.00	80.00	Roland Shu
	Powertech Technology	6239.TW	6239 TT	1350	3	TWD	51.20	5.1	45.00	(6.3)	0.2	3.2	15.6	(6.2)	9.1	65.30	37.65	Roland Shu
	Radiant Opto-Electronics	6176.TW	6176 TT	1802	1	TWD	118.00	7.1	160.00	42.4	0.0	0.9	3.5	(6.9)	(1.3)	153.88	103.50	Arthur Lai
	Samsung Electronics	005930.KS	005930 KS	205078	1	KRW	1,535,000	0.7	#####	29.0	3.3	0.9	6.5	9.6	0.9	#####	#####	Henry H Kim, CFA
	SPIL	2325.TW	2325 TT	3685	1	TWD	34.95	3.7	40.00	19.2	(0.9)	2.8	10.3	0.3	12.7	35.90	27.00	Roland Shu
	TPK	3673.TW	3673 TT	6475	3	TWD	585	4.3	420.00	(24.6)	0.9	(3.9)	15.8	98.7	14.0	642	272.02	Arthur Lai
	Tripod Technology	3044.TW	3044 TT	1280	1	TWD	72.00	4.1	68.00	(1.3)	12.3	9.9	19.4	(21.8)	15.6	92.90	50.60	Roland Shu
	TSMC	2330.TW	2330 TT	96487	1	TWD	110.00	2.7	120.00	11.8	1.4	9.5	8.4	23.7	13.4	112.50	73.80	Roland Shu
	UMC	2303.TW	2303 TT	4880	2	TWD	11.40	2.5	12.00	8.6	1.8	0.9	(1.7)	(26.7)	(2.6)	15.45	10.00	Roland Shu
	Unimicron	3037.TW	3037 TT	1559	2	TWD	29.95	3.4	31.00	7.2	(0.7)	(2.9)	4.0	(10.9)	(2.8)	36.45	27.55	Roland Shu
	Vanguard International Semiconductors	5347.TWO	5347 TT	1845	3	TWD	33.45	3.6	23.00	(28.4)	9.3	22.5	51.4	110.4	66.0	34.00	11.80	Roland Shu
	Wintek	2384.TW	2384 TT	925	2H	TWD	14.80	0.0	15.50	4.7	0.0	(3.9)	6.5	(24.1)	(3.9)	19.80	11.15	Arthur Lai
	Young Fast	3622.TW	3622 TT	267	3	TWD	52.10	1.3	48.00	(7.9)	(0.2)	(7.5)	(4.9)	(21.9)	(12.0)	76.30	46.05	Arthur Lai
Europe	ARM Holdings PLC	ARM.L	ARM LN	22393	1	GBP	10.32	0.7	11.20	9.2	5.4	12.7	15.5	100.8	34.4	10.33	4.64	Amit B Harchandani
	ASML Holding NV	ASML.AS	ASML NA	31636	1	EUR	59.01	1.0	64.00	9.5	4.7	13.9	4.3	49.6	22.9	59.35	35.80	Amit B Harchandani
	CSR Plc	CSR.L	CSR LN	1322	2	GBP	5.08	1.7	5.00	(0.1)	2.1	6.9	37.2	115.0	52.0	5.13	1.97	Amit B Harchandani
	Infineon Technologies	IFXGn.DE	IFX GR	9433	2	EUR	6.68	1.8	6.20	(5.4)	13.1	8.2	(3.0)	(8.2)	9.0	7.37	4.87	Amit B Harchandani
	STMicroelectronics	STM.PA	STM FP	7969	2	EUR	6.70	4.6	6.30	(1.5)	4.6	8.6	0.9	54.7	24.8	6.72	3.64	Amit B Harchandani
Wolfson	WLF.L	WLF LN	373	1	GBP	2.06	0.0	2.35	14.1	5.6	17.7	1.9	7.0	4.4	2.34	1.67	Amit B Harchandani	
Japan	Alps Electric	6770.T	6770 JP	1197	2	JPY	654	0.8	670	3.2	(14.7)	13.3	26.3	(7.2)	26.7	787	347.00	Yuta Fukasawa
	Asahi Glass	5201.T	5201 JP	8847	2	JPY	750	3.5	660	(8.5)	(3.1)	21.8	24.4	23.8	19.8	796	415.00	Atsushi Ikeda
	Hirose Electric	6806.T	6806 JP	4786	1	JPY	13,580	1.0	12,800	(4.7)	(1.6)	9.9	25.5	61.5	32.0	14,440	6,770	Yuta Fukasawa
	Hosiden	6804.OS	6804 JP	377	2	JPY	559	1.8	570	3.8	(1.6)	11.4	6.9	5.1	5.5	607	378.00	Yuta Fukasawa
	Ibiden	4062.T	4062 JP	2331	1	JPY	1,654	1.8	1,700	4.6	1.9	19.4	34.0	2.4	21.1	1,725	892	Yuta Fukasawa
	Kyocera	6971.T	6971 JP	18051	2	JPY	9,640	1.2	8,500	(10.6)	(2.9)	12.2	18.7	24.7	24.1	10,120	6,000	Yuta Fukasawa
	Mabuchi Motor	6592.T	6592 JP	1835	2	JPY	5,130	2.3	5,000	(0.2)	(4.5)	5.6	23.0	50.0	40.4	5,450	2,931	Yuta Fukasawa
	Mitsumi Electric	6767.T	6767 JP	482	2	JPY	540	0.0	550	1.9	(2.9)	6.3	12.3	(14.3)	8.2	625	359.00	Yuta Fukasawa
	Murata	6981.OS	6981 JP	17237	2	JPY	8,000	1.3	6,200	(21.3)	4.7	19.4	44.4	75.1	58.4	8,190	3,555	Yuta Fukasawa
	NGK Spark Plug	5334.T	5334 JP	3542	2	JPY	1,594	1.4	1,190	(24.0)	(2.7)	16.3	43.0	41.8	39.8	1,659	796	Manabu Hagiwara
	Nidec	6594.OS	6594 JP	9090	1	JPY	6,600	1.2	6,200	(4.8)	(0.2)	21.5	27.2	(5.7)	31.5	6,950	4,550	Yuta Fukasawa
	Nippon Electric Glass	5214.T	5214 JP	2432	2	JPY	479.00	3.3	470.00	1.5	(7.9)	7.6	9.4	(18.5)	(1.6)	582	361.00	Atsushi Ikeda
	Nippon Sheet Glass	5202.T	5202 JP	1041	2H	JPY	113.00	0.0	100.00	(11.5)	(1.7)	11.9	7.6	8.7	0.0	128.00	53.00	Atsushi Ikeda
	Rohm	6963.OS	6963 JP	3720	3	JPY	3,380	0.9	2,700	(19.2)	(4.5)	8.7	11.6	(5.5)	20.8	3,730	2,157	Yuta Fukasawa
	Shinko Electric Industries	6967.T	6967 JP	1305	2	JPY	946	2.1	770	(16.5)	4.3	30.5	48.3	36.1	38.7	1,013	446.00	Yuta Fukasawa
	SUMCO	3436.T	3436 JP	2618	1	JPY	995	0.2	1,200	20.8	(4.9)	(1.8)	5.3	20.6	18.5	1,160	480.00	Takao Kanai
	Taiyo Yuden	6976.T	6976 JP	1652	2	JPY	1,376	0.7	1,100	(19.3)	(3.1)	23.1	68.8	65.8	82.5	1,521	569	Yuta Fukasawa
	TDK	6762.T	6762 JP	4437	3	JPY	3,455	2.0	2,800	(16.9)	(2.4)	7.8	9.5	(12.4)	11.1	3,895	2,719	Yuta Fukasawa

Source: Citi Research

Figure 661. Sector Performance for Semiconductor & Component Stocks

	Company Name	Reuters Code	B'berg Code	Market Cap (\$M)	Citi Rating	Local CCY	3-May-13 Price	Dividend Yield (%)	Target Price	ETR (%)	Performance (%)					52 Weeks		Analyst Name
											1 Wk	1 Mo	3 Mo	12 Mo	YTD	High	Low	
Semiconductors & Components																		
North America	Advanced Micro Devices	AMD.N	AMD US	2571	2H	USD	3.60	0.0	3.00	(16.7)	36.4	55.2	38.5	(51.4)	50.0	7.40	1.81	Glen Yeung
	Altera Corp	ALTR.O	ALTR US	10478	2	USD	32.73	1.2	36.00	11.2	4.9	(1.3)	(5.1)	(5.2)	(4.8)	38.80	29.59	Glen Yeung
	Amkor Technology Inc	AMKR.O	AMKR US	676	1	USD	4.41	0.0	6.00	36.1	4.5	16.1	(8.9)	(10.0)	4.0	5.58	3.55	Terence Whalen
	Analog Devices	ADI.O	ADI US	13769	2	USD	45.00	2.9	48.00	9.7	3.9	2.1	0.7	17.8	7.0	47.27	34.25	Terence Whalen
	Applied Materials Inc	AMAT.O	AMAT US	17797	2	USD	14.83	2.2	14.00	(4.0)	4.9	12.8	12.6	28.6	29.6	15.18	9.95	Terence Whalen
	ATMI Inc	ATMI.O	ATMI US	698	2	USD	21.85	0.0	22.00	0.7	(0.1)	2.2	5.0	4.5	4.6	23.33	17.59	Terence Whalen
	Broadcom Corporation	BRCM.O	BRCM US	18787	1	USD	36.06	1.2	41.00	14.9	4.4	8.5	9.0	0.2	8.6	37.00	28.60	Glen Yeung
	Brooks Automation Inc	BRKS.O	BRKS US	648	2H	USD	9.76	3.3	8.00	(14.8)	4.6	3.2	0.8	(12.2)	21.2	11.03	7.00	Terence Whalen
	Cypress Semiconductor Corp	CY.O	CY US	1488	2H	USD	10.13	4.3	10.50	8.0	2.1	(3.1)	(1.6)	(30.9)	(6.5)	14.70	8.70	Glen Yeung
	Entegris Inc	ENTG.O	ENTG US	1350	2H	USD	9.69	0.0	10.00	3.2	1.9	2.4	(2.1)	11.3	5.6	10.18	7.45	Terence Whalen
	Fairchild Semiconductor	FCS.N	FCS US	1866	1	USD	13.52	0.0	20.00	47.9	8.3	2.3	(11.9)	(0.4)	(6.1)	15.75	11.14	Terence Whalen
	FormFactor Inc	FORM.O	FORM US	267	2	USD	4.95	0.0	5.25	6.1	2.3	10.0	(2.8)	(24.1)	8.6	6.92	3.70	Terence Whalen
	Freescale Semiconductor Holdi	FSL.N	FSL US	3843	1H	USD	15.12	0.0	20.00	32.3	(3.8)	9.6	2.2	23.3	37.3	16.26	7.63	Glen Yeung
	Integrated Device Technology II	IDTI.O	IDTI US	1059	1H	USD	7.27	0.0	10.00	37.6	5.8	1.4	(0.7)	20.6	(0.4)	7.85	4.60	Glen Yeung
	Intel Corp	INTC.O	INTC US	119105	2	USD	23.96	3.9	24.00	3.8	2.4	13.8	12.2	(16.1)	16.2	28.38	19.23	Glen Yeung
	International Rectifier	IRF.N	IRF US	1515	2	USD	21.82	0.0	na	na	13.4	14.4	8.3	(1.6)	23.1	21.94	14.33	Terence Whalen
	Intersil Corporation	ISIL.O	ISIL US	1003	3	USD	7.94	6.0	5.00	(31.0)	3.3	(0.6)	(11.2)	(21.4)	(4.2)	10.97	6.31	Terence Whalen
	KLA Tencor Corp	KLAC.O	KLAC US	9008	1	USD	54.30	2.9	60.00	13.1	4.2	5.8	(2.6)	6.8	13.7	57.97	43.21	Terence Whalen
	Lam Research Corp	LRCX.O	LRCX US	7470	2	USD	46.01	0.0	45.00	(2.2)	0.7	13.7	10.3	11.7	27.3	46.72	31.17	Terence Whalen
	Linear Technology	LLTC.O	LLTC US	8677	3	USD	37.31	2.8	33.00	(8.8)	5.2	4.5	0.8	17.5	8.8	38.90	28.28	Terence Whalen
	Marvell Technology Group Ltd.	MRVL.O	MRVL US	5373	2	USD	10.71	0.0	10.50	0.3	1.6	7.0	12.7	(25.0)	47.5	14.34	6.98	Glen Yeung
	Maxim Integrated	MXIM.O	MXIM US	9128	1	USD	31.36	3.1	39.00	27.6	2.2	0.5	(1.0)	11.1	6.7	33.67	23.55	Terence Whalen
	Microchip Technology	MCHP.O	MCHP US	7336	2	USD	37.55	3.7	39.00	7.6	5.5	6.2	8.8	8.2	15.2	37.91	28.92	Terence Whalen
	Micron Technology Inc	MU.O	MU US	9920	1H	USD	9.63	0.0	13.50	40.2	2.1	5.8	23.0	48.8	51.9	10.27	5.16	Glen Yeung
	NVIDIA Corp	NVDA.O	NVDA US	8573	2H	USD	13.87	0.5	15.00	10.3	3.4	14.4	12.1	9.8	13.1	15.22	11.15	Glen Yeung
	ON Semiconductor	ONNN.O	ONNN US	3611	2	USD	8.02	0.0	9.00	12.2	6.5	3.5	(1.6)	(4.4)	13.8	8.71	5.70	Terence Whalen
	Qualcomm Inc	QCOM.O	QCOM US	110184	1	USD	63.77	1.9	81.00	28.4	3.7	(3.3)	(4.4)	0.3	3.1	68.50	53.09	Glen Yeung
	Semtech	SMTC.O	SMTC US	2176	1	USD	32.43	0.0	40.00	23.3	3.9	(2.4)	6.8	21.4	12.0	35.50	22.22	Terence Whalen
	Silicon Laboratories	SLAB.O	SLAB US	1684	1	USD	39.68	0.0	49.00	23.5	0.9	1.7	(9.6)	12.3	(5.1)	47.41	32.00	Terence Whalen
	Spanion Inc.	CODE.N	CODE US	741	2H	USD	12.66	0.0	15.00	18.5	8.6	9.5	9.0	14.3	(9.0)	14.53	9.46	Glen Yeung
	Teradyne Inc	TER.N	TER US	3123	1	USD	16.39	0.0	19.00	15.9	0.2	7.5	(1.5)	(1.0)	(3.0)	17.66	12.95	Terence Whalen
	Texas Instruments Inc	TXN.O	TXN US	40888	1	USD	37.01	2.9	40.00	10.3	3.6	8.4	9.8	17.9	19.8	37.20	26.06	Glen Yeung
	Xilinx Inc	XLNX.O	XLNX US	9981	2	USD	38.16	2.2	40.00	7.4	1.9	5.4	2.7	9.8	6.4	39.43	30.25	Glen Yeung

Source: Citi Research

Figure 662. Sector Performance for Software Stocks

	Company Name	Reuters Code	B'berg Code	Market Cap (\$M)	Citi Rating	Local CCY	3-May-13 Price	Dividend Yield (%)	Target Price	ETR (%)	Performance (%)					52 Weeks		Analyst Name
											1 Wk	1 Mo	3 Mo	12 Mo	YTD	High	Low	
Software																		
CEEMEA	CheckPoint Software Technolog	CHKP.O	CHKP US	9410	1	USD	47.28	0.0	55.00	16.3	4.8	4.5	(7.3)	(16.8)	(0.8)	56.54	40.60	Walter H Pritchard, CFA
Europe	AVEVA Plc	AVV.L	AVV LN	2373	2	GBP	22.44	1.1	21.60	(2.6)	1.4	(0.6)	1.3	34.9	2.8	23.41	14.63	Hugo Mills
	Micro Focus International Plc	MCRO.L	MCRO LN	1574	2	GBP	6.78	3.4	7.30	11.1	(0.2)	(3.4)	8.8	44.5	16.5	7.08	4.22	Hugo Mills
	Telecity Group Plc	TCY.L	TCY LN	2974	1	GBP	9.46	0.9	10.20	8.8	3.9	2.4	10.0	15.9	20.2	9.74	7.48	Hugo Mills
North America	Adobe Systems Inc.	ADBE.O	ADBE US	23596	1	USD	47.01	0.0	48.00	2.1	4.7	7.6	22.6	41.1	24.8	47.17	29.52	Walter H Pritchard, CFA
	Autodesk, Inc.	ADSK.O	ADSK US	8865	2	USD	39.52	0.0	36.00	(8.9)	5.9	2.5	1.5	1.5	11.8	41.42	27.70	Walter H Pritchard, CFA
	BMC Software, Inc.	BMC.O	BMC US	6416	2	USD	45.42	0.0	36.00	(20.7)	(0.4)	(0.0)	7.7	9.6	14.6	47.98	35.48	Walter H Pritchard, CFA
	CA Inc.	CA.O	CA US	12643	2	USD	27.73	3.6	25.00	(6.2)	6.7	13.0	10.8	3.6	26.2	27.94	21.48	Walter H Pritchard, CFA
	Citrix Systems, Inc.	CTXS.O	CTXS US	11848	1	USD	63.49	0.0	75.00	18.1	2.7	(9.9)	(14.2)	(25.7)	(3.2)	85.65	56.57	Walter H Pritchard, CFA
	Fortinet, Inc.	FTNT.O	FTNT US	2932	2H	USD	18.08	0.0	21.00	16.2	4.1	(18.6)	(23.4)	(30.6)	(14.0)	28.23	17.26	Walter H Pritchard, CFA
	Guidewire Software, Inc.	GWRE.N	GWRE US	2316	2	USD	41.03	0.0	32.00	(22.0)	4.8	12.5	19.5	50.5	38.1	41.75	22.40	Walter H Pritchard, CFA
	Intuit Inc.	INTU.O	INTU US	17860	2	USD	60.26	1.1	59.00	(1.0)	1.5	(6.7)	(4.2)	3.2	1.3	68.41	53.38	Walter H Pritchard, CFA
	Jive Software, Inc.	JIVE.O	JIVE US	981	2H	USD	14.72	0.0	14.50	(1.5)	5.7	3.0	(4.8)	(36.1)	1.3	23.47	10.63	Walter H Pritchard, CFA
	Microsoft Corp.	MSFT.O	MSFT US	279679	1	USD	33.49	2.6	35.00	7.3	5.3	17.3	19.9	5.4	25.4	33.52	26.26	Walter H Pritchard, CFA
	Oracle Corporation	ORCL.O	ORCL US	157242	1	USD	33.38	0.9	38.00	14.0	3.2	3.0	(7.8)	13.6	0.2	36.43	25.33	Walter H Pritchard, CFA
	Palo Alto Networks, Inc.	PANW.N	PANW US	3760	2H	USD	54.39	0.0	62.00	14.0	1.5	1.4	(0.0)	na	1.6	72.54	47.00	Walter H Pritchard, CFA
	Qlik Technologies Inc.	QLIK.O	QLIK US	2281	2	USD	26.24	0.0	26.00	(0.9)	0.4	7.4	15.1	(8.0)	20.8	28.32	16.71	Walter H Pritchard, CFA
	Red Hat, Inc.	RHT.N	RHT US	9414	2	USD	49.65	0.0	53.00	6.7	2.3	4.1	(12.7)	(18.3)	(6.3)	60.74	46.34	Walter H Pritchard, CFA
	salesforce.com, inc.	CRM.N	CRM US	24744	1	USD	42.24	0.0	47.75	13.0	3.8	0.3	(3.5)	7.3	0.5	46.99	30.05	Walter H Pritchard, CFA
	ServiceNow, Inc.	NOW.N	NOW US	5401	1	USD	40.95	0.0	49.00	19.7	(3.7)	18.6	45.9	na	36.4	43.97	22.62	Walter H Pritchard, CFA
	Sourcefire, Inc.	FIRE.O	FIRE US	1687	2H	USD	54.18	0.0	51.00	(5.9)	6.2	(2.9)	27.6	(5.9)	14.7	59.49	39.50	Walter H Pritchard, CFA
	Symantec Corp.	SYMC.O	SYMC US	17119	1	USD	24.84	0.0	26.00	4.7	1.7	1.6	12.3	53.0	32.0	25.00	13.06	Walter H Pritchard, CFA
	Verisign, Inc.	VRSN.O	VRSN US	7138	2	USD	47.35	0.0	47.00	(0.7)	5.8	1.9	6.8	14.6	22.0	50.15	32.81	Walter H Pritchard, CFA
	VMware, Inc.	VMW.N	VMW US	31912	2	USD	74.50	0.0	73.00	(2.0)	4.3	(2.1)	(5.4)	(33.8)	(20.9)	111.46	70.05	Walter H Pritchard, CFA
	Web.Com Group	WWWWW.O	WWWWW L	944	1	USD	19.00	0.0	21.00	10.5	9.9	16.5	16.2	18.5	28.4	19.88	13.25	Walter H Pritchard, CFA
	Websense, Inc.	WBSN.O	WBSN US	658	2	USD	18.09	0.0	16.00	(11.6)	2.6	20.6	21.9	(9.3)	20.3	19.79	12.70	Walter H Pritchard, CFA
	Workday Inc	WDAY.N	WDAY US	10628	2	USD	63.80	0.0	58.00	(9.1)	3.0	8.0	19.2	na	17.1	65.00	45.05	Walter H Pritchard, CFA

Source: Citi Research

Figure 663. Sector Performance for Technology - General Stocks

	Company Name	Reuters Code	B'berg Code	Market Cap (\$M)	Citi Rating	Local CCY	3-May-13 Price	Dividend Yield (%)	Target Price	ETR (%)	Performance (%)					52 Weeks		Analyst Name
											1 Wk	1 Mo	3 Mo	12 Mo	YTD	High	Low	
Technology - General																		
Asia	AAC Technologies Holdings	2018.HK	2018 HK	5966	1	HKD	37.70	3.2	36.00	(3.2)	0.9	1.1	26.5	63.2	39.1	39.45	20.10	Kevin Chang
	Chicony Electronics	2385.TW	2385 TT	1948	1	TWD	85.20	5.8	93.00	14.0	(1.5)	5.8	7.8	53.6	27.0	87.20	50.72	Wei Chen
	Delta Electronics	2308.TW	2308 TT	11982	3	TWD	146.00	3.7	105.00	(24.5)	2.8	11.9	37.7	52.1	37.1	150.00	76.80	Wei Chen
	Foxconn International Holdings	2038.HK	2038 HK	3083	1	HKD	3.21	0.0	5.80	80.7	8.8	13.4	(1.2)	(14.9)	(14.6)	4.20	2.22	Kevin Chang
	Foxconn Technology	2354.TW	2354 TT	3373	3	TWD	80.60	1.1	80.00	0.5	4.1	(1.7)	(6.8)	(19.8)	(11.3)	123.00	77.00	Wei Chen
	Hon Hai Precision	2317.TW	2317 TT	31031	1	TWD	77.50	2.6	110.00	44.2	1.7	(6.7)	(8.4)	(5.3)	(12.8)	98.40	71.82	Kevin Chang
	LG Electronics	066570.KS	066570 KS	12587	2	KRW	84,800	0.2	89,000	5.2	(5.5)	6.0	17.8	19.1	15.2	91,800	55,800	Henry H Kim, CFA
	LG Innotek	011070.KS	011070 KS	1592	3	KRW	87,000	0.4	68,000	(21.4)	(2.6)	1.5	16.5	3.3	5.7	96,200	68,800	Henry H Kim, CFA
	Samsung Electro-Mechanics	009150.KS	009150 KS	6693	2	KRW	98,800	1.0	110,000	12.3	1.9	(0.2)	8.1	(10.2)	(0.4)	112,500	85,700	Henry H Kim, CFA
	Samsung SDI	006400.KS	006400 KS	5289	2	KRW	128,000	0.8	155,000	21.9	3.2	(6.2)	(8.6)	(21.5)	(15.2)	171,500	120,500	Henry H Kim, CFA
	Samsung Techwin	012450.KS	012450 KS	3243	1	KRW	67,300	0.7	76,000	13.5	(1.2)	2.9	14.5	(2.6)	12.7	80,900	55,000	Henry H Kim, CFA
	Simplo Technology	6121.TWO	6121 TT	1314	3	TWD	126.00	4.5	122.00	1.3	3.7	(8.4)	(8.4)	(38.1)	(13.7)	205.45	121.00	Wei Chen
	SK Hynix	000660.KS	000660 KS	18605	1	KRW	29,550	0.0	39,000	32.0	0.3	2.2	22.1	8.4	14.8	30,000	20,100	Henry H Kim, CFA
	Venture	VENM.SI	VMS SP	1605	2	SGD	7.21	7.6	8.12	20.2	(13.1)	(16.2)	(14.9)	(8.4)	(10.5)	8.75	7.18	Patrick Yau, CFA
	WPG Holdings	3702.TW	3702 TT	2053	3	TWD	36.65	7.0	27.00	(19.8)	4.0	5.3	(8.3)	(10.6)	(3.6)	41.20	30.00	Roland Shu
Japan	Fujitsu	6702.T	6702 JP	8175	1	JPY	387.00	1.3	470.00	22.7	(5.1)	0.0	2.9	(2.3)	7.5	446.00	269.00	Kota Ezawa
	GS Yuasa	6674.T	6674 JP	1715	2	JPY	407.00	2.0	430.00	7.6	(1.5)	7.1	24.8	0.2	17.6	475.00	286.00	Tsubasa Sasaki
	Hitachi	6501.T	6501 JP	30079	1	JPY	610	1.6	730	21.3	(1.9)	15.1	11.9	24.0	21.0	647	401.00	Kota Ezawa
	Mitsubishi Electric	6503.T	6503 JP	21257	2	JPY	970	1.1	840	(12.2)	4.2	32.0	29.5	41.8	32.7	997	557	Kota Ezawa
	NEC	6701.T	6701 JP	6604	2	JPY	249.00	1.6	240.00	(2.0)	(8.1)	1.6	2.9	77.9	37.6	295.00	96.00	Kota Ezawa
	Toshiba	6502.T	6502 JP	22349	1	JPY	517	1.5	550	7.9	(3.7)	11.2	30.9	62.6	53.4	565	234.00	Kota Ezawa
North America	Ingram Micro Inc	IM.N	IM US	2757	2	USD	18.09	0.0	19.00	5.0	5.0	(4.7)	(0.8)	(5.6)	6.9	20.21	14.42	Jim Suva, CPA
	Synnex Corp	SNX.N	SNX US	1306	2	USD	35.02	0.0	39.00	11.4	4.0	(0.3)	(4.3)	(4.1)	1.9	41.21	30.70	Jim Suva, CPA
	Tech Data Corp	TECD.O	TECD US	1780	2	USD	47.13	0.0	48.00	1.8	4.8	4.4	(8.8)	(10.9)	3.5	54.60	42.25	Jim Suva, CPA

Source: Citi Research

Figure 664. Sector Performance for Telecommunications Equipment Stocks

	Company Name	Reuters Code	B'berg Code	Market Cap (\$M)	Citi Rating	Local CCY	3-May-13 Price	Dividend Yield (%)	Target Price	ETR (%)	Performance (%)					52 Weeks		Analyst Name
											1 Wk	1 Mo	3 Mo	12 Mo	YTD	High	Low	
Telecommunications Equipment																		
Asia	ZTE	0763.HK	763 HK	5896	1	HKD	13.30	1.3	18.00	36.7	7.3	7.8	(11.0)	(28.3)	1.8	18.58	9.23	Bin Liu
Europe	Alcatel-Lucent	ALUA.PA	ALU FP	3113	2H	EUR	1.02	0.0	1.20	17.3	(3.3)	(0.2)	(21.3)	(11.6)	2.0	1.44	0.71	Kevin J Dennean, CFA
	Ei Towers SpA	EIT.MI	EIT IM	980	2	EUR	26.55	1.6	na	na	1.8	13.9	19.2	47.9	28.4	27.39	15.30	Nicolo' Rolando
	Ericsson LM	ERICB.ST	ERICB SS	40275	1	SEK	79.80	3.4	85.00	10.0	(0.4)	(0.6)	4.6	21.2	22.6	86.40	55.90	Kevin J Dennean, CFA
	Nokia Oyj	NOK1V.HE	NOK1V FF	12398	2H	EUR	2.53	0.0	2.55	0.6	1.2	(0.5)	(13.2)	(5.2)	(13.4)	3.64	1.33	Jim Suva, CPA
	Spirent Communications Plc	SPT.L	SPT LN	1295	1	GBP	1.29	1.5	1.65	30.2	(1.2)	(13.4)	(22.5)	(26.1)	(14.7)	1.74	1.06	Hugo Mills
North America	Adtran Technology	ADTN.O	ADTN US	1299	2	USD	21.19	1.7	23.00	10.2	3.1	10.2	4.8	(30.3)	8.4	31.03	15.38	Kevin J Dennean, CFA
	ARRIS Group, Inc.	ARRS.O	ARRS US	2251	2	USD	16.35	0.0	17.50	7.0	(0.2)	(1.0)	(0.4)	27.5	9.4	17.98	11.70	Kevin J Dennean, CFA
	Ciena Corp	CIEN.O	CIEN US	1493	1H	USD	14.71	0.0	22.00	49.6	(0.5)	(4.2)	(7.3)	5.2	(6.3)	18.39	11.45	Kevin J Dennean, CFA
	Corning Incorporated	GLW.N	GLW US	21935	2	USD	14.87	2.7	14.00	(3.2)	4.5	11.5	24.9	6.2	17.8	14.99	10.62	Jim Suva, CPA
	Finisar Corp	FNSR.O	FNSR US	1242	1H	USD	13.29	0.0	20.00	50.5	3.1	5.4	(16.0)	(17.1)	(18.4)	17.14	10.95	Kevin J Dennean, CFA
	Infinera Corp	INFN.O	INFN US	978	2H	USD	8.46	0.0	8.25	(2.5)	3.0	34.7	17.0	22.3	45.6	8.60	4.33	Kevin J Dennean, CFA
	JDSU Corp	JDSU.O	JDSU US	3132	1H	USD	13.32	0.0	16.00	20.1	(0.9)	2.5	(9.9)	14.9	(1.3)	15.63	8.47	Kevin J Dennean, CFA
	Polycom Inc	PLCM.O	PLCM US	1851	2	USD	10.73	0.0	11.00	2.5	6.0	(0.8)	0.7	(16.2)	2.6	12.84	7.45	Kevin J Dennean, CFA
	Tellabs Inc	TLAB.O	TLAB US	747	2	USD	2.10	0.0	2.00	(4.8)	4.5	5.0	(0.2)	(43.9)	(7.9)	3.89	1.90	Kevin J Dennean, CFA

Source: Citi Research

Figure 665. Comparable Valuation for Consumer Electronics Stocks

	Company	Reuters	B'berg	Fiscal	Last	PE (x)		Price / FCF (x)		EV / EBITDA (x)		EV / Sales (x)		Price / Sales (x)		Price / BV (x)		Price / Tang BV (x)		FCY Yield (%)	
	Name	Code	Code	Year End	Rep Yr	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
Consumer Electronics																					
Asia	VTech Holdings	0303.HK	303 HK	31-Mar	2012	16.6	14.8	18.2	15.6	11.6	10.4	1.6	1.5	1.8	1.7	6.3	5.9	6.3	5.9	5.5	6.4
						16.6	14.8	18.2	15.6	11.6	10.4	1.6	1.5	1.8	1.7	6.3	5.9	6.3	5.9	5.5	6.4
Japan	Casio Computer	6952.T	6952 JP	31-Mar	2012	20.2	18.5	52.9	20.6	5.9	5.4	0.5	0.5	0.7	0.7	1.3	1.3	1.5	1.4	1.9	4.9
	Funai Electric	6839.OS	6839 JP	31-Mar	2012	(14.9)	18.9	(4.1)	(29.7)	43.1	(2.4)	(0.2)	(0.1)	0.2	0.2	0.3	0.3	0.4	0.4	(24.3)	(3.4)
	Panasonic	6752.T	6752 JP	31-Mar	2012	(2.2)	34.7	(10.0)	(9.8)	5.0	4.9	0.3	0.3	0.2	0.2	1.2	1.2	8.6	6.9	(10.0)	(10.2)
	Pioneer	6773.T	6773 JP	31-Mar	2012	(4.3)	12.6	(1.8)	7.9	2.5	2.2	0.2	0.2	0.1	0.1	0.8	0.7	0.8	0.7	(56.1)	12.7
	Sharp	6753.T	6753 JP	31-Mar	2012	(0.8)	(30.0)	(2.1)	nm	67.7	5.5	0.5	0.4	0.2	0.1	1.9	2.1	3.1	3.0	(46.6)	(1.0)
	Sony	6758.T	6758 JP	31-Mar	2012	nm	30.1	11.6	12.8	3.3	2.9	0.2	0.2	0.3	0.3	0.7	0.7	(0.2)	(0.2)	8.6	7.8
						(0.4)	14.1	7.8	0.3	21.2	3.1	0.3	0.3	0.3	0.3	1.1	1.1	2.4	2.0	(21.1)	1.8

Source: Citi Research

Figure 666. Comparable Valuation for Hardware Stocks

	Company	Reuters	B'berg	Fiscal	Last	PE (x)		Price / FCF (x)		EV / EBITDA (x)		EV / Sales (x)		Price / Sales (x)		Price / BV (x)		Price / Tang BV (x)		FCY Yield (%)	
	Name	Code	Code	Year End	Rep Yr	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
Hardware																					
Asia	Acer	2353.TW	2353 TT	31-Dec	2011	nm	nm	95.9	97.3	(16.8)	(24.9)	(0.0)	(0.0)	0.2	0.2	0.9	0.9	0.9	0.9	1.0	1.0
	ASUSTeK Computer	2357.TW	2357 TT	31-Dec	2012	12.3	12.4	13.0	10.6	5.6	5.6	0.4	0.4	0.6	0.6	1.9	1.8	1.9	1.8	7.7	9.4
	Catcher Technology	2474.TW	2474 TT	31-Dec	2011	11.2	10.6	20.9	15.1	5.0	4.5	2.4	2.1	2.9	2.7	1.7	1.5	1.7	1.5	4.8	6.6
	Compal Electronics	2324.TW	2324 TT	31-Dec	2011	11.5	9.6	4.9	9.1	3.1	2.1	0.1	0.0	0.1	0.1	0.7	0.7	0.7	0.7	20.5	11.0
	Flextronics International Ltd	FLEX.O	FLEX US	31-Mar	2013	8.3	9.0	6.8	7.6	4.2	3.2	0.2	0.2	0.2	0.2	2.0	1.8	2.4	2.2	14.7	13.1
	HTC	2498.TW	2498 TT	31-Dec	2012	22.7	25.0	13.5	89.0	10.0	10.5	0.5	0.6	0.9	1.0	2.9	2.8	2.9	2.8	7.4	1.1
	Kingboard Laminates Holdings	1888.HK	1888 HK	31-Dec	2012	7.3	6.1	3.4	7.4	4.1	3.0	0.7	0.5	0.7	0.6	0.8	0.8	0.8	0.8	29.5	13.5
	Largan Precision	3008.TW	3008 TT	31-Dec	2012	15.9	14.9	15.0	15.3	10.1	8.5	4.1	3.2	4.7	3.9	3.9	3.4	3.9	3.4	6.7	6.5
	Lenovo Group	0992.HK	992 HK	31-Mar	2012	14.7	13.1	(13.1)	10.4	2.1	2.1	0.1	0.1	0.3	0.2	3.7	3.1	3.7	3.1	(7.7)	9.6
	Pegatron	4938.TW	4938 TT	31-Dec	2012	9.3	6.8	6.9	4.9	3.8	2.8	0.1	0.1	0.1	0.1	1.1	0.9	1.1	0.9	14.6	20.4
	Quanta Computer	2382.TW	2382 TT	31-Dec	2011	11.5	10.9	3.4	10.9	8.5	6.6	0.2	0.2	0.2	0.2	1.8	1.6	1.8	1.6	29.1	9.2
	TPV Technology	0903.HK	903 HK	31-Dec	2011	5.6	4.8	(3.4)	(2.5)	2.3	4.1	0.1	0.1	0.0	0.0	0.3	0.3	0.4	0.4	(29.5)	(40.8)
	Wistron	3231.TW	3231 TT	31-Dec	2011	9.1	9.0	3.0	17.2	4.1	3.5	0.1	0.1	0.1	0.1	1.0	0.9	1.0	0.9	33.2	5.8
						11.6	11.0	13.1	22.5	3.6	2.4	0.7	0.6	0.8	0.8	1.7	1.6	1.8	1.6	10.1	5.1
Europe	Seagate Technology	STX.O	STX US	30-Jun	2012	7.9	7.6	6.3	7.5	4.9	5.1	1.1	1.1	1.1	1.0	4.4	4.9	5.9	7.2	15.8	13.3
	Sensata Technologies Holding	IST.N	ST US	31-Dec	2012	16.8	14.7	20.1	16.9	18.4	15.0	3.8	3.3	3.2	3.0	4.5	3.7	(7.1)	(12.3)	5.0	5.9
	TE Connectivity Ltd.	TEL.N	TEL US	30-Sep	2012	14.1	11.9	21.4	12.4	7.8	6.8	1.4	1.3	1.4	1.3	2.3	2.0	7.4	5.1	4.7	8.1
						12.9	11.4	15.9	12.3	10.4	8.9	2.1	1.9	1.9	1.8	3.7	3.5	2.1	(0.0)	8.5	9.1
Japan	Brother Industries	6448.T	6448 JP	31-Mar	2012	17.5	12.4	(38.6)	20.3	3.2	2.8	0.3	0.3	0.6	0.5	1.2	1.2	1.2	1.2	(2.6)	4.9
	Canon	7751.T	7751 JP	31-Dec	2012	12.6	11.2	16.0	11.3	3.8	3.4	0.7	0.7	1.1	1.0	1.4	1.3	1.4	1.3	6.2	8.9
	Dainippon Screen Mfg	7735.T	7735 JP	31-Mar	2012	(16.4)	32.3	(6.0)	nm	(35.3)	10.9	0.5	0.6	0.6	0.6	1.4	1.4	1.4	1.4	(16.6)	(0.6)
	Fujifilm Holdings	4901.T	4901 JP	31-Mar	2012	20.6	12.8	11.3	8.2	0.7	0.3	0.1	0.0	0.5	0.4	0.5	0.5	0.5	0.5	8.9	12.3
	Hoya	7741.T	7741 JP	31-Mar	2012	14.1	15.7	nm	46.6	6.5	6.3	1.8	1.6	2.3	2.2	1.9	1.8	1.9	1.8	0.2	2.1
	Konica Minolta	4902.T	4902 JP	31-Mar	2012	16.1	11.3	(13.8)	32.7	3.1	2.3	0.4	0.4	0.5	0.4	0.8	0.7	0.8	0.7	(7.2)	3.1
	Nikon	7731.T	7731 JP	31-Mar	2012	19.3	13.0	nm	19.8	7.4	5.2	0.7	0.6	0.8	0.8	1.8	1.6	1.8	1.6	0.1	5.1
	Olympus	7733.T	7733 JP	31-Mar	2012	nm	27.3	nm	14.5	13.3	8.3	1.4	1.4	1.0	1.1	7.1	5.6	(15.9)	(78.4)	0.2	6.9
	Ricoh	7752.T	7752 JP	31-Mar	2012	22.2	9.7	10.2	8.4	3.3	2.0	0.2	0.2	0.4	0.4	0.9	0.8	0.9	0.8	9.8	11.9
	Seiko Epson	6724.T	6724 JP	31-Mar	2013	(20.5)	12.5	65.1	46.0	4.7	3.9	0.3	0.3	0.2	0.2	0.8	0.8	0.8	0.8	1.5	2.2
	Tamron Co Ltd	7740.T	7740 JP	31-Dec	2012	11.2	8.8	13.3	9.6	4.3	3.3	0.7	0.6	0.8	0.8	1.3	1.2	1.3	1.2	7.5	10.4
	Tokyo Electron	8035.T	8035 JP	31-Mar	2012	nm	52.8	(62.9)	nm	15.0	11.7	1.1	1.0	1.7	1.7	1.4	1.4	1.4	1.4	(1.6)	0.0
						9.7	18.3	(0.6)	21.7	2.5	5.0	0.7	0.7	0.9	0.8	1.7	1.5	(0.2)	(5.5)	0.5	5.6
North America	Amphenol Corp	APH.N	APH US	31-Dec	2012	20.1	18.0	30.6	21.6	12.3	11.3	2.8	2.5	2.7	2.4	4.5	3.9	15.1	10.5	3.3	4.6
	Apple, Inc.	AAPL.O	AAPL US	30-Sep	2012	12.0	11.3	9.7	11.3	5.5	5.2	1.8	1.7	2.6	2.4	3.1	2.9	3.3	3.0	10.3	8.9
	Arrow Electronics Inc	ARW.N	ARW US	31-Dec	2012	9.1	8.2	21.5	7.5	6.4	5.6	0.3	0.2	0.2	0.2	0.9	0.9	1.6	1.4	4.7	13.4
	Avnet Inc	AVT.N	AVT US	30-Jun	2012	9.4	8.7	8.9	9.6	6.4	5.9	0.2	0.2	0.2	0.2	1.1	1.0	1.5	1.3	11.3	10.4
	AVX Corp	AVX.N	AVX US	31-Mar	2013	18.9	17.6	20.4	nm	4.1	4.0	0.6	0.5	1.4	1.3	1.0	1.0	1.1	1.2	4.9	0.6
	Benchmark Electronics Inc	BHE.N	BHE US	31-Dec	2012	16.2	14.0	27.1	16.3	4.7	4.1	0.2	0.2	0.4	0.4	0.8	0.8	0.9	0.8	3.7	6.1
	BlackBerry	BBRY.O	BBRY US	28-Feb	2013	(24.4)	nm	4.3	12.9	4.6	3.4	0.5	0.4	0.7	0.6	0.9	0.9	1.4	1.6	23.0	7.7
	Celestica Inc	CLS.N	CLS US	31-Dec	2012	11.6	9.5	81.9	17.5	5.7	4.7	0.2	0.2	0.3	0.3	1.1	1.0	1.2	1.1	1.2	5.7
	Cisco Systems Inc.	CSCO.O	CSCO US	31-Jul	2012	10.7	9.9	11.2	9.5	5.9	5.2	1.6	1.4	2.3	2.2	1.9	1.6	3.2	2.5	8.9	10.5
	Electronics for Imaging Inc	EFII.O	EFII US	31-Dec	2012	18.7	16.8	19.3	21.0	7.2	7.3	1.2	1.2	1.8	1.6	1.9	1.7	3.5	3.0	5.2	4.8
	EMC Corp	EMC.N	EMC US	31-Dec	2012	12.6	11.7	9.7	9.8	6.6	6.0	1.7	1.5	2.2	2.0	2.0	1.9	5.6	4.8	10.3	10.2
	F5 Networks Inc	FFIV.O	FFIV US	30-Sep	2012	17.3	15.9	13.6	13.1	10.3	8.6	3.2	2.7	4.1	3.8	3.7	3.0	5.1	3.8	7.4	7.6
	Hewlett-Packard Co	HPQ.N	HPQ US	31-Oct	2012	6.2	6.8	8.4	8.3	3.7	3.7	0.5	0.5	0.4	0.4	1.6	1.4	(5.2)	(13.9)	12.0	12.0
	International Business Machine	IBM.N	IBM US	31-Dec	2012	12.2	10.9	11.5	10.9	8.2	7.4	2.2	2.1	2.2	2.0	10.1	8.4	(10.6)	(11.2)	8.7	9.1
	Jabil Circuit Inc	JBL.N	JBL US	31-Aug	2012	7.9	7.3	19.5	10.9	3.5	3.2	0.2	0.2	0.2	0.2	1.6	1.4	1.7	1.5	5.1	9.2
	Juniper Networks, Inc.	JNPR.N	JNPR US	31-Dec	2012	13.2	11.8	10.8	10.3	5.6	4.1	1.1	0.9	1.9	1.7	1.1	1.0	2.4	2.1	9.3	9.7
	Lexmark International Inc	LXK.N	LXK US	31-Dec	2012	7.8	8.3	9.9	8.2	2.4	2.8	0.4	0.5	0.6	0.6	1.5	1.4	2.8	2.4	10.1	12.2
	Molex Inc	MOLX.O	MOLX US	30-Jun	2012	18.9	17.4	83.0	24.7	6.6	6.1	1.1	1.1	1.4	1.4	2.0	1.9	2.2	2.1	1.2	4.1
	Motorola Solutions Inc	MSI.N	MSI US	31-Dec	2012	15.3	13.2	9.9	11.6	8.4	7.5	1.5	1.4	1.7	1.5	5.1	4.6	10.2	8.9	10.1	8.6
	NetApp Inc	NTAP.O	NTAP US	30-Apr	2012	15.4	14.0	15.3	11.1	8.6	7.6	1.3	1.1	2.0	1.8	2.6	2.4	3.5	3.2	6.5	9.0
	Plexus Corp	PLXS.O	PLXS US	30-Sep	2012	12.9	11.9	37.7	13.2	6.0	5.2	0.4	0.3	0.4	0.4	1.3	1.2	1.3	1.2	2.7	7.6
	Riverbed Technology Inc.	RVBD.O	RVBD US	31-Dec	2012	15.8	14.8	14.6	10.4	16.8	14.1	2.3	1.8	2.4	2.1	2.4	2.0	7.0	4.2	6.8	9.6
	Sanmina-SCI Corporation	SANM.O	SANM US	30-Sep	2012	9.6	7.6	5.7	5.0	4.2	3.0	0.2	0.2	0.2	0.2	1.0	0.9	1.0	0.9	17.4	20.1
	Vishay Intertechnology Inc	VSH.N	VSH US	31-Dec	2012	16.2	11.6	37.4	17.7	2.4	1.8	0.4	0.3	0.9	0.8	1.1	1.0	1.1	1.0	2.7	5.7
	Western Digital Corp	WDC.O	WDC US	30-Jun	2012	6.9	7.4	5.9	6.1	3.4	3.2	0.8	0.7	0.9	0.9	1.6	1.4	2.3	2.0	17.0	16.5
	Xerox Corp	XR.N	XRX US	31-Dec	2012	7.7	7.6	6.4	6.3	3.8	3.4	0.6	0.5	0.5	0.5	0.8	0.8	11.5	4.6	15.6	15.9
						11.5	11.7	20.5	12.2	6.3	5.5	1.0	0.9	1.3	1.2	2.2	1.9	2.9	1.7	8.4	9.2

Source: Citi Research

Figure 667. Comparable Valuation for Infrastructure/Service Providers Stocks

	Company	Reuters	B'berg	Fiscal	Last	PE (x)		Price / FCF (x)		EV / EBITDA (x)		EV / Sales (x)		Price / Sales (x)		Price / BV (x)		Price / Tang BV (x)		FCY Yield (%)	
	Name	Code	Code	Year End	Rep Yr	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
Infrastructure/Service Providers																					
Europe	Wirecard	WDIG.DE	WDI GR	31-Dec	2012	25.6	20.5	41.3	29.4	14.6	11.8	3.9	3.3	4.8	4.1	3.8	3.3	10.6	8.3	2.4	3.4
						25.6	20.5	41.3	29.4	14.6	11.8	3.9	3.3	4.8	4.1	3.8	3.3	10.6	8.3	2.4	3.4

Source: Citi Research

Figure 668. Comparable Valuation for Internet Stocks

	Company	Reuters	B'berg	Fiscal	Last	PE (x)		Price / FCF (x)		EV / EBITDA (x)		EV / Sales (x)		Price / Sales (x)		Price / BV (x)		Price / Tang BV (x)		FCY Yield (%)	
	Name	Code	Code	Year End	Rep Yr	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
Internet																					
Asia	Baidu.com	BIDU.O	BIDU US	31-Dec	2012	17.2	17.7	16.5	16.8	11.3	10.0	5.0	3.9	6.3	5.2	4.8	3.8	5.6	4.3	6.1	6.0
	Bitauto Holdings	BITA.N	BITA US	31-Dec	2012	13.8	11.0	24.4	14.5	9.0	6.6	1.6	1.2	2.1	1.6	2.3	1.9	2.5	2.0	4.1	6.9
	Ctrip.com International	CTRP.O	CTRP US	31-Dec	2011	18.9	16.2	15.8	14.5	17.8	15.1	2.4	1.9	4.1	3.6	2.4	2.1	2.8	2.4	6.3	6.9
	Daum Communications	035720.KQ	035720 KS	31-Dec	2011	12.2	10.6	11.5	10.1	6.8	5.6	2.0	1.7	2.2	2.0	2.1	1.8	2.4	2.1	8.7	9.9
	Giant Interactive Group	GA.N	GA US	31-Dec	2011	8.1	7.1	6.1	5.4	5.2	4.1	3.4	2.5	4.7	4.1	2.8	2.3	2.8	2.3	16.4	18.3
	Info Edge	INED.BO	INFOE IN	31-Mar	2012	36.5	27.4	83.8	27.6	24.3	17.1	7.0	5.7	8.5	7.3	5.5	4.5	5.6	4.6	1.2	3.6
	Jiayuan.com International	DATE.O	DATE US	31-Dec	2011	13.6	11.4	18.1	15.4	9.9	7.2	1.5	1.2	2.0	1.7	1.4	1.2	1.4	1.2	5.5	6.5
	NCsoft	036570.KS	036570 KS	31-Dec	2011	20.5	16.7	16.2	20.5	12.5	9.4	3.9	3.1	4.6	4.0	3.1	2.5	3.5	2.8	6.2	4.9
	NetEase.com	NTES.O	NTES US	31-Dec	2011	11.6	11.2	11.9	11.4	8.9	7.5	4.1	3.3	5.1	4.6	2.2	1.8	2.2	1.8	8.4	8.8
	NHN	035420.KS	035420 KS	31-Dec	2011	24.7	21.5	25.2	21.5	13.7	11.7	4.4	3.8	5.0	4.4	6.3	5.2	6.6	5.4	4.0	4.7
	Perfect World	PWRD.O	PWRD US	31-Dec	2012	8.9	8.5	6.1	6.1	4.5	3.9	1.1	0.9	1.4	1.5	0.8	0.8	1.0	0.9	16.3	16.4
	Qihoo 360 Technology	QIHU.N	QIHU US	31-Dec	2011	34.4	22.7	41.4	25.0	28.6	15.6	7.8	5.0	8.6	5.9	7.7	5.9	7.8	6.0	2.4	4.0
	Renren	RENN.N	RENN US	31-Dec	2011	(13.6)	(11.4)	(9.8)	(10.6)	(1.4)	(2.4)	0.5	0.8	5.0	4.1	1.0	1.1	1.1	1.2	(10.3)	(9.4)
	Shanda Games	GAME.O	GAME US	31-Dec	2011	4.0	3.8	3.8	3.6	2.4	1.8	0.8	0.6	1.1	1.1	1.0	0.9	1.3	1.1	26.4	28.0
	Sina	SINA.O	SINA US	31-Dec	2011	nm	78.2	78.2	55.0	49.8	29.7	4.2	3.5	6.4	5.5	3.3	3.1	3.3	3.2	1.3	1.8
	Sky-mobi	MOBI.O	MOBI US	31-Mar	2012	55.1	13.6	8.3	7.7	(25.8)	(11.3)	(0.4)	(0.3)	0.6	0.5	0.6	0.6	0.6	0.6	12.0	13.0
	Soufun Holdings	SFUN.N	SFUN US	31-Dec	2011	11.0	8.7	9.8	7.6	7.3	4.9	3.2	2.1	4.0	3.1	5.6	3.4	5.6	3.4	10.2	13.2
	Tencent Holdings	0700.HK	700 HK	31-Dec	2011	21.0	15.5	30.8	21.7	14.3	9.9	6.3	4.3	7.3	5.2	6.9	4.9	7.7	5.4	3.2	4.6
	Youku	YOKU.N	YOKU US	31-Dec	2011	nm	24.2	nm	23.5	nm	15.1	5.5	3.5	6.3	4.0	4.9	4.1	5.3	4.5	(0.0)	4.3
	YY	YY.O	YY US	31-Dec	2012	21.1	12.4	27.8	12.1	14.6	7.4	3.2	1.9	4.7	3.1	3.8	2.9	3.9	2.9	3.6	8.3
							17.7	16.3	22.4	15.5	11.2	8.5	3.4	2.5	4.5	3.6	3.4	2.7	3.7	2.9	6.6
Australia/NZ	SEEK Ltd	SEK.AX	SEK AU	30-Jun	2012	26.2	20.4	44.1	24.8	15.6	11.1	6.0	4.5	6.0	4.6	4.2	3.8	(27.5)	nm	2.3	4.0
						26.2	20.4	44.1	24.8	15.6	11.1	6.0	4.5	6.0	4.6	4.2	3.8	(27.5)	na	2.3	4.0
Europe	CDON Group	CDON.ST	CDON SS	31-Dec	2011	16.0	12.4	36.0	22.9	9.2	7.2	0.4	0.3	0.4	0.3	3.1	2.4	26.0	7.6	2.8	4.4
	Delticom	DEXGn.DE	DEX GR	31-Dec	2012	19.3	17.0	nm	21.3	10.9	10.0	0.8	0.8	0.9	0.8	10.3	10.4	10.5	10.6	(0.4)	4.7
	Moneysupermarket	MONY.L	MONY LN	31-Dec	2012	18.5	16.7	16.0	14.3	15.3	13.5	4.7	4.2	5.0	4.6	5.5	5.3	37.0	18.4	6.2	7.0
	Rightmove	RMV.L	RMV LN	31-Dec	2012	27.0	23.2	28.1	24.2	21.3	19.1	14.9	13.4	15.0	13.1	nm	nm	nm	nm	3.6	4.1
	United Internet AG	UTDI.DE	UTDI GR	31-Dec	2012	19.9	15.0	19.6	14.1	10.2	8.3	1.5	1.4	1.5	1.4	17.1	11.9	(15.4)	(25.2)	5.1	7.1
	Zooplus	ZO1G.DE	ZO1 GR	31-Dec	2011	82.3	22.1	nm	30.4	35.7	12.7	0.6	0.5	0.6	0.5	6.8	5.2	6.9	5.3	(0.9)	3.3
						30.5	17.7	24.9	21.2	17.1	11.8	3.8	3.4	3.9	3.4	8.6	7.1	13.0	3.3	2.7	5.1
Japan	CyberAgent	4751.T	4751 JP	30-Sep	2012	7.3	11.2	6.0	16.7	4.4	2.8	0.4	0.3	0.6	0.6	2.2	1.9	2.7	2.3	16.8	6.0
	DeNA	2432.T	2432 JP	31-Mar	2012	8.7	7.8	8.9	8.0	3.4	2.6	1.4	1.0	1.9	1.5	2.9	2.2	4.2	2.8	11.2	12.5
	Dwango	3715.T	3715 JP	30-Sep	2012	87.6	59.5	88.9	66.3	27.0	21.1	2.7	2.4	2.9	2.7	5.7	5.3	7.4	6.9	1.1	1.5
	Gree	3632.T	3632 JP	30-Jun	2012	9.2	8.7	15.3	21.4	4.0	3.5	1.4	1.1	1.9	1.5	2.7	2.1	3.8	2.8	6.5	4.7
	Kakaku.Com	2371.T	2371 JP	31-Mar	2012	44.4	35.1	41.3	23.7	23.4	17.3	11.8	9.3	13.1	10.6	14.1	10.8	14.8	11.2	2.4	4.2
	Mixi	2121.T	2121 JP	31-Mar	2012	15.8	12.4	16.7	15.5	3.9	3.0	0.8	0.7	1.6	1.4	1.5	1.4	1.7	1.6	6.0	6.4
	Rakuten	4755.OS	4755 JP	31-Dec	2011	24.2	20.7	51.4	25.9	13.1	11.2	3.5	3.2	3.0	2.8	4.4	3.7	18.6	11.3	1.9	3.9
	Yahoo Japan	4689.T	4689 JP	31-Mar	2012	24.5	22.9	26.6	25.0	12.5	11.0	7.3	6.2	8.3	7.2	5.2	4.4	5.5	4.6	3.8	4.0
						27.7	22.3	31.9	25.3	11.5	9.1	3.7	3.0	4.2	3.5	4.8	4.0	7.3	5.4	6.2	5.4

Source: Citi Research

Figure 669. Comparable Valuation for IT Services Stocks

	Company	Reuters	B'berg	Fiscal	Last	PE (x)		Price / FCF (x)		EV / EBITDA (x)		EV / Sales (x)		Price / Sales (x)		Price / BV (x)		Price / Tang BV (x)		FCY Yield (%)	
	Name	Code	Code	Year End	Rep Yr	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
IT Services																					
Asia	CSE Global	CSES.SI	CSE SP	31-Dec	2011	7.5	6.8	6.6	8.9	5.3	4.3	0.8	0.7	0.8	0.8	1.6	1.3	2.5	1.8	15.1	11.2
	HCL Technologies	HCLT.BO	HCLT IN	30-Jun	2012	14.0	13.0	21.5	18.1	8.7	7.9	1.9	1.6	2.1	1.9	3.7	3.0	5.6	4.0	4.6	5.5
	Infosys	INFY.BO	INFO IN	31-Mar	2012	14.0	13.4	35.1	19.6	9.2	8.1	2.6	2.2	3.3	2.9	3.3	2.8	3.3	2.8	2.8	5.1
	MindTree	MINT.BO	MTCL IN	31-Mar	2012	10.4	9.3	19.3	28.6	6.3	5.9	1.3	1.1	1.5	1.3	2.7	2.1	2.7	2.2	5.2	3.5
	SK C&C	034730.KS	034730 KS	31-Dec	2011	10.3	9.0	31.8	26.8	7.4	4.8	0.8	0.5	2.0	1.8	1.7	1.4	1.7	1.5	3.1	3.7
	Tata Consultancy Services	TCS.BO	TCS IN	31-Mar	2012	19.9	17.8	29.5	25.3	14.8	13.0	4.2	3.7	4.4	3.9	6.8	5.4	7.4	5.8	3.4	4.0
	Tech Mahindra	TEML.BO	TECHM IN	31-Mar	2012	10.6	9.1	28.9	11.8	7.2	6.7	1.5	1.3	1.9	1.7	2.4	1.9	2.6	2.1	3.5	8.5
	Wipro	WIPR.BO	WPRO IN	31-Mar	2012	13.2	12.2	9.9	38.3	9.1	8.4	1.8	1.7	2.0	1.9	3.1	2.6	3.8	3.2	10.1	2.6
						12.5	11.3	22.8	22.2	8.5	7.4	1.9	1.6	2.2	2.0	3.2	2.6	3.7	2.9	6.0	5.5
Europe	Accenture Ltd	ACN.N	ACN US	31-Aug	2012	18.7	17.0	20.2	14.9	10.2	9.8	1.7	1.6	1.9	1.8	9.1	7.8	18.7	14.5	5.0	6.7
	ATOS	ATOS.PA	ATO FP	31-Dec	2012	11.5	10.3	13.7	12.9	5.4	4.8	0.6	0.5	0.6	0.6	1.7	1.5	7.1	4.6	7.3	7.7
	Capgemini SA	CAPP.PA	CAP FP	31-Dec	2012	13.4	12.4	23.0	14.6	5.4	4.9	0.5	0.5	0.7	0.6	1.3	1.2	6.3	4.6	4.4	6.9
	Dassault Systemes SA	DAST.PA	DSY FP	31-Dec	2012	25.2	22.3	25.9	22.6	15.5	13.0	4.9	4.3	5.5	5.0	4.2	3.7	8.5	6.5	3.9	4.4
	Fidessa	FDSA.L	FDSA LN	31-Dec	2012	22.1	20.8	12.2	11.8	7.8	7.4	2.2	2.0	2.5	2.3	4.4	3.9	9.8	7.9	8.2	8.5
	Sage Group PLC	SGE.L	SGE LN	30-Sep	2012	15.5	13.8	17.5	13.6	10.5	10.4	3.1	3.2	2.9	2.6	4.7	5.4	(6.3)	(5.4)	5.7	7.4
	SAP AG	SAPG.DE	SAP GR	31-Dec	2012	18.2	16.0	23.2	18.3	14.3	12.1	4.4	3.9	4.2	3.8	4.5	3.9	nm	26.3	4.3	5.5
	SDL	SDL.L	SDL LN	31-Dec	2012	12.7	10.7	16.7	13.0	8.4	6.8	1.0	0.9	1.1	1.0	1.2	1.1	23.8	7.8	6.0	7.7
	Software AG	SOWG.DE	SOW GR	31-Dec	2012	13.0	12.1	13.7	13.6	8.8	8.4	2.3	2.2	2.2	2.1	2.3	2.0	35.2	10.2	7.3	7.4
						16.7	15.0	18.4	15.0	9.6	8.6	2.3	2.1	2.4	2.2	3.7	3.4	12.9	8.6	5.8	6.9
Japan	Nomura Research Institute	4307.T	4307 JP	31-Mar	2012	20.1	18.7	20.1	22.2	5.9	5.4	1.3	1.2	1.7	1.7	1.8	1.7	2.2	2.0	5.0	4.5
	NTT Data	9613.T	9613 JP	31-Mar	2012	22.6	17.9	27.6	24.5	5.1	4.8	0.8	0.8	0.7	0.6	1.4	1.3	6.4	5.6	3.6	4.1
	Oracle Japan	4716.T	4716 JP	31-May	2012	19.5	17.7	17.5	16.2	10.4	9.1	3.0	2.7	3.4	3.1	6.8	5.5	6.8	5.5	5.7	6.2
	Secom	9735.T	9735 JP	31-Mar	2012	20.5	18.6	21.5	17.8	5.3	4.9	1.1	1.0	1.6	1.6	1.8	1.7	1.9	1.8	4.7	5.6
	Trend Micro	4704.T	4704 JP	31-Dec	2011	24.0	22.8	23.4	22.2	7.4	6.9	2.3	2.2	3.9	3.9	3.0	2.8	3.3	3.2	4.3	4.5
						21.3	19.2	22.0	20.6	6.8	6.2	1.7	1.6	2.3	2.2	3.0	2.6	4.1	3.6	4.6	5.0
North America	Alliance Data Systems Corp	ADS.N	ADS US	31-Dec	2012	17.0	13.9	10.1	8.5	7.9	6.9	2.5	2.2	2.7	2.2	7.6	4.2	(7.6)	(86.0)	9.9	11.8
	Automatic Data Processing Inc	ADP.O	ADP US	30-Jun	2012	23.9	22.0	21.1	19.2	13.4	12.4	2.8	2.6	3.0	2.7	5.0	4.9	11.2	10.8	4.7	5.2
	Computer Sciences Corporation	CSC.N	CSC US	31-Mar	2012	13.5	12.8	19.8	12.1	4.1	3.7	0.5	0.5	0.5	0.5	2.1	1.9	9.1	5.9	5.0	8.3
	EPAM Systems, Inc.	EPAM.N	EPAM US	31-Dec	2012	14.3	12.0	33.2	22.2	10.2	7.4	1.6	1.3	2.0	1.6	2.9	2.4	3.2	2.6	3.0	4.5
	Fidelity National Info Svcs, Inc	FIS.N	FIS US	31-Dec	2012	15.1	13.5	15.0	12.9	8.9	8.3	2.7	2.5	2.0	1.9	1.8	1.7	(3.0)	(3.4)	6.6	7.8
	Fiserv, Inc.	FISV.O	FISV US	31-Dec	2012	14.6	13.1	15.9	12.4	9.6	8.8	3.0	2.9	2.3	2.2	2.9	2.5	(3.2)	(3.7)	6.3	8.1
	FleetCor Technologies Inc	FLT.N	FLT US	31-Dec	2012	20.9	18.3	24.8	20.7	14.4	12.1	8.5	7.5	8.1	7.4	5.4	4.3	(24.1)	50.0	4.0	4.8
	Global Payments, Inc.	GPN.N	GPN US	31-May	2012	12.8	11.5	12.4	10.6	7.7	6.8	1.6	1.5	1.5	1.4	3.0	2.4	(13.7)	nm	8.0	9.4
	Green Dot Corp	GDOT.N	GDOT US	31-Dec	2012	15.3	14.2	14.8	16.6	1.7	0.8	0.3	0.2	1.4	1.3	1.9	1.7	2.1	1.8	6.8	6.0
	NetSpend Holdings	NTSP.O	NTSP US	31-Dec	2012	20.4	17.5	22.0	18.1	9.2	7.3	2.7	2.2	3.1	2.8	6.1	4.4	30.5	9.8	4.6	5.5
	Paychex Inc	PAYX.O	PAYX US	31-May	2012	23.5	22.0	21.3	20.5	12.7	11.8	5.5	5.1	5.9	5.6	7.7	6.9	11.6	9.9	4.7	4.9
	Total System Services	TSS.N	TSS US	31-Dec	2012	16.7	14.8	16.0	12.5	7.7	6.7	2.2	1.9	2.3	2.1	2.8	2.5	6.1	5.2	6.3	8.0
	Vantiv, Inc.	VNTV.N	VNTV US	31-Dec	2012	15.3	13.4	13.7	11.9	11.9	10.1	5.6	4.8	4.1	3.7	5.5	4.6	(2.9)	(3.7)	7.3	8.4
	VeriFone Systems Inc	PAY.N	PAY US	31-Oct	2012	10.7	9.6	13.5	11.5	8.4	7.2	1.8	1.6	1.3	1.3	1.6	1.5	(5.8)	(18.4)	7.4	8.7
	West Corp	WSTC.O	WSTC US	31-Dec	2012	7.9	7.3	8.6	7.3	8.1	7.1	2.0	1.8	0.6	0.7	(2.3)	(2.9)	(0.6)	(0.7)	11.6	13.7
	Western Union Co.	WU.N	WU US	31-Dec	2012	11.1	9.8	13.6	10.8	5.7	5.2	1.4	1.3	1.6	1.5	7.2	5.9	(2.9)	(3.1)	7.3	9.3
	WEX Inc	WEX.N	WEX US	31-Dec	2012	16.3	14.9	(40.5)	44.6	8.6	7.5	4.3	3.7	3.9	3.6	2.7	2.2	(45.1)	16.5	(2.5)	2.2
						15.8	14.2	13.9	16.0	8.8	7.7	2.9	2.6	2.7	2.5	3.8	3.0	(2.1)	(0.4)	5.9	7.5

Source: Citi Research

Figure 670. Comparable Valuation for Semiconductors & Components Stocks

	Company	Reuters	B'berg	Fiscal	Last	PE (x)		Price / FCF (x)		EV / EBITDA (x)		EV / Sales (x)		Price / Sales (x)		Price / BV (x)		Price / Tang BV (x)		FCY Yield (%)	
	Name	Code	Code	Year End	Rep Yr	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
Semiconductors & Components																					
Asia	ASE	2311.TW	2311 TT	31-Dec	2012	12.7	10.3	13.2	9.2	5.5	4.8	1.2	1.1	0.9	0.9	1.7	1.5	1.7	1.5	7.6	10.8
	AU Optonics	2409.TW	2409 TT	31-Dec	2012	33.1	25.4	3.9	2.5	2.8	2.3	0.5	0.4	0.3	0.3	0.8	0.8	0.8	0.8	25.7	40.8
	Avago Technologies	AVGO.O	AVGO US	31-Oct	2012	12.7	10.8	15.5	10.2	9.0	7.0	2.7	2.2	3.3	2.9	2.8	2.3	3.4	2.7	6.4	9.8
	Chipbond Technology	6147.TWO	6147 TT	31-Dec	2012	13.8	12.4	9.6	10.9	7.4	6.8	2.6	2.2	2.6	2.3	2.3	2.1	2.3	2.1	10.4	9.2
	E Ink Holdings	8069.TWO	8069 TT	31-Dec	2011	nm	nm	10.4	13.8	5.2	4.3	0.5	0.5	1.0	1.4	1.0	1.0	1.0	1.0	9.6	7.3
	Innolux Corp	3481.TW	3481 TT	31-Dec	2011	22.7	18.6	3.2	2.9	3.3	2.5	0.6	0.5	0.3	0.3	0.9	0.8	0.9	0.8	31.3	35.0
	Kinsus Interconnect Technology	3189.TW	3189 TT	31-Dec	2011	15.3	13.5	23.1	16.3	6.4	5.4	1.6	1.4	1.9	1.7	1.8	1.7	1.8	1.7	4.3	6.1
	LG Display	034220.KS	034220 KS	31-Dec	2012	11.3	9.2	14.0	20.7	2.1	1.9	0.4	0.4	0.4	0.4	0.9	0.9	1.1	1.0	7.1	4.8
	MagnaChip Semiconductor	MX.N	MX US	31-Dec	2012	6.3	5.3	10.0	7.3	3.5	2.7	0.6	0.5	0.7	0.6	1.5	1.2	1.6	1.2	10.0	13.7
	Novatek	3034.TW	3034 TT	31-Dec	2011	19.1	18.6	14.1	19.9	13.2	12.6	2.0	1.8	2.3	2.2	3.6	3.5	3.6	3.5	7.1	5.0
	Powertech Technology	6239.TW	6239 TT	31-Dec	2012	11.8	10.5	5.9	5.9	2.9	2.6	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	17.1	17.0
	Radiant Opto-Electronics	6176.TW	6176 TT	31-Dec	2012	9.2	8.0	4.7	11.3	4.8	3.7	0.5	0.4	0.7	0.6	2.3	2.1	2.4	2.1	21.2	8.9
	Samsung Electronics	005930.KS	005930 KS	31-Dec	2012	6.6	5.9	10.4	8.1	3.0	2.3	0.8	0.6	1.0	0.9	1.5	1.2	1.6	1.2	9.6	12.3
	SPIIL	2325.TW	2325 TT	31-Dec	2012	20.1	12.4	10.7	11.3	5.4	4.4	1.4	1.2	1.6	1.4	1.8	1.7	1.8	1.7	9.3	8.8
	TPK	3673.TW	3673 TT	31-Dec	2012	11.2	12.2	nm	12.7	6.9	6.6	1.0	0.9	1.0	0.9	3.6	3.2	3.6	3.2	0.0	7.9
	Tripod Technology	3044.TW	3044 TT	31-Dec	2011	13.3	11.9	12.7	13.8	4.9	4.7	0.9	0.8	0.9	0.9	1.5	1.4	1.5	1.4	7.9	7.2
	TSMC	2330.TW	2330 TT	31-Dec	2012	14.7	13.6	35.1	73.6	7.1	6.0	4.5	3.9	4.7	4.1	3.4	2.9	3.4	2.9	2.8	1.4
	UMC	2303.TW	2303 TT	31-Dec	2011	24.4	31.0	nm	nm	2.7	2.3	0.8	0.8	1.2	1.1	0.7	0.7	0.7	0.7	(0.6)	0.5
	Unimicron	3037.TW	3037 TT	31-Dec	2012	13.1	11.2	73.1	7.9	4.2	3.9	0.8	0.6	0.7	0.6	1.0	0.9	1.0	0.9	1.4	12.6
	Vanguard International Semicon	5347.TWO	5347 TT	31-Dec	2012	16.1	16.0	11.7	12.4	7.0	6.7	2.1	1.9	2.7	2.7	2.2	2.0	2.2	2.0	8.5	8.1
	Wintek	2384.TW	2384 TT	31-Dec	2011	(38.7)	nm	48.4	15.0	6.0	5.0	0.6	0.6	0.3	0.3	0.8	0.8	0.8	0.8	2.1	6.7
	Young Fast	3622.TW	3622 TT	31-Dec	2011	24.0	20.7	(6.3)	30.8	2.6	2.3	0.3	0.3	0.5	0.4	0.8	0.7	0.8	0.7	(15.8)	3.2
						13.0	13.9	16.2	15.1	5.3	4.6	1.2	1.1	1.4	1.3	1.7	1.6	1.8	1.6	8.3	10.8
Europe	ARM Holdings PLC	ARM.L	ARM LN	31-Dec	2012	48.8	39.9	52.5	42.1	37.4	30.8	19.7	16.8	20.7	18.0	9.7	8.3	15.3	12.0	1.9	2.4
	ASML Holding NV	ASML.AS	ASML NA	31-Dec	2012	25.3	14.0	71.9	16.8	18.1	10.8	4.6	3.4	5.0	3.6	5.2	4.2	5.4	4.3	1.4	6.0
	CSR Plc	CSR.L	CSR LN	31-Dec	2012	17.0	17.0	19.1	25.1	7.4	7.6	1.1	1.1	1.4	1.5	1.9	1.8	3.2	2.8	5.2	4.0
	Infineon Technologies	IFXGn.DE	IFX GR	30-Sep	2012	41.0	20.1	48.8	22.3	6.8	5.3	1.3	1.2	2.0	1.8	2.0	1.9	2.1	1.9	2.0	4.5
	STMicroelectronics	STM.PA	STM FP	31-Dec	2012	28.9	17.4	22.8	10.1	7.6	4.9	0.8	0.8	0.9	0.9	1.4	1.3	1.4	1.4	4.4	9.9
	Wolfson	WLF.L	WLF LN	31-Dec	2012	36.5	17.5	(44.6)	11.8	25.4	11.1	1.4	1.2	1.6	1.4	2.5	2.1	3.2	2.5	(2.2)	8.5
						32.9	21.0	28.4	21.4	17.1	11.7	4.8	4.1	5.3	4.5	3.8	3.3	5.1	4.2	2.1	5.9
Japan	Alps Electric	6770.T	6770 JP	31-Mar	2012	(14.1)	14.3	3.7	3.7	5.6	4.9	0.3	0.4	0.2	0.2	1.1	1.0	1.2	1.1	26.8	27.1
	Asahi Glass	5201.T	5201 JP	31-Dec	2012	19.2	19.0	(22.8)	(41.9)	4.9	4.9	0.8	0.7	0.7	0.7	0.9	0.9	0.9	0.9	(4.4)	(2.4)
	Hirose Electric	6806.T	6806 JP	31-Mar	2012	37.0	29.9	39.1	38.2	10.3	8.9	2.9	2.6	5.0	4.6	2.2	2.1	2.2	2.1	2.6	2.6
	Hosiden	6804.OS	6804 JP	31-Mar	2012	nm	16.2	6.2	27.0	(3.6)	(0.6)	(0.1)	(0.0)	0.2	0.2	0.4	0.4	0.4	0.4	16.2	3.7
	Ibiden	4062.T	4062 JP	31-Mar	2012	87.9	20.8	35.3	23.5	3.3	3.0	0.6	0.6	0.8	0.9	0.9	0.9	1.0	0.9	2.8	4.2
	Kyocera	6971.T	6971 JP	31-Mar	2012	29.0	20.3	19.6	44.3	5.9	4.0	0.7	0.6	1.4	1.2	1.2	1.1	1.3	1.3	5.1	2.3
	Mabuchi Motor	6592.T	6592 JP	31-Dec	2012	25.7	20.2	nm	55.0	5.3	4.4	0.6	0.6	1.8	1.6	1.1	1.0	1.1	1.0	0.6	1.8
	Mitsumi Electric	6767.T	6767 JP	31-Mar	2012	(4.6)	(39.4)	(7.2)	(27.4)	(2.3)	(0.7)	(0.1)	(0.0)	0.3	0.3	0.5	0.5	0.5	0.5	(13.9)	(3.7)
	Murata	6981.OS	6981 JP	31-Mar	2012	46.0	28.1	82.7	36.8	10.8	8.6	2.0	1.7	2.5	2.2	2.2	2.1	2.2	2.1	1.2	2.7
	NGK Spark Plug	5334.T	5334 JP	31-Mar	2012	22.1	16.9	15.6	nm	7.5	5.4	1.0	0.9	1.3	1.2	1.5	1.4	1.5	1.4	6.4	(0.7)
	Nidec	6594.OS	6594 JP	31-Mar	2012	nm	22.0	(48.5)	78.7	18.1	11.1	1.4	1.3	1.4	1.2	2.5	2.3	4.0	3.6	(2.1)	1.3
	Nippon Electric Glass	5214.T	5214 JP	31-Mar	2012	31.8	nm	31.3	29.0	2.6	3.5	0.6	0.7	0.8	0.9	0.5	0.5	0.5	0.5	3.2	3.5
	Nippon Sheet Glass	5202.T	5202 JP	31-Mar	2012	(3.4)	(8.3)	(3.0)	(9.0)	9.2	5.1	0.3	0.3	0.2	0.2	0.7	0.8	0.7	0.8	(33.2)	(11.2)
	Rohm	6963.OS	6963 JP	31-Mar	2012	nm	nm	19.3	(55.3)	1.9	1.7	0.3	0.3	1.2	1.2	0.6	0.6	0.6	0.6	5.2	(1.8)
	Shinko Electric Industries	6967.T	6967 JP	31-Mar	2012	66.1	28.7	(32.7)	63.9	7.0	4.6	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0	(3.1)	1.6
	SUMCO	3436.T	3436 JP	31-Dec	2012	17.1	6.7	23.8	9.9	8.7	6.3	2.2	1.8	1.3	1.1	1.5	1.2	1.5	1.2	4.2	10.1
	Taiyo Yuden	6976.T	6976 JP	31-Mar	2012	43.3	23.1	7.0	6.3	7.2	5.6	0.9	0.9	0.8	0.8	1.5	1.4	1.5	1.4	14.2	15.8
	TDK	6762.T	6762 JP	31-Mar	2012	90.3	22.6	16.6	22.7	4.2	3.6	0.5	0.5	0.6	0.6	0.8	0.8	1.0	1.0	6.0	4.4
						32.9	15.1	10.9	18.0	5.9	4.7	0.9	0.8	1.2	1.1	1.2	1.1	1.3	1.2	2.1	3.4

Source: Citi Research

Figure 671. Comparable Valuation for Semiconductors & Components Stocks

	Company	Reuters	B'berg	Fiscal	Last	PE (x)		Price / FCF (x)		EV / EBITDA (x)		EV / Sales (x)		Price / Sales (x)		Price / BV (x)		Price / Tang BV (x)		FCY Yield (%)	
	Name	Code	Code	Year End	Rep Yr	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
Semiconductors & Components																					
North America	Advanced Micro Devices	AMD.N	AMD US	31-Dec	2012	(11.2)	22.9	(7.4)	nm	14.9	5.7	0.7	0.6	0.6	0.5	6.5	4.2	(11.2)	nm	(13.6)	0.5
	Altera Corp	ALTR.O	ALTR US	31-Dec	2012	22.2	20.8	18.9	16.9	12.4	10.5	3.9	3.4	5.9	5.5	2.8	2.5	2.8	2.5	5.3	5.9
	Amkor Technology Inc	AMKR.O	AMKR US	31-Dec	2012	7.5	6.7	(6.3)	(7.7)	3.0	3.1	0.7	0.7	0.3	0.3	0.9	0.8	0.9	0.8	(16.0)	(13.1)
	Analog Devices	ADI.O	ADI US	31-Oct	2012	20.8	17.0	19.0	15.8	11.0	8.4	3.9	3.2	5.2	4.9	2.7	2.3	2.9	2.5	5.3	6.3
	Applied Materials Inc	AMAT.O	AMAT US	31-Oct	2012	30.5	16.7	46.4	12.2	13.9	8.8	2.3	1.9	2.4	2.0	2.5	2.2	7.8	5.5	2.2	8.2
	ATMI Inc	ATMI.O	ATMI US	31-Dec	2012	15.3	14.2	nm	9.4	5.7	4.9	1.2	1.1	1.6	1.6	1.2	1.1	1.4	1.2	0.7	10.7
	Broadcom Corporation	BRCM.O	BRCM US	31-Dec	2012	22.0	19.3	14.3	12.9	13.5	10.9	1.9	1.7	2.5	2.4	2.0	1.8	5.1	3.7	7.0	7.7
	Brooks Automation Inc	BRKS.O	BRKS US	30-Sep	2012	37.4	19.1	(56.4)	13.5	11.8	8.0	0.9	0.8	1.3	1.2	1.0	0.9	1.2	1.1	(1.8)	7.4
	Cypress Semiconductor Corp	CY.O	CY US	31-Dec	2012	32.8	16.8	14.8	17.6	13.5	9.0	2.0	1.7	2.2	1.9	9.3	7.4	30.2	16.4	6.8	5.7
	Entegris Inc	ENTG.O	ENTG US	31-Dec	2012	20.2	16.6	nm	20.6	8.0	6.4	1.5	1.3	2.0	1.9	1.8	1.6	1.9	1.7	0.6	4.9
	Fairchild Semiconductor	FCS.N	FCS US	31-Dec	2012	24.9	11.3	30.4	9.3	8.2	5.2	1.1	1.0	1.2	1.1	1.2	1.1	1.4	1.3	3.3	10.7
	FormFactor Inc	FORM.O	FORM US	31-Dec	2012	(16.7)	(44.4)	nm	12.2	(23.4)	1.0	0.3	0.1	1.2	1.1	0.8	0.8	0.8	0.8	(0.9)	8.2
	Freescale Semiconductor Holdi	FSL.N	FSL US	31-Dec	2012	78.9	11.9	15.8	8.1	11.4	8.6	2.3	2.1	0.9	0.9	(0.9)	(1.0)	(0.9)	(0.9)	6.3	12.3
	Integrated Device Technology I	IDTI.O	IDTI US	31-Mar	2013	34.3	23.5	18.7	26.1	13.4	10.7	1.6	1.6	2.2	2.2	1.7	1.6	2.4	2.2	5.3	3.8
	Intel Corp	INTC.O	INTC US	31-Dec	2012	13.2	13.6	(49.5)	nm	8.9	9.2	2.1	2.0	2.3	2.2	2.2	2.1	3.3	3.1	(2.0)	(0.9)
	International Rectifier	IRF.N	IRF US	30-Jun	2012	(19.4)	86.1	nm	31.2	35.0	8.7	1.2	1.1	1.6	1.5	1.3	1.2	1.4	1.3	0.6	3.2
	Intersil Corporation	ISIL.O	ISIL US	31-Dec	2012	71.2	nm	18.5	13.8	17.4	15.2	1.5	1.5	1.8	1.8	1.1	1.1	3.0	3.0	5.4	7.2
	KLA Tencor Corp	KLAC.O	KLAC US	30-Jun	2012	16.8	13.9	10.5	13.4	8.6	6.7	2.5	2.1	3.3	3.0	2.6	2.3	2.9	2.5	9.6	7.4
	Lam Research Corp	LRCX.O	LRCX US	30-Jun	2012	21.0	12.1	21.5	12.6	11.9	6.7	1.8	1.5	2.2	1.7	1.7	1.4	3.7	2.7	4.6	7.9
	Linear Technology	LLTC.O	LLTC US	30-Jun	2012	21.9	20.7	17.5	17.5	13.2	12.0	6.4	5.8	6.9	6.6	8.3	6.9	8.3	6.9	5.7	5.7
	Marvell Technology Group Ltd.	MRVL.O	MRVL US	31-Jan	2013	12.4	14.0	9.4	25.7	7.5	8.6	1.0	1.1	2.0	1.8	1.3	1.2	2.4	2.1	10.7	3.9
	Maxim Integrated	MXIM.O	MXIM US	30-Jun	2012	17.5	15.5	16.1	15.0	9.9	8.5	3.4	3.0	3.8	3.5	3.7	3.5	4.8	4.4	6.2	6.7
	Microchip Technology	MCHP.O	MCHP US	31-Mar	2013	23.0	18.2	42.7	20.3	21.7	13.8	3.9	3.5	4.8	4.3	3.5	3.4	6.2	5.8	2.3	4.9
	Micron Technology Inc	MU.O	MU US	31-Aug	2012	(23.0)	7.8	(19.5)	5.1	5.0	2.8	1.3	1.0	1.1	0.9	1.3	1.1	1.4	1.2	(5.1)	19.7
	NVIDIA Corp	NVDA.O	NVDA US	31-Jan	2013	15.4	17.0	13.5	7.6	5.9	5.6	1.2	1.1	2.0	2.0	1.8	1.7	2.2	2.0	7.4	13.1
	ON Semiconductor	ONNN.O	ONNN US	31-Dec	2012	16.2	11.7	21.2	10.4	8.2	6.5	1.4	1.2	1.3	1.2	2.3	1.9	3.2	2.5	4.7	9.6
	Qualcomm Inc	QCOM.O	QCOM US	30-Sep	2012	14.2	13.3	17.0	15.2	9.6	7.8	3.3	2.7	4.6	4.1	2.7	2.3	3.0	2.5	5.9	6.6
	Semtech	SMT.C	SMTC US	31-Jan	2013	19.1	14.6	27.7	14.9	12.6	11.2	3.6	3.2	3.8	3.3	2.8	2.3	20.6	6.9	3.6	6.7
	Silicon Laboratories	SLAB.O	SLAB US	31-Dec	2012	17.1	14.2	21.1	18.1	13.0	9.9	2.4	2.0	2.9	2.6	2.2	1.8	3.0	2.4	4.7	5.5
	Spanion Inc.	CODE.N	CODE US	31-Dec	2012	12.4	9.7	25.2	6.2	5.7	4.7	0.9	0.8	0.8	0.8	1.2	1.2	2.4	1.9	4.0	16.1
	Teradyne Inc	TER.N	TER US	31-Dec	2012	12.2	8.5	43.6	6.6	5.7	3.6	1.4	1.0	2.2	1.8	1.5	1.3	2.2	1.6	2.3	15.2
	Texas Instruments Inc	TXN.O	TXN US	31-Dec	2012	19.8	16.1	2.8	12.6	11.3	9.9	3.5	3.5	3.4	3.3	4.2	4.9	16.7	32.0	35.4	7.9
	Xilinx Inc	XLNX.O	XLNX US	31-Mar	2013	21.4	18.8	16.6	17.2	10.6	8.8	3.6	3.2	4.8	4.6	3.4	2.9	3.6	3.1	6.0	5.8
						18.8	15.6	12.6	13.9	10.3	7.9	2.1	1.9	2.6	2.4	2.5	2.2	4.3	4.0	3.7	7.0

Source: Citi Research

Figure 672. Comparable Valuation for Software Stocks

	Company	Reuters	B'berg	Fiscal	Last	PE (x)		Price / FCF (x)		EV / EBITDA (x)		EV / Sales (x)		Price / Sales (x)		Price / BV (x)		Price / Tang BV (x)		FCY Yield (%)		
	Name	Code	Code	Year End	Rep Yr																	
						2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	
Software																						
CEEMEA	CheckPoint Software Technolog	CHKP.O	CHKP US	31-Dec	2012	13.7	12.3	10.8	9.5	7.6	6.8	4.3	3.8	6.8	6.1	2.6	2.5	3.3	3.1	9.3	10.5	
						13.7	12.3	10.8	9.5	7.6	6.8	4.3	3.8	6.8	6.1	2.6	2.5	3.3	3.1	9.3	10.5	
Europe	AVEVA Plc	AVV.L	AVV LN	31-Mar	2012	30.4	26.4	30.7	26.3	18.9	16.5	6.1	5.4	7.0	6.3	6.1	5.3	8.2	6.7	3.3	3.8	
	Micro Focus International Plc	MCRO.L	MCRO LN	30-Apr	2012	13.1	11.5	12.5	10.5	9.0	8.8	4.2	4.2	4.1	3.6	53.8	(95.4)	(4.6)	(3.9)	8.0	9.5	
	Telecity Group Plc	TCY.L	TCY LN	31-Dec	2012	25.9	21.9	98.0	30.2	13.9	11.8	6.6	5.7	5.9	5.2	4.6	3.8	7.1	5.5	1.0	3.3	
						23.1	19.9	47.0	22.3	13.9	12.4	5.6	5.1	5.7	5.1	21.5	(28.8)	3.6	2.8	4.1	5.5	
North America	Adobe Systems Inc.	ADBE.O	ADBE US	30-Nov	2012	32.7	20.2	23.7	19.8	26.5	14.6	5.2	4.1	5.9	4.9	3.4	3.1	10.3	7.6	4.2	5.0	
	Autodesk, Inc.	ADSK.O	ADSK US	31-Jan	2013	20.6	18.4	17.3	12.4	14.9	12.4	3.1	2.9	4.0	3.6	4.4	4.5	8.2	8.0	5.8	8.1	
	BMC Software, Inc.	BMC.O	BMC US	31-Mar	2012	13.4	12.7	10.0	10.2	7.6	7.9	2.6	2.7	3.2	2.9	10.0	8.0	(4.8)	(4.9)	10.0	9.8	
	CA Inc.	CA.O	CA US	31-Mar	2012	11.3	11.2	9.2	8.1	6.2	6.2	2.4	2.4	2.7	2.6	2.3	2.2	(7.3)	(8.0)	10.8	12.4	
	Citrix Systems, Inc.	CTXS.O	CTXS US	31-Dec	2012	20.6	18.1	15.3	13.3	15.0	12.2	3.5	3.0	4.1	3.8	3.6	3.5	10.7	8.4	6.5	7.5	
	Fortinet, Inc.	FTNT.O	FTNT US	31-Dec	2012	37.1	30.2	17.9	15.0	21.3	15.4	3.5	2.6	5.2	4.6	4.5	3.6	4.5	3.7	5.6	6.7	
	Guidewire Software, Inc.	GWRE.N	GWRE US	31-Jul	2012	81.5	nm	nm	nm	nm	84.5	7.2	6.0	8.8	7.9	9.0	8.2	9.0	8.2	0.8	0.8	
	Intuit Inc.	INTU.O	INTU US	31-Jul	2012	18.0	16.4	15.0	13.7	11.4	10.0	3.8	3.3	3.9	3.6	5.0	4.3	15.4	10.8	6.7	7.3	
	Jive Software, Inc.	JIVE.O	JIVE US	31-Dec	2012	(24.9)	(42.1)	nm	nm	(14.3)	(17.2)	5.5	4.0	6.6	5.2	12.0	15.9	19.2	27.9	0.0	0.2	
	Microsoft Corp.	MSFT.O	MSFT US	30-Jun	2012	12.0	11.6	10.8	9.1	6.5	5.9	2.7	2.4	3.6	3.4	3.5	2.9	4.5	3.6	9.3	11.0	
	Oracle Corporation	ORCL.O	ORCL US	31-May	2012	12.4	11.2	12.6	10.6	8.0	7.5	3.8	3.5	4.3	4.0	3.4	2.9	11.6	7.0	7.9	9.4	
	Palo Alto Networks, Inc.	PANW.N	PANW US	31-Jul	2012	nm	nm	(50.6)	39.1	nm	92.7	8.5	6.1	10.8	8.5	14.5	12.5	15.0	12.9	(2.0)	2.6	
	Qlik Technologies Inc.	QLIK.O	QLIK US	31-Dec	2012	69.6	39.6	93.8	39.0	65.9	31.0	4.4	3.6	4.9	4.3	8.2	6.6	8.6	6.8	1.1	2.6	
	Red Hat, Inc.	RHT.N	RHT US	28-Feb	2013	40.4	36.5	25.5	22.3	30.5	26.4	6.1	5.1	7.3	6.3	6.3	5.4	14.0	10.3	3.9	4.5	
	salesforce.com, inc.	CRM.N	CRM US	31-Jan	2013	nm	81.2	44.8	37.6	nm	nm	7.8	5.8	8.2	6.9	10.4	9.1	29.4	19.1	2.2	2.7	
	ServiceNow, Inc.	NOW.N	NOW US	31-Dec	2012	nm	nm	nm	57.3	nm	nm	12.7	7.8	14.2	10.1	19.0	16.0	20.4	17.4	0.6	1.7	
	Sourcefire, Inc.	FIRE.O	FIRE US	31-Dec	2012	57.9	48.1	43.5	37.8	50.8	32.5	5.4	4.3	6.4	5.5	5.8	5.4	6.2	5.7	2.3	2.6	
	Symantec Corp.	SYMC.O	SYMC US	31-Mar	2012	14.4	12.8	11.0	10.3	7.8	6.4	2.3	2.1	2.5	2.5	3.2	2.7	(10.5)	(27.7)	9.1	9.7	
	Verisign, Inc.	VRSN.O	VRSN US	31-Dec	2012	21.4	19.8	15.8	15.4	10.0	9.2	6.3	5.7	7.8	7.1	(45.8)	(23.1)	(34.5)	(19.7)	6.3	6.5	
	VMware, Inc.	VMW.N	VMW US	31-Dec	2012	22.9	20.0	17.9	15.0	20.4	15.3	5.2	4.3	6.3	5.7	4.6	3.8	9.9	6.7	5.6	6.6	
	Web.Com Group	WWWV.O	WWWV U	31-Dec	2012	9.4	8.3	11.8	7.6	16.1	9.5	3.1	2.4	2.0	1.7	7.4	4.5	(1.1)	(1.3)	8.5	13.1	
	WebSense, Inc.	WBSN.O	WBSN US	31-Dec	2012	19.3	17.8	12.3	17.7	12.8	12.0	1.8	1.7	1.9	1.8	6.1	5.2	(2.4)	(2.6)	8.2	5.7	
	Workday Inc	WDAY.N	WDAY US	31-Jan	2013	(44.5)	(87.3)	nm	(95.1)	nm	(83.2)	37.6	23.1	17.0	24.8	18.2	22.6	19.1	23.7	(0.1)	(1.1)	
							22.3	15.2	18.8	15.1	17.6	14.8	6.3	4.7	6.2	5.7	5.2	5.6	6.7	5.4	4.9	5.9

Source: Citi Research

Figure 673. Comparable Valuation for Technology - General Stocks

	Company	Reuters	B'berg	Fiscal	Last	PE (x)		Price / FCF (x)		EV / EBITDA (x)		EV / Sales (x)		Price / Sales (x)		Price / BV (x)		Price / Tang BV (x)		FCY Yield (%)	
	Name	Code	Code	Year End	Rep Yr	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
Technology - General																					
Asia	AAC Technologies Holdings	2018.HK	2018 HK	31-Dec	2011	17.3	16.0	21.2	18.1	14.4	13.1	4.8	4.6	4.9	4.8	5.3	4.6	5.3	4.6	4.7	5.5
	Chicony Electronics	2385.TW	2385 TT	31-Dec	2012	12.9	11.4	15.7	15.6	9.4	8.1	0.8	0.7	0.8	0.7	3.1	2.8	3.1	2.9	6.4	6.4
	Delta Electronics	2308.TW	2308 TT	31-Dec	2011	21.6	19.2	19.0	17.0	11.6	10.2	1.8	1.5	2.0	1.8	3.9	3.6	3.9	3.6	5.3	5.9
	Foxconn International Holdings	2038.HK	2038 HK	31-Dec	2011	12.0	5.5	(31.0)	7.1	3.3	2.0	0.1	0.1	0.2	0.2	0.8	0.7	0.8	0.7	(3.2)	14.1
	Foxconn Technology	2354.TW	2354 TT	31-Dec	2011	12.8	13.3	9.1	4.6	5.6	4.5	0.5	0.4	0.7	0.7	1.5	1.4	1.5	1.4	11.0	21.6
	Hon Hai Precision	2317.TW	2317 TT	31-Dec	2011	8.4	6.8	8.1	6.6	3.0	2.1	0.2	0.1	0.2	0.2	1.1	1.0	1.1	1.0	12.4	15.3
	LG Electronics	066570.KS	066570 KS	31-Dec	2012	11.2	9.9	nm	30.3	4.7	4.7	0.3	0.3	0.2	0.2	1.1	1.0	1.3	1.2	0.7	3.3
	LG Innotek	011070.KS	011070 KS	31-Dec	2012	18.5	13.0	nm	19.1	5.7	5.2	0.5	0.5	0.3	0.2	1.3	1.2	1.4	1.2	0.7	5.2
	Samsung Electro-Mechanics	009150.KS	009150 KS	31-Dec	2012	15.5	14.7	nm	31.0	5.2	4.9	0.7	0.7	0.8	0.7	1.7	1.6	1.9	1.7	0.1	3.2
	Samsung SDI	006400.KS	006400 KS	31-Dec	2011	15.0	11.8	(19.8)	(15.2)	0.1	0.1	0.0	0.0	1.0	0.9	0.7	0.7	0.7	0.7	(5.0)	(6.6)
	Samsung Techwin	012450.KS	012450 KS	31-Dec	2011	23.9	16.0	40.5	23.1	12.5	9.1	1.0	0.8	1.1	0.9	2.1	1.9	2.5	2.2	2.5	4.3
	Simplo Technology	6121.TWO	6121 TT	31-Dec	2012	11.2	10.5	8.8	14.2	6.7	5.6	0.5	0.4	0.6	0.5	2.0	1.7	2.0	1.7	11.3	7.1
	SK Hynix	000660.KS	000660 KS	31-Dec	2012	7.3	6.1	10.4	9.4	3.5	2.8	1.7	1.4	1.5	1.3	1.6	1.3	1.8	1.4	9.6	10.7
	Venture	VENM.SI	VMS SP	31-Dec	2012	12.2	11.3	12.5	12.8	7.5	7.0	0.6	0.6	0.8	0.7	1.1	1.1	1.8	1.8	8.0	7.8
	WPG Holdings	3702.TW	3702 TT	31-Dec	2012	12.7	11.9	(9.8)	nm	14.9	14.8	0.2	0.2	0.2	0.1	1.5	1.5	1.5	1.5	(10.2)	0.0
						14.2	11.8	7.0	13.8	7.2	6.3	0.9	0.8	1.0	0.9	1.9	1.7	2.1	1.8	3.6	6.9
Japan	Fujitsu	6702.T	6702 JP	31-Mar	2012	(8.5)	11.6	(37.8)	5.4	2.4	2.2	0.2	0.2	0.2	0.2	1.1	1.0	1.5	1.3	(2.6)	18.6
	GS Yuasa	6674.T	6674 JP	31-Mar	2012	18.9	13.0	(12.5)	(23.1)	7.9	6.2	0.7	0.7	0.6	0.5	1.4	1.3	1.4	1.3	(8.0)	(4.3)
	Hitachi	6501.T	6501 JP	31-Mar	2012	18.7	12.7	11.7	8.5	5.5	5.0	0.5	0.5	0.3	0.3	1.4	1.2	14.5	16.7	8.6	11.8
	Mitsubishi Electric	6503.T	6503 JP	31-Mar	2012	30.4	15.9	(38.9)	20.1	6.4	5.7	0.5	0.5	0.6	0.6	1.6	1.5	2.1	1.9	(2.6)	5.0
	NEC	6701.T	6701 JP	31-Mar	2012	18.0	14.2	35.9	8.5	3.6	3.4	0.2	0.2	0.2	0.2	0.9	0.9	1.4	1.2	2.8	11.7
	Toshiba	6502.T	6502 JP	31-Mar	2012	19.5	11.7	17.1	12.6	7.5	5.9	0.6	0.6	0.4	0.4	2.6	2.2	(6.0)	(10.3)	5.8	7.9
						16.2	13.2	(4.1)	5.3	5.6	4.7	0.5	0.4	0.4	0.4	1.5	1.4	2.5	2.0	0.7	8.4
North America	Ingram Micro Inc	IM.N	IM US	31-Dec	2012	8.3	7.1	14.8	9.0	4.5	3.8	0.1	0.1	0.1	0.1	0.7	0.7	0.9	0.8	6.8	11.1
	Synnex Corp	SNX.N	SNX US	30-Nov	2012	9.0	8.1	5.7	73.0	4.8	4.0	0.1	0.1	0.1	0.1	0.9	0.8	1.1	1.0	17.5	1.4
	Tech Data Corp	TECD.O	TECD US	31-Jan	2013	9.8	9.6	37.4	10.6	4.6	5.1	0.1	0.1	0.1	0.1	0.9	0.8	1.2	1.1	2.7	9.4
						9.0	8.3	19.3	30.9	4.6	4.3	0.1	0.1	0.1	0.1	0.8	0.8	1.1	1.0	9.0	7.3

Source: Citi Research

Figure 674. Comparable Valuation for Telecommunications Equipment Stocks

	Company	Reuters	B'berg	Fiscal	Last	PE (x)		Price / FCF (x)		EV / EBITDA (x)		EV / Sales (x)		Price / Sales (x)		Price / BV (x)		Price / Tang BV (x)		FCY Yield (%)	
	Name	Code	Code	Year End	Rep Yr	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
Telecommunications Equipment																					
Asia	ZTE	0763.HK	763 HK	31-Dec	2012	14.9	12.2	43.7	24.3	6.1	5.8	0.4	0.3	0.4	0.3	1.5	1.4	1.6	1.4	2.3	4.1
						14.9	12.2	43.7	24.3	6.1	5.8	0.4	0.3	0.4	0.3	1.5	1.4	1.6	1.4	2.3	4.1
Europe	Alcatel-Lucent	ALUA.PA	ALU FP	31-Dec	2012	(5.8)	nm	(10.4)	(6.4)	2.1	1.8	0.1	0.1	0.2	0.2	1.3	1.7	(0.7)	(0.6)	(9.6)	(15.5)
	EI Towers SpA	EIT.MI	EIT IM	31-Dec	2012	27.8	24.1	12.2	11.5	9.2	8.3	3.9	3.6	3.2	3.1	1.4	1.3	16.9	13.8	8.2	8.7
	Ericsson LM	ERICB.ST	ERICB SS	31-Dec	2012	13.3	13.4	10.7	22.0	9.0	7.3	1.0	0.9	1.1	1.1	1.8	1.7	2.8	2.6	9.3	4.5
	Nokia Oyj	NOK1V.HE	NOK1V FH	31-Dec	2012	(48.7)	16.8	(89.4)	25.4	5.8	2.0	0.2	0.1	0.4	0.3	1.3	1.2	3.8	3.2	(1.1)	3.9
	Spirent Communications Plc	SPT.L	SPT LN	31-Dec	2012	17.3	15.1	16.8	14.4	9.0	7.6	2.3	2.1	2.8	2.7	2.6	2.3	4.3	3.6	6.0	6.9
						0.8	17.3	(12.0)	13.4	7.0	5.4	1.5	1.4	1.5	1.5	1.7	1.7	5.4	4.5	2.5	1.7
North America	Adtran Technology	ADTN.O	ADTN US	31-Dec	2012	27.9	19.1	20.8	15.5	10.0	6.4	1.3	1.1	2.1	2.0	1.9	1.7	1.9	1.7	4.8	6.4
	ARRIS Group, Inc.	ARRS.O	ARRS US	31-Dec	2012	10.5	7.8	(6.7)	8.1	7.6	6.5	0.8	0.8	0.6	0.5	1.4	1.3	(2.8)	(9.9)	(14.9)	12.4
	Ciena Corp	CIEN.O	CIEN US	31-Oct	2012	22.0	10.6	52.9	9.7	8.9	6.0	1.1	0.9	0.9	1.0	(20.2)	67.2	(6.0)	(17.8)	1.9	10.3
	Corning Incorporated	GLW.N	GLW US	31-Dec	2012	11.5	10.6	12.2	17.4	5.5	5.3	1.8	1.7	2.6	2.4	1.0	1.0	1.1	1.0	8.2	5.8
	Finisar Corp	FNSR.O	FNSR US	30-Apr	2012	22.0	13.5	57.7	22.8	8.5	6.2	1.1	0.9	1.4	1.2	1.6	1.5	2.0	1.8	1.7	4.4
	Infinera Corp	INFN.O	INFN US	31-Dec	2012	(72.5)	nm	(48.8)	30.8	43.3	18.1	1.5	1.4	1.9	1.8	2.9	2.8	2.9	2.8	(2.0)	3.2
	JDSU Corp	JDSU.O	JDSU US	30-Jun	2012	24.4	18.5	50.9	53.4	9.8	9.0	1.6	1.4	1.9	1.7	3.1	3.0	4.0	3.7	2.0	1.9
	Polycom Inc	PLCM.O	PLCM US	31-Dec	2012	18.8	15.1	13.9	14.9	9.8	6.9	0.8	0.6	1.3	1.2	1.3	1.2	2.1	1.9	7.2	6.7
	Tellabs Inc	TLAB.O	TLAB US	31-Dec	2012	(66.4)	51.1	nm	nm	28.4	3.6	0.2	0.2	0.9	0.9	0.8	0.8	0.9	0.9	(0.3)	0.9
						(0.2)	18.3	19.1	21.6	14.7	7.6	1.1	1.0	1.5	1.4	(0.7)	9.0	0.7	(1.5)	0.9	5.8

Source: Citi Research

Figure 675. Growth Rates and Key Ratios for Consumer Electronics Stocks

	Company	Reuters	B'berg	Fiscal	Last	EPS Growth (%)		Revenue Growth (%)		EBIT Growth (%)		ROE (%)		ROA (%)		Net Debt / Cap (%)		Net Debt / Eq (%)	
	Name	Code	Code	Year End	Rep Yr	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
Consumer Electronics																			
Asia	VTech Holdings	0303.HK	303 HK	31-Mar	2012	5.0	12.2	4.1	6.5	5.0	12.6	37.2	41.6	22.3	24.3	nm	nm	(61.8)	(63.3)
						5.0	12.2	4.1	6.5	5.0	12.6	37.2	41.6	22.3	24.3	na	na	(61.8)	(63.3)
Japan	Casio Computer	6952.T	6952 JP	31-Mar	2012	nm	9.1	6.6	0.1	nm	7.5	7.3	7.6	3.0	3.3	4.0	(0.2)	4.1	(0.2)
	Funai Electric	6839.OS	6839 JP	31-Mar	2012	39.5	nm	(21.8)	13.7	nm	nm	(2.3)	1.8	(1.6)	1.2	(82.0)	(24.9)	(45.1)	(19.9)
	Panasonic	6752.T	6752 JP	31-Mar	2012	3.8	nm	(8.5)	(6.3)	nm	78.9	(45.6)	3.5	(12.0)	0.8	39.4	36.5	65.0	57.4
	Pioneer	6773.T	6773 JP	31-Mar	2012	nm	nm	1.2	(1.2)	(68.0)	nm	(17.8)	6.0	(4.7)	1.7	44.8	40.4	81.2	67.7
	Sharp	6753.T	6753 JP	31-Mar	2012	(18.9)	97.2	(0.3)	8.1	nm	nm	nm	(6.8)	(19.1)	(0.6)	82.9	83.5	nm	nm
	Sony	6758.T	6758 JP	31-Mar	2012	nm	nm	2.7	3.8	nm	22.4	0.6	2.8	0.1	0.4	(17.4)	(26.5)	(14.8)	(21.0)
						8.2	53.2	(3.4)	3.1	(68.0)	36.3	(11.6)	2.5	(5.7)	1.1	11.9	18.1	18.1	16.8

Source: Citi Research

Figure 676. Growth Rates and Key Ratios for Hardware Stocks

	Company Name	Reuters Code	B'berg Code	Fiscal Year End	Last Rep Yr	EPS Growth (%)		Revenue Growth (%)		EBIT Growth (%)		ROE (%)		ROA (%)		Net Debt / Cap (%)		Net Debt / Eq (%)	
						2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
Hardware																			
Asia	Acer	2353.TW	2353 TT	31-Dec	2011	nm	nm	(11.4)	4.5	(75.8)	nm	0.5	(0.2)	0.2	(0.1)	(72.1)	(74.4)	(41.9)	(42.7)
	ASUSTeK Computer	2357.TW	2357 TT	31-Dec	2012	(6.1)	(0.5)	3.0	(4.6)	21.6	(6.2)	16.2	15.2	7.8	7.7	(74.8)	(86.1)	(42.8)	(46.3)
	Catcher Technology	2474.TW	2474 TT	31-Dec	2011	(5.3)	5.7	7.7	7.0	10.6	3.4	15.9	15.1	9.8	9.6	(32.4)	(36.6)	(24.5)	(26.8)
	Compal Electronics	2324.TW	2324 TT	31-Dec	2011	11.3	20.0	6.3	3.4	0.3	12.3	6.5	7.3	2.3	2.6	(26.5)	(33.1)	(21.0)	(24.9)
	Flextronics International Ltd	FLEX.O	FLEX US	31-Mar	2013	(0.5)	(7.8)	(19.8)	6.9	(10.7)	4.2	14.3	19.0	3.0	4.0	17.6	12.3	21.4	14.0
	HTC	2498.TW	2498 TT	31-Dec	2012	(37.4)	(9.5)	(12.1)	(7.0)	(40.3)	(10.2)	13.0	11.4	4.8	4.2	nm	nm	(76.1)	(69.1)
	Kingboard Laminates Holdings	1888.HK	1888 HK	31-Dec	2012	24.9	18.9	17.9	11.6	33.7	16.9	11.9	13.1	7.4	8.3	(2.7)	(8.3)	(2.6)	(7.6)
	Largan Precision	3008.TW	3008 TT	31-Dec	2012	22.1	6.9	15.7	18.7	15.6	14.3	26.9	24.4	21.0	19.8	nm	nm	(59.6)	(64.8)
	Lenovo Group	0992.HK	992 HK	31-Mar	2012	28.2	12.0	15.7	7.8	35.2	13.1	25.5	25.9	3.8	4.1	nm	nm	nm	nm
	Pegatron	4938.TW	4938 TT	31-Dec	2012	95.6	36.6	10.1	10.7	68.7	30.5	11.9	14.6	3.0	3.8	(19.0)	(31.2)	(16.0)	(23.8)
	Quanta Computer	2382.TW	2382 TT	31-Dec	2011	(12.2)	5.5	1.7	5.1	9.0	9.9	15.8	15.5	3.4	3.3	(63.7)	(75.1)	(38.9)	(42.9)
	TPV Technology	0903.HK	903 HK	31-Dec	2011	21.3	18.1	7.6	7.8	29.8	20.4	5.6	6.3	1.6	1.9	12.4	22.2	14.2	28.5
	Wistron	3231.TW	3231 TT	31-Dec	2011	6.3	1.6	0.2	(8.8)	6.8	(1.5)	11.0	10.5	2.7	2.8	(4.7)	(5.8)	(4.4)	(5.5)
						12.4	9.0	3.3	4.9	8.0	8.9	13.5	13.7	5.4	5.5	(26.6)	(31.6)	(24.4)	(26.0)
Europe	Seagate Technology	STX.O	STX US	30-Jun	2012	(22.0)	3.9	(4.2)	(1.9)	(30.3)	(4.1)	53.7	55.1	19.8	20.4	8.2	22.2	8.9	28.6
	Sensata Technologies Holding	IST.N	ST US	31-Dec	2012	5.2	14.0	1.9	9.2	5.6	19.1	16.4	18.2	5.9	7.7	45.8	32.4	84.4	47.9
	TE Connectivity Ltd.	TEL.N	TEL US	30-Sep	2012	9.9	18.9	(0.2)	7.9	4.8	16.0	18.5	17.6	7.8	7.9	19.8	9.4	24.6	10.4
						(2.3)	12.3	(0.9)	5.1	(6.6)	10.3	29.5	30.3	11.2	12.0	24.6	21.3	39.3	29.0
Japan	Brother Industries	6448.T	6448 JP	31-Mar	2012	(16.0)	40.9	1.9	4.5	(18.1)	17.9	7.0	9.7	4.4	6.2	(28.0)	(22.1)	(21.9)	(18.1)
	Canon	7751.T	7751 JP	31-Dec	2012	43.2	12.4	7.8	3.5	45.1	12.8	11.7	12.4	7.8	8.3	(35.3)	(42.5)	(26.1)	(29.8)
	Dainippon Screen Mfg	7735.T	7735 JP	31-Mar	2012	nm	nm	(24.4)	8.2	nm	nm	(8.4)	4.6	(2.9)	1.5	25.8	26.7	34.8	36.4
	Fujifilm Holdings	4901.T	4901 JP	31-Mar	2012	19.0	60.8	(0.3)	2.7	(6.2)	39.6	2.7	4.0	1.7	2.6	(6.4)	(10.4)	(6.0)	(9.4)
	Hoya	7741.T	7741 JP	31-Mar	2012	39.4	(10.2)	(3.5)	4.6	19.6	(5.7)	14.6	12.0	9.9	8.4	(45.2)	(53.6)	(31.1)	(34.9)
	Konica Minolta	4902.T	4902 JP	31-Mar	2012	9.7	42.0	3.7	3.6	11.5	37.8	5.0	6.7	2.5	3.5	19.0	13.6	23.5	15.7
	Nikon	7731.T	7731 JP	31-Mar	2012	(26.8)	48.4	7.7	7.5	(37.6)	76.0	9.6	13.1	4.9	6.9	(10.6)	(15.4)	(9.6)	(13.3)
	Olympus	7733.T	7733 JP	31-Mar	2012	nm	nm	(13.2)	(10.2)	(1.5)	nm	8.1	22.9	0.7	3.1	76.2	68.2	nm	nm
	Ricoh	7752.T	7752 JP	31-Mar	2012	nm	nm	(0.1)	4.2	nm	94.5	4.1	8.8	1.5	3.3	36.4	32.9	57.2	49.1
	Seiko Epson	6724.T	6724 JP	31-Mar	2013	nm	nm	(3.0)	4.8	(13.7)	71.7	(4.0)	6.3	(1.3)	2.1	38.9	37.5	63.5	59.9
	Tamron Co Ltd	7740.T	7740 JP	31-Dec	2012	33.0	26.8	9.6	6.8	32.7	26.0	12.1	14.0	8.7	10.7	(25.0)	(37.1)	(20.0)	(27.1)
	Tokyo Electron	8035.T	8035 JP	31-Mar	2012	(89.2)	nm	(22.8)	3.7	(83.1)	97.1	0.7	2.7	0.5	2.1	nm	nm	(51.2)	(53.9)
							1.5	31.6	(3.0)	3.7	(5.1)	46.8	5.3	9.8	3.2	4.9	4.2	(0.2)	1.2
North America	Amphenol Corp	APH.N	APH US	31-Dec	2012	11.0	11.6	8.3	9.1	8.8	8.2	24.0	23.4	11.6	11.9	18.7	12.0	23.1	13.6
	Apple, Inc.	AAPL.O	AAPL US	30-Sep	2012	(15.1)	6.3	5.7	2.1	(16.2)	(0.1)	28.0	26.3	19.0	17.6	(52.7)	(73.3)	(34.5)	(42.3)
	Arrow Electronics Inc	ARW.N	ARW US	31-Dec	2012	(6.9)	11.4	0.4	3.0	(5.9)	10.5	10.7	11.1	4.0	4.2	26.8	18.7	36.6	23.1
	Avnet Inc	AVT.N	AVT US	30-Jun	2012	(14.6)	8.1	(1.6)	2.8	(20.3)	4.8	12.3	11.6	4.8	4.8	21.0	13.4	26.5	15.5
	AVX Corp	AVX.N	AVX US	31-Mar	2013	(49.6)	7.4	(8.5)	7.8	(46.9)	4.5	(3.1)	5.7	(2.5)	4.2	nm	(87.5)	(53.2)	(46.7)
	Benchmark Electronics Inc	BHE.N	BHE US	31-Dec	2012	(8.3)	16.2	(6.4)	2.7	(13.6)	14.6	5.2	5.8	3.9	4.4	(48.9)	(53.3)	(32.9)	(34.8)
	BlackBerry	BBRY.O	BBRY US	28-Feb	2013	nm	nm	(39.8)	27.7	nm	nm	(6.6)	0.8	(4.8)	0.6	(39.0)	(31.0)	(28.1)	(23.7)
	Celestica Inc	CLS.N	CLS US	31-Dec	2012	(25.6)	22.4	(11.7)	5.3	(27.7)	21.8	6.4	8.6	3.3	4.5	(58.1)	(65.2)	(36.7)	(39.5)
	Cisco Systems Inc.	CSCO.O	CSCO US	31-Jul	2012	5.2	7.6	4.8	6.8	4.1	8.0	17.3	14.8	10.0	9.0	nm	nm	(55.7)	(60.8)
	Electronics for Imaging Inc	EFII.O	EFII US	31-Dec	2012	10.0	11.2	7.3	3.4	19.1	4.2	6.3	6.9	3.8	4.1	nm	nm	(56.7)	(58.1)
	EMC Corp	EMC.N	EMC US	31-Dec	2012	8.3	7.7	7.9	8.0	7.2	7.6	13.8	13.5	8.2	8.2	(35.6)	(43.9)	(26.3)	(30.5)
	F5 Networks Inc	FFIV.O	FFIV US	30-Sep	2012	(0.2)	8.6	5.4	10.9	(4.6)	12.9	18.2	16.6	12.8	12.0	(87.3)	nm	(46.6)	(59.9)
	Hewlett-Packard Co	HPQ.N	HPQ US	31-Oct	2012	(18.6)	(8.1)	(9.3)	(7.7)	(18.5)	(9.5)	20.7	16.5	4.7	4.3	32.6	22.0	48.3	28.3
	International Business Machine	IBM.N	IBM US	31-Dec	2012	9.2	12.3	0.2	4.7	9.7	11.9	83.0	77.6	14.0	14.6	44.3	38.4	79.6	62.4
	Jabil Circuit Inc	JBL.N	JBL US	31-Aug	2012	(3.8)	8.3	5.6	5.3	(0.2)	7.1	20.8	19.5	5.7	5.6	17.5	9.1	21.3	10.0
	Juniper Networks, Inc.	JNPR.N	JNPR US	31-Dec	2012	46.5	11.2	4.6	11.6	75.8	19.1	6.9	7.3	4.9	5.2	(50.3)	(69.1)	(33.4)	(40.9)
	Lexmark International Inc	LXK.N	LXK US	31-Dec	2012	12.7	(6.4)	(9.8)	(8.6)	1.8	(2.7)	12.3	17.5	4.5	6.8	(25.9)	(37.1)	(20.6)	(27.1)
	Molex Inc	MOLX.O	MOLX US	30-Jun	2012	(6.2)	8.6	4.0	4.2	(5.6)	13.0	10.0	11.4	6.9	8.1	(12.2)	(13.3)	(10.9)	(11.7)
	Motorola Solutions Inc	MSI.N	MSI US	31-Dec	2012	16.6	15.9	3.1	5.0	12.0	12.8	34.2	38.4	8.2	8.7	nm	nm	(59.8)	(57.9)
	NetApp Inc	NTAP.O	NTAP US	30-Apr	2012	(6.0)	9.6	2.3	6.6	(20.3)	14.3	10.9	12.3	4.8	5.2	nm	nm	(90.6)	(96.3)
	Plexus Corp	PLXS.O	PLXS US	30-Sep	2012	(11.5)	8.6	(4.1)	5.0	(10.2)	8.0	10.9	10.7	5.1	5.2	(4.3)	(20.1)	(4.1)	(16.7)
	Riverbed Technology Inc.	RVBD.O	RVBD US	31-Dec	2012	(1.2)	6.7	30.5	14.9	(86.1)	(28.5)	(0.2)	(0.4)	(0.1)	(0.2)	(4.4)	(30.1)	(4.2)	(23.1)
	Sanmina-SCI Corporation	SANM.O	SANM US	30-Sep	2012	6.4	26.6	(2.3)	6.0	(7.1)	20.8	8.3	12.5	2.7	4.5	20.0	3.8	25.0	3.9
	Vishay Intertechnology Inc	VSH.N	VSH US	31-Dec	2012	19.0	39.9	5.3	10.3	17.0	35.7	7.6	9.7	4.2	5.5	(58.4)	(65.4)	(36.9)	(39.5)
	Western Digital Corp	WDC.O	WDC US	30-Jun	2012	(1.8)	(6.8)	22.1	(3.6)	(1.1)	(10.6)	19.6	20.4	11.3	12.9	(44.1)	(72.0)	(30.6)	(41.8)
	Xerox Corp	XRX.N	XRX US	31-Dec	2012	7.8	1.6	(2.1)	0.2	0.6	4.6	9.9	9.5	4.0	4.0	33.0	28.1	49.2	39.1
						(0.7)	9.9	0.8	5.5	(5.1)	7.7	14.9	15.7	6.0	6.8	(14.6)	(24.6)	(13.5)	(21.4)

Source: Citi Research

Figure 677. Growth Rates and Key Ratios for Infrastructure/Service Providers Stocks

	Company Name	Reuters Code	B'berg Code	Fiscal Year End	Last Rep Yr	EPS Growth (%)		Revenue Growth (%)		EBIT Growth (%)		ROE (%)		ROA (%)		Net Debt / Cap (%)		Net Debt / Eq (%)	
						2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
						Infrastructure/Service Providers													
Europe	Wirecard	WDIG.DE	WDI GR	31-Dec	2012	12.4	24.9	19.1	17.7	12.9	24.5	14.2	15.8	6.9	8.1	nm	nm	(58.2)	(57.2)
						12.4	24.9	19.1	17.7	12.9	24.5	14.2	15.8	6.9	8.1	na	na	(58.2)	(57.2)

Source: Citi Research

Figure 678. Growth Rates and Key Ratios for Internet Stocks

	Company	Reuters	B'berg	Fiscal	Last	EPS Growth (%)		Revenue Growth (%)		EBIT Growth (%)		ROE (%)		ROA (%)		Net Debt / Cap (%)		Net Debt / Eq (%)	
	Name	Code	Code	Year End	Rep Yr	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
Internet																			
Asia	Baidu.com	BIDU.O	BIDU US	31-Dec	2012	(0.8)	(2.7)	30.3	20.0	(0.3)	(1.6)	31.0	22.7	19.4	15.0	nm	nm	nm	nm
	Bitauto Holdings	BITA.N	BITA US	31-Dec	2012	41.3	26.2	30.9	29.1	43.0	28.3	16.6	17.4	12.0	12.1	nm	nm	(56.5)	(58.2)
	Ctrip.com International	CTRP.O	CTRP US	31-Dec	2011	0.9	17.0	12.8	14.4	(25.3)	4.0	7.5	7.7	5.0	5.1	nm	nm	(76.2)	(80.3)
	Daum Communications	035720.KQ	035720 KS	31-Dec	2011	30.5	15.2	23.4	13.2	15.5	14.4	18.2	18.3	15.5	15.6	(33.5)	(40.2)	(25.1)	(28.7)
	Giant Interactive Group	GA.N	GA US	31-Dec	2011	4.1	12.8	14.5	14.1	16.3	10.1	38.8	35.0	27.9	24.4	nm	nm	(76.8)	(89.2)
	Info Edge	INED.BO	INFOE IN	31-Mar	2012	1.8	33.0	16.5	16.4	10.7	37.7	17.3	18.2	13.4	14.5	nm	nm	(51.1)	(65.7)
	Jiayuan.com International	DATE.O	DATE US	31-Dec	2011	(2.5)	18.6	17.6	19.7	8.0	25.4	9.0	9.9	7.3	8.0	(73.4)	(84.6)	(42.3)	(45.8)
	NCsoft	036570.KS	036570 KS	31-Dec	2011	19.2	22.9	10.1	15.7	47.2	25.4	16.7	16.7	13.0	13.5	nm	nm	(53.4)	(57.8)
	NetEase.com	NTES.O	NTES US	31-Dec	2011	4.3	3.8	12.6	10.4	6.9	5.7	20.0	17.1	17.6	15.2	(86.3)	nm	(46.3)	(55.1)
	NHN	035420.KS	035420 KS	31-Dec	2011	6.6	14.6	21.3	13.3	14.9	15.3	27.7	26.2	18.4	18.2	nm	nm	(55.9)	(58.5)
	Perfect World	PWRD.O	PWRD US	31-Dec	2012	(36.7)	5.1	(9.1)	(5.3)	(32.8)	(1.4)	8.7	8.5	5.6	5.5	(40.2)	(60.3)	(28.7)	(37.6)
	Qihoo 360 Technology	QIHU.N	QIHU US	31-Dec	2011	46.3	51.3	51.9	49.7	nm	89.9	13.8	20.7	11.9	17.3	nm	nm	(85.7)	(87.1)
	Renren	RENN.N	RENN US	31-Dec	2011	(17.9)	(19.3)	23.8	22.6	(19.2)	(13.2)	(8.4)	(10.8)	(7.7)	(10.0)	nm	nm	(79.5)	(77.0)
	Shanda Games	GAME.O	GAME US	31-Dec	2011	2.7	5.6	2.9	2.5	(4.0)	0.5	25.1	23.0	12.4	11.8	(44.9)	(82.4)	(31.0)	(45.2)
	Sina	SINA.O	SINA US	31-Dec	2011	93.1	nm	11.8	17.6	nm	nm	1.5	3.7	1.2	2.8	nm	nm	(70.4)	(72.1)
	Sky-mobi	MOBI.O	MOBI US	31-Mar	2012	(91.7)	nm	(11.4)	26.8	nm	53.7	(7.2)	(3.7)	(5.7)	(2.8)	nm	nm	(98.2)	nm
	Soufun Holdings	SFUN.N	SFUN US	31-Dec	2011	12.1	26.5	22.5	29.6	12.3	26.7	68.1	48.2	24.0	22.4	(12.3)	nm	(11.0)	(52.7)
	Tencent Holdings	0700.HK	700 HK	31-Dec	2011	37.1	35.6	29.7	40.1	34.6	37.9	35.5	34.3	21.3	22.3	(53.1)	(45.7)	(34.7)	(31.4)
	Youku	YOKU.N	YOKU US	31-Dec	2011	76.7	nm	73.5	58.8	37.8	nm	(7.2)	12.2	(5.7)	9.4	nm	nm	(71.5)	(66.6)
	YY	YY.O	YY US	31-Dec	2012	39.6	69.9	74.0	56.4	nm	80.4	14.2	20.7	11.1	16.2	nm	nm	nm	nm
						13.3	19.8	23.0	23.3	10.4	24.4	17.4	17.3	10.9	11.8	(49.1)	(62.6)	(55.2)	(59.3)
Australia/NZ	SEEK Ltd	SEK.AX	SEK AU	30-Jun	2012	9.1	28.8	38.3	29.1	19.9	39.3	17.0	19.6	9.2	10.9	25.2	14.4	33.8	16.8
							9.1	28.8	38.3	29.1	19.9	39.3	17.0	19.6	9.2	10.9	25.2	14.4	33.8
Europe	CDON Group	CDON.ST	CDON SS	31-Dec	2011	56.0	29.0	25.2	18.0	46.4	25.2	23.9	24.2	6.8	7.6	2.7	(10.5)	2.8	(9.5)
	Delticom	DEXGn.DE	DEX GR	31-Dec	2012	(3.9)	13.4	(0.7)	9.9	(3.6)	13.4	53.3	60.9	14.0	15.7	(91.4)	(73.3)	(47.8)	(42.3)
	Moneysupermarket	MONY.L	MONY LN	31-Dec	2012	23.1	10.7	11.1	9.0	27.5	16.0	17.1	19.3	13.4	14.5	(35.9)	(81.3)	(26.4)	(44.8)
	Rightmove	RMV.L	RMV LN	31-Dec	2012	12.9	16.2	10.6	11.4	9.8	11.8	nm	nm	nm	nm	nm	nm	(72.1)	(56.6)
	United Internet AG	UTDI.DE	UTDI GR	31-Dec	2012	91.8	32.1	11.4	8.6	52.7	26.1	96.7	93.6	18.1	21.8	46.2	23.4	86.0	30.5
	Zooplus	ZO1G.DE	ZO1 GR	31-Dec	2011	nm	nm	24.2	21.8	nm	nm	8.7	26.9	3.5	11.4	7.8	(12.0)	8.4	(10.7)
						36.0	20.3	13.6	13.1	26.5	18.5	39.9	45.0	11.1	14.2	(14.1)	(30.7)	(8.2)	(22.3)
Japan	CyberAgent	4751.T	4751 JP	30-Sep	2012	98.7	(34.8)	36.4	9.4	(16.4)	41.0	34.3	18.1	14.3	10.5	nm	nm	(70.8)	(65.1)
	DeNA	2432.T	2432 JP	31-Mar	2012	46.7	11.4	41.1	23.1	31.5	11.8	39.6	32.2	24.8	20.8	nm	nm	(67.1)	(73.7)
	Dwango	3715.T	3715 JP	30-Sep	2012	nm	47.1	3.2	8.3	60.7	46.8	6.7	9.3	4.9	6.7	(59.1)	(71.1)	(37.1)	(41.6)
	Gree	3632.T	3632 JP	30-Jun	2012	(31.0)	5.4	2.3	24.6	(34.6)	9.5	34.1	28.1	19.0	17.4	(91.0)	(71.7)	(47.6)	(41.8)
	Kakaku.Com	2371.T	2371 JP	31-Mar	2012	27.4	26.8	13.5	23.7	20.6	33.1	33.9	34.8	21.8	23.1	nm	nm	nm	nm
	Mixi	2121.T	2121 JP	31-Mar	2012	nm	26.9	15.2	17.6	20.8	26.9	10.2	11.8	7.7	8.9	nm	nm	(66.9)	(64.0)
	Rakuten	4755.OS	4755 JP	31-Dec	2011	25.7	17.0	10.4	7.4	21.5	17.6	19.9	19.4	2.8	3.1	42.9	34.6	75.2	52.9
	Yahoo Japan	4689.T	4689 JP	31-Mar	2012	15.0	6.9	12.7	14.6	12.6	10.4	22.8	20.6	19.1	17.6	nm	nm	(52.4)	(57.9)
						30.4	13.3	16.9	16.1	14.6	24.7	25.2	21.8	14.3	13.5	(35.7)	(36.1)	(38.1)	(41.6)

Source: Citi Research

Figure 679. Growth Rates and Key Ratios for IT Services Stocks

	Company	Reuters	B'berg	Fiscal	Last	EPS Growth (%)		Revenue Growth (%)		EBIT Growth (%)		ROE (%)		ROA (%)		Net Debt / Cap (%)		Net Debt / Eq (%)	
	Name	Code	Code	Year End	Rep Yr	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
IT Services																			
Asia	CSE Global	CSES.SI	CSE SP	31-Dec	2011	5.7	10.0	2.9	3.0	7.2	10.2	22.5	20.6	11.5	11.2	(0.3)	(16.8)	(0.3)	(14.4)
	HCL Technologies	HCLT.BO	HCLT IN	30-Jun	2012	52.8	8.1	20.5	11.4	43.4	3.8	30.6	25.9	18.6	17.4	(25.6)	(48.7)	(20.4)	(32.7)
	Infosys	INFY.BO	INFO IN	31-Mar	2012	13.3	4.4	19.6	11.1	6.6	6.4	25.7	22.7	22.3	19.8	nm	nm	(59.2)	(63.9)
	MindTree	MINT.BO	MTCL IN	31-Mar	2012	51.4	12.3	23.3	12.4	89.5	(2.1)	29.8	26.0	22.4	20.5	(7.8)	(16.1)	(7.2)	(13.9)
	SK C&C	034730.KS	034730 KS	31-Dec	2011	19.7	14.1	8.0	8.7	16.4	10.9	17.6	17.2	8.3	8.3	19.3	14.8	24.0	17.3
	Tata Consultancy Services	TCS.BO	TCS IN	31-Mar	2012	31.1	11.9	28.8	13.3	25.9	11.0	37.9	33.7	29.9	26.9	(37.8)	(56.0)	(27.4)	(35.9)
	Tech Mahindra	TEML.BO	TECHM IN	31-Mar	2012	11.3	16.4	24.2	10.5	61.1	(0.7)	26.6	24.4	16.4	16.7	16.6	(0.1)	20.0	(0.1)
	Wipro	WIPR.BO	WPRO IN	31-Mar	2012	18.9	8.1	15.8	7.9	17.4	7.0	23.3	23.3	15.2	15.2	(46.3)	(43.1)	(31.6)	(30.1)
						25.5	10.7	17.9	9.8	33.4	5.8	26.8	24.2	18.1	17.0	(11.7)	(23.7)	(12.8)	(21.7)
Europe	Accenture Ltd	ACN.N	ACN US	31-Aug	2012	10.8	10.1	4.2	6.4	12.0	2.6	71.6	54.2	20.3	17.3	nm	nm	nm	nm
	ATOS	ATOS.PA	ATO FP	31-Dec	2012	20.9	11.5	0.1	3.2	50.2	12.6	14.9	14.9	4.9	5.4	(24.3)	(37.8)	(19.6)	(27.4)
	Capgemini SA	CAPP.PA	CAP FP	31-Dec	2012	10.2	8.5	0.1	3.1	21.4	8.7	9.1	9.5	4.0	4.4	(24.6)	(30.7)	(19.8)	(23.5)
	Dassault Systemes SA	DAST.PA	DSY FP	31-Dec	2012	8.2	12.9	4.7	10.0	7.2	17.5	14.5	15.1	9.6	10.2	nm	nm	(61.3)	(68.4)
	Fidessa	FDSA.L	FDSA LN	31-Dec	2012	1.1	6.1	0.7	5.4	(0.0)	4.6	20.9	20.0	11.6	11.5	nm	nm	(57.6)	(63.3)
	Sage Group PLC	SGE.L	SGE LN	30-Sep	2012	10.6	12.4	2.2	0.7	2.3	5.0	5.2	28.0	2.6	11.3	26.7	36.4	36.3	57.2
	SAP AG	SAPG.DE	SAP GR	31-Dec	2012	11.9	14.3	8.0	9.5	11.3	16.9	21.7	21.3	12.1	12.8	(0.5)	(18.0)	(0.5)	(15.2)
	SDL	SDL.L	SDL LN	31-Dec	2012	(14.9)	18.7	5.2	7.1	(17.5)	19.3	7.5	8.4	5.0	5.7	(7.8)	(16.0)	(7.3)	(13.8)
						(2.9)	7.7	(2.5)	0.9	(9.4)	2.9	14.5	15.0	8.4	8.5	(0.9)	(13.0)	(0.9)	(11.5)
						6.2	11.4	2.5	5.1	8.6	10.0	20.0	20.7	8.7	9.7	(5.3)	(13.2)	(16.3)	(20.7)
Japan	Nomura Research Institute	4307.T	4307 JP	31-Mar	2012	(7.5)	7.2	6.3	3.5	6.4	7.8	11.5	11.5	7.4	7.9	(19.8)	(26.8)	(16.5)	(21.1)
	NTT Data	9613.T	9613 JP	31-Mar	2012	24.6	26.1	4.4	2.4	4.1	8.8	6.2	7.4	2.5	3.2	21.8	19.4	27.8	24.0
	Oracle Japan	4716.T	4716 JP	31-May	2012	15.5	10.2	10.6	8.2	9.9	9.3	39.5	34.3	22.3	20.8	nm	nm	(85.7)	(92.2)
	Secom	9735.T	9735 JP	31-Mar	2012	61.9	10.2	9.0	1.8	32.0	4.3	9.2	9.5	5.1	5.5	(41.1)	(45.8)	(29.1)	(31.4)
	Trend Micro	4704.T	4704 JP	31-Dec	2011	3.5	5.1	1.5	1.8	5.9	5.0	13.6	13.6	7.5	7.6	nm	nm	(91.3)	(87.2)
						19.6	11.8	6.4	3.5	11.7	7.0	16.0	15.3	9.0	9.0	(13.0)	(17.8)	(39.0)	(41.6)
North America	Alliance Data Systems Corp	ADS.N	ADS US	31-Dec	2012	17.7	22.0	17.4	8.3	16.2	10.1	63.2	40.1	4.3	4.9	62.8	32.2	nm	47.4
	Automatic Data Processing Inc	ADP.O	ADP US	30-Jun	2012	6.5	8.7	6.5	7.4	5.2	7.4	22.7	22.5	4.0	3.2	(43.3)	(52.7)	(30.2)	(34.5)
	Computer Sciences Corporatio	CSC.N	CSC US	31-Mar	2012	7.2	5.5	(4.1)	(2.0)	nm	5.2	14.3	13.9	4.1	4.6	15.0	6.4	17.7	6.8
	EPAM Systems, Inc.	EPAM.N	EPAM US	31-Dec	2012	10.8	19.2	24.7	23.0	8.7	33.2	18.3	20.1	15.3	17.3	(73.2)	(87.9)	(42.3)	(46.8)
	Fidelity National Info Svcs, Inc	FIS.N	FIS US	31-Dec	2012	13.5	11.4	5.0	5.5	13.6	7.0	10.0	10.9	4.9	5.5	36.5	33.6	57.4	50.7
	Fiserv, Inc.	FISV.O	FISV US	31-Dec	2012	16.2	11.6	10.4	4.5	6.1	11.6	17.2	17.7	6.9	7.5	46.8	41.4	87.9	70.7
	FleetCor Technologies Inc	FLT.N	FLT US	31-Dec	2012	28.8	14.4	18.8	10.1	25.7	15.4	26.0	23.2	9.3	9.4	30.8	11.5	44.5	13.0
	Global Payments, Inc.	GPN.N	GPN US	31-May	2012	3.7	11.5	8.8	8.8	23.8	17.2	19.4	20.2	7.7	7.8	17.2	(1.8)	20.8	(1.8)
	Green Dot Corp	GDOT.N	GDOT US	31-Dec	2012	(14.6)	7.4	(0.0)	7.9	(15.1)	10.2	11.1	10.0	5.2	5.0	nm	nm	nm	nm
	NetSpend Holdings	NTSP.O	NTSP US	31-Dec	2012	33.8	16.6	20.2	15.0	30.4	18.5	36.4	29.9	20.6	21.6	(9.0)	(56.6)	(8.3)	(36.2)
	Paychex Inc	PAYX.O	PAYX US	31-May	2012	5.4	6.6	4.1	5.6	5.6	6.5	34.4	33.2	8.3	8.1	(63.6)	(78.6)	(38.9)	(44.0)
	Total System Services	TSS.N	TSS US	31-Dec	2012	10.7	13.0	5.1	7.2	6.4	11.9	17.6	17.8	12.2	12.0	(15.1)	(31.2)	(13.1)	(23.8)
	Vantiv, Inc.	VNTV.N	VNTV US	31-Dec	2012	23.7	13.9	17.9	10.8	17.4	13.5	26.1	25.4	5.2	6.0	35.4	23.1	54.9	30.0
	VeriFone Systems Inc	PAY.N	PAY US	31-Oct	2012	(24.6)	11.0	(3.5)	7.0	(23.3)	9.3	4.6	6.8	1.8	2.9	32.4	22.8	47.9	29.6
	West Corp	WSTC.O	WSTC US	31-Dec	2012	(9.9)	8.0	3.0	4.0	0.3	13.8	na	na	4.0	6.0	nm	nm	na	na
Western Union Co.	WU.N	WU US	31-Dec	2012	(19.0)	13.1	(3.8)	2.5	(18.5)	7.6	75.5	68.9	8.3	9.0	65.8	59.9	nm	nm	
WEX Inc	WEX.N	WEX US	31-Dec	2012	7.4	9.1	14.9	9.4	9.9	8.9	15.7	14.7	4.3	4.3	22.2	7.1	28.5	7.6	
						6.9	11.9	8.6	7.9	7.0	12.2	25.8	23.5	7.4	7.9	10.7	(4.7)	17.4	4.9

Source: Citi Research

Figure 680. Growth Rates and Key Ratios for Semiconductors & Components Stocks

	Company	Reuters	B'berg	Fiscal	Last	EPS Growth (%)		Revenue Growth (%)		EBIT Growth (%)		ROE (%)		ROA (%)		Net Debt / Cap (%)		Net Debt / Eq (%)	
	Name	Code	Code	Year End	Rep Yr	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
Semiconductors & Components																			
Asia	ASE	2311.TW	2311 TT	31-Dec	2012	18.0	23.2	8.8	7.6	19.8	18.5	13.7	15.5	6.1	7.2	29.3	21.3	41.5	27.1
	AU Optonics	2409.TW	2409 TT	31-Dec	2012	nm	30.6	15.0	3.9	nm	(3.3)	2.4	3.1	0.7	0.9	40.9	28.3	69.1	39.4
	Avago Technologies	AVGO.O	AVGO US	31-Oct	2012	(2.5)	17.5	4.5	14.1	(1.9)	25.6	20.9	21.7	17.8	18.7	(96.2)	nm	(49.0)	(58.0)
	Chipbond Technology	6147.TWO	6147 TT	31-Dec	2012	25.8	11.3	15.6	10.7	19.0	18.8	17.5	17.8	10.9	11.0	(11.6)	(23.9)	(10.4)	(19.3)
	E Ink Holdings	8069.TWO	8069 TT	31-Dec	2011	nm	(20.7)	(14.2)	(25.1)	88.0	nm	0.6	0.5	0.3	0.3	14.4	9.3	16.8	10.3
	Innolux Corp	3481.TW	3481 TT	31-Dec	2011	nm	22.3	4.1	0.8	nm	6.6	4.1	4.7	1.3	1.6	45.8	33.8	84.4	51.0
	Kinsus Interconnect Technology	3189.TW	3189 TT	31-Dec	2011	5.5	13.4	8.9	9.3	14.8	15.2	12.3	13.0	7.9	8.5	(54.9)	(61.3)	(35.5)	(38.0)
	LG Display	034220.KS	034220 KS	31-Dec	2012	nm	22.9	(2.8)	(6.1)	49.4	11.6	8.7	9.8	3.8	4.5	8.5	4.0	9.3	4.1
	MagnaChip Semiconductor	MX.N	MX US	31-Dec	2012	22.4	18.7	7.2	4.7	13.3	14.7	18.4	23.9	7.6	11.1	(10.9)	(32.9)	(9.8)	(24.8)
	Novatek	3034.TW	3034 TT	31-Dec	2011	8.6	3.1	8.1	6.0	8.5	2.0	19.6	19.1	12.1	12.0	nm	nm	(55.1)	(57.0)
	Powertech Technology	6239.TW	6239 TT	31-Dec	2012	(5.1)	12.6	(5.1)	3.7	(12.3)	9.9	9.0	9.7	4.6	5.1	(16.2)	(29.8)	(14.0)	(23.0)
	Radiant Opto-Electronics	6176.TW	6176 TT	31-Dec	2012	6.5	14.5	6.9	14.0	12.9	15.7	26.5	27.2	11.4	12.2	nm	nm	(74.2)	(69.7)
	Samsung Electronics	005930.KS	005930 KS	31-Dec	2012	47.1	12.5	17.5	8.1	48.7	12.7	25.5	22.7	17.2	16.4	(35.8)	(49.5)	(26.4)	(33.1)
	SPIL	2325.TW	2325 TT	31-Dec	2012	(3.8)	61.2	5.9	11.7	19.5	39.2	9.0	14.0	5.6	8.4	(11.1)	(21.6)	(10.0)	(17.7)
	TPK	3673.TW	3673 TT	31-Dec	2012	17.9	(8.4)	12.3	8.7	9.5	(9.4)	34.5	27.5	12.4	10.4	26.9	18.8	36.8	23.2
	Tripod Technology	3044.TW	3044 TT	31-Dec	2011	(3.0)	12.0	4.6	4.9	8.1	11.2	11.6	12.3	6.1	6.5	(18.5)	(23.5)	(15.6)	(19.0)
	TSMC	2330.TW	2330 TT	31-Dec	2012	16.7	8.1	20.2	14.7	23.3	9.1	24.7	23.0	18.3	16.6	(3.8)	1.1	(3.7)	1.1
	UMC	2303.TW	2303 TT	31-Dec	2011	(25.3)	(21.0)	16.9	7.5	(83.5)	nm	2.9	2.3	2.1	1.6	3.0	4.5	3.1	4.7
	Unimicron	3037.TW	3037 TT	31-Dec	2012	1.4	17.1	(1.0)	15.2	(9.4)	18.2	7.5	8.4	3.4	3.8	10.6	2.8	11.9	2.9
	Vanguard International Semicon	5347.TWO	5347 TT	31-Dec	2012	40.3	0.7	12.2	1.3	48.4	(0.6)	14.3	12.6	12.3	11.0	nm	nm	(64.6)	(72.2)
	Wintek	2384.TW	2384 TT	31-Dec	2011	66.7	nm	(12.0)	7.5	nm	nm	(2.0)	0.2	(0.8)	0.1	46.4	44.8	86.6	81.2
	Young Fast	3622.TW	3622 TT	31-Dec	2011	nm	15.7	25.9	12.4	nm	35.6	3.2	3.6	2.2	2.4	(20.0)	(21.2)	(16.6)	(17.5)
						14.0	12.7	7.2	6.2	15.3	13.2	13.0	13.3	7.4	7.7	(2.8)	(5.3)	(1.1)	(9.3)
Europe	ARM Holdings PLC	ARM.L	ARM LN	31-Dec	2012	43.7	22.5	21.2	15.3	33.8	21.1	18.8	19.9	15.7	17.0	nm	nm	(51.3)	(57.3)
	ASML Holding NV	ASML.AS	ASML NA	31-Dec	2012	(13.2)	79.8	2.3	34.1	(8.8)	74.9	22.1	33.0	12.6	19.8	(63.1)	(72.0)	(38.7)	(41.9)
	CSR Plc	CSR.L	CSR LN	31-Dec	2012	69.9	(0.1)	(8.2)	(7.9)	32.5	(4.4)	11.2	10.8	7.8	7.7	(89.0)	(92.6)	(47.1)	(48.1)
	Infineon Technologies	IFXGn.DE	IFX GR	30-Sep	2012	(56.7)	nm	(4.9)	8.8	(46.3)	81.4	4.9	9.8	3.0	6.2	nm	nm	(52.7)	(54.6)
	STMicroelectronics	STM.PA	STM FP	31-Dec	2012	nm	66.4	(1.0)	0.9	89.0	nm	2.6	7.2	1.5	4.2	(18.8)	(29.8)	(15.8)	(23.0)
	Wolfson	WLF.L	WLF LN	31-Dec	2012	nm	nm	28.9	12.5	nm	nm	1.9	9.6	1.5	8.0	(34.5)	(65.9)	(25.6)	(39.7)
						11.0	42.2	6.4	10.6	20.1	43.3	10.2	15.1	7.0	10.5	(51.3)	(65.1)	(38.5)	(44.1)
Japan	Alps Electric	6770.T	6770 JP	31-Mar	2012	nm	nm	2.4	2.9	(49.9)	nm	(7.4)	7.2	(1.9)	1.8	15.3	14.2	18.0	16.5
	Asahi Glass	5201.T	5201 JP	31-Dec	2012	3.0	0.9	5.7	0.7	(3.2)	(6.7)	4.7	4.7	2.4	2.4	23.8	22.8	31.2	29.5
	Hirose Electric	6806.T	6806 JP	31-Mar	2012	0.1	23.8	(0.1)	7.9	4.8	12.2	5.2	6.2	4.7	5.6	nm	nm	(58.3)	(58.7)
	Hosiden	6804.OS	6804 JP	31-Mar	2012	nm	nm	31.1	(0.7)	83.0	nm	0.4	2.5	0.3	1.7	(61.1)	(61.4)	(37.9)	(38.0)
	Ibiden	4062.T	4062 JP	31-Mar	2012	(74.5)	nm	(6.3)	(4.4)	(65.2)	nm	1.0	4.0	0.6	2.6	(16.4)	(18.7)	(14.1)	(15.7)
	Kyocera	6971.T	6971 JP	31-Mar	2012	(23.1)	42.5	7.2	11.8	(20.3)	69.7	4.0	5.5	2.9	3.9	(49.9)	(49.1)	(33.3)	(33.0)
	Mabuchi Motor	6592.T	6592 JP	31-Dec	2012	9.6	27.1	16.7	10.6	60.3	30.9	3.8	4.8	3.5	4.4	(92.2)	(86.2)	(48.0)	(46.3)
	Mitsumi Electric	6767.T	6767 JP	31-Mar	2012	64.0	88.2	(8.2)	1.5	52.1	nm	(9.7)	(1.2)	(6.9)	(0.9)	(96.1)	(91.8)	(49.0)	(47.9)
	Murata	6981.OS	6981 JP	31-Mar	2012	20.5	63.5	16.0	15.1	15.6	63.5	4.5	7.1	3.6	5.7	(18.9)	(21.9)	(15.9)	(17.9)
	NGK Spark Plug	5334.T	5334 JP	31-Mar	2012	(38.5)	30.6	(7.5)	8.4	(14.2)	49.5	6.6	8.1	4.6	5.8	(31.2)	(24.1)	(23.8)	(19.4)
	Nidec	6594.OS	6594 JP	31-Mar	2012	(90.3)	nm	2.6	13.7	(72.6)	nm	1.0	11.1	0.4	4.5	23.8	22.5	31.3	29.0
	Nippon Electric Glass	5214.T	5214 JP	31-Mar	2012	(61.4)	nm	(15.0)	(6.9)	(64.3)	(63.6)	1.6	(0.3)	1.1	(0.2)	(5.4)	(5.5)	(5.1)	(5.3)
	Nippon Sheet Glass	5202.T	5202 JP	31-Mar	2012	nm	58.9	(5.3)	1.5	nm	90.0	(19.5)	(8.9)	(3.6)	(1.5)	70.7	72.7	nm	nm
	Rohm	6963.OS	6963 JP	31-Mar	2012	93.2	nm	(3.9)	2.0	(40.2)	nm	(0.2)	0.5	(0.1)	0.4	(59.4)	(55.7)	(37.3)	(35.8)
	Shinko Electric Industries	6967.T	6967 JP	31-Mar	2012	nm	nm	(1.3)	2.1	nm	nm	1.5	3.4	1.2	2.7	(5.5)	(4.8)	(5.2)	(4.6)
	SUMCO	3436.T	3436 JP	31-Dec	2012	na	nm	na	17.5	na	72.4	8.7	20.1	3.0	7.3	45.8	37.2	84.4	59.4
	Taiyo Yuden	6976.T	6976 JP	31-Mar	2012	nm	87.3	6.2	2.5	nm	nm	3.5	6.1	1.7	3.1	22.2	16.9	28.5	20.4
	TDK	6762.T	6762 JP	31-Mar	2012	nm	nm	1.3	2.2	20.4	60.0	1.0	3.9	0.5	1.8	4.6	2.6	4.8	2.7
						(8.9)	47.0	2.4	4.9	(6.7)	37.8	0.6	4.7	1.0	2.8	(13.5)	(13.5)	(7.6)	(9.7)

Source: Citi Research

Figure 681. Growth Rates and Key Ratios for Semiconductors & Components Stocks Ctd

	Company	Reuters	B'berg	Fiscal	Last	EPS Growth (%)		Revenue Growth (%)		EBIT Growth (%)		ROE (%)		ROA (%)		Net Debt / Cap (%)		Net Debt / Eq (%)	
	Name	Code	Code	Year End	Rep Yr	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
Semiconductors & Components																			
North America	Advanced Micro Devices	AMD.N	AMD US	31-Dec	2012	79.9	nm	(12.0)	10.0	95.6	nm	(51.0)	22.8	(6.1)	3.1	72.8	60.4	nm	nm
	Altera Corp	ALTR.O	ALTR US	31-Dec	2012	(14.2)	7.1	0.3	6.9	(11.6)	11.4	13.4	12.7	9.7	9.5	nm	nm	(78.1)	(81.0)
	Amkor Technology Inc	AMKR.O	AMKR US	31-Dec	2012	76.8	12.4	9.1	2.0	53.8	10.0	18.3	18.0	4.3	4.7	61.3	59.5	nm	nm
	Analog Devices	ADI.O	ADI US	31-Oct	2012	1.1	22.4	(1.0)	9.2	(1.3)	23.2	14.8	15.6	11.2	12.3	nm	nm	(77.8)	(81.4)
	Applied Materials Inc	AMAT.O	AMAT US	31-Oct	2012	(28.1)	82.9	(13.6)	17.5	(24.0)	84.7	7.7	13.9	4.5	8.2	6.8	(7.2)	7.2	(6.7)
	ATMI Inc	ATMI.O	ATMI US	31-Dec	2012	6.6	7.8	7.0	2.6	8.1	10.6	8.6	8.2	7.5	7.4	(39.3)	(56.7)	(28.2)	(36.2)
	Broadcom Corporation	BRCM.O	BRCM US	31-Dec	2012	31.4	13.8	7.2	4.2	23.1	17.0	11.6	12.1	8.2	8.8	(22.7)	(41.3)	(18.5)	(29.3)
	Brooks Automation Inc	BRKS.O	BRKS US	30-Sep	2012	(45.2)	96.1	(5.7)	12.3	(34.7)	nm	2.6	4.9	2.3	4.3	(23.7)	(28.8)	(19.2)	(22.3)
	Cypress Semiconductor Corp	CY.O	CY US	31-Dec	2012	(45.2)	95.3	(4.1)	13.4	(39.9)	84.7	28.6	53.2	5.9	11.0	30.4	13.3	43.8	15.4
	Entegris Inc	ENTG.O	ENTG US	31-Dec	2012	(16.7)	21.4	(5.8)	10.4	(20.6)	30.0	8.2	9.6	7.1	8.4	(89.6)	nm	(47.3)	(50.3)
	Fairchild Semiconductor	FCS.N	FCS US	31-Dec	2012	(1.4)	nm	5.9	7.9	7.1	nm	3.6	8.5	2.6	6.4	(16.6)	(33.0)	(14.2)	(24.8)
	FormFactor Inc	FORM.O	FORM US	31-Dec	2012	67.8	62.3	28.1	3.2	57.0	70.4	(8.8)	(1.8)	(7.5)	(1.6)	nm	nm	(73.8)	(78.2)
	Freescale Semiconductor Holdi	FSL.N	FSL US	31-Dec	2012	nm	nm	5.0	6.2	22.3	40.0	na	na	1.5	9.5	nm	nm	na	na
	Integrated Device Technology I	IDTI.O	IDTI US	31-Mar	2013	(44.3)	46.4	(7.5)	1.7	(36.1)	37.7	5.0	7.3	4.3	6.3	(77.5)	(81.6)	(43.7)	(44.9)
	Intel Corp	INTC.O	INTC US	31-Dec	2012	(14.7)	(3.2)	(0.4)	1.3	(16.1)	(2.3)	17.4	15.9	10.8	10.0	(7.4)	(5.2)	(6.8)	(4.9)
	International Rectifier	IRF.N	IRF US	30-Jun	2012	nm	nm	(8.6)	6.1	nm	nm	(7.6)	1.5	(6.4)	1.3	(48.1)	(55.8)	(32.5)	(35.8)
	Intersil Corporation	ISIL.O	ISIL US	31-Dec	2012	nm	(50.0)	(9.0)	2.1	nm	nm	0.1	0.8	0.1	0.6	(19.8)	(22.4)	(16.5)	(18.3)
	KLA Tencor Corp	KLAC.O	KLAC US	30-Jun	2012	(30.3)	20.4	(11.0)	9.4	(28.8)	23.3	15.8	17.6	10.4	11.9	nm	nm	(63.1)	(66.2)
	Lam Research Corp	LRCX.O	LRCX US	30-Jun	2012	8.4	73.5	34.6	24.6	(24.7)	nm	2.3	10.7	1.5	7.0	(11.9)	(26.3)	(10.6)	(20.8)
	Linear Technology	LLTC.O	LLTC US	30-Jun	2012	(0.5)	5.8	0.8	5.7	(2.2)	8.6	46.7	39.3	20.3	23.8	nm	nm	(68.0)	(72.9)
	Marvell Technology Group Ltd.	MRVL.O	MRVL US	31-Jan	2013	(32.1)	(11.1)	(6.6)	(0.4)	(51.2)	(13.6)	6.5	5.3	5.6	4.5	(74.8)	(74.4)	(42.8)	(42.7)
	Maxim Integrated	MXIM.O	MXIM US	30-Jun	2012	12.7	13.1	2.3	11.1	11.6	19.9	17.9	21.2	11.9	13.9	(42.8)	(51.2)	(30.0)	(33.9)
	Microchip Technology	MCHP.O	MCHP US	31-Mar	2013	(5.3)	26.2	16.1	14.4	(51.0)	95.0	7.1	15.2	4.0	7.5	(44.5)	(54.2)	(30.8)	(35.2)
	Micron Technology Inc	MU.O	MU US	31-Aug	2012	59.8	nm	5.4	20.4	nm	nm	(5.6)	15.6	(3.0)	9.0	16.8	(0.6)	20.2	(0.6)
	NVIDIA Corp	NVDA.O	NVDA US	31-Jan	2013	(4.5)	(9.3)	7.1	2.8	(0.0)	(8.6)	12.5	10.1	9.4	7.6	nm	nm	(77.2)	(80.3)
	ON Semiconductor	ONNN.O	ONNN US	31-Dec	2012	14.2	38.9	(2.7)	7.0	15.6	34.0	12.5	16.2	5.4	7.6	11.5	(8.2)	13.0	(7.6)
	Qualcomm Inc	QCOM.O	QCOM US	30-Sep	2012	20.7	7.1	28.1	13.8	28.0	9.8	18.3	16.2	14.5	13.3	(63.7)	(85.2)	(38.9)	(46.0)
	Semtech	SMTC.O	SMTC US	31-Jan	2013	(1.6)	30.5	20.4	16.9	4.4	27.5	6.4	12.0	4.5	7.6	12.9	(5.7)	14.8	(5.4)
	Silicon Laboratories	SLAB.O	SLAB US	31-Dec	2012	7.5	20.6	5.7	10.3	11.0	27.8	11.0	11.6	8.5	9.3	(57.6)	(76.6)	(36.5)	(43.4)
	Spanion Inc.	CODE.N	CODE US	31-Dec	2012	(0.6)	27.4	(1.6)	5.1	(45.3)	61.4	(0.7)	2.3	(0.4)	1.2	14.5	0.6	17.0	0.6
	Teradyne Inc	TER.N	TER US	31-Dec	2012	(1.4)	44.1	(1.8)	20.3	(9.0)	59.8	11.4	15.6	8.5	12.1	(44.8)	(92.1)	(30.9)	(47.9)
	Texas Instruments Inc	TXN.O	TXN US	31-Dec	2012	22.3	23.0	(4.6)	2.8	29.2	22.9	19.3	26.5	10.3	13.4	20.2	27.2	25.3	37.5
	Xilinx Inc	XLNX.O	XLNX US	31-Mar	2013	(10.4)	13.8	(3.2)	5.8	(9.7)	18.0	17.2	17.5	10.6	11.3	(30.5)	(51.0)	(23.4)	(33.8)
						3.8	26.4	2.5	8.7	(1.3)	30.9	8.5	14.2	5.5	8.2	(18.0)	(27.9)	(25.6)	(33.2)

Source: Citi Research

Figure 682. Growth Rates and Key Ratios for Software Stocks

	Company	Reuters	B'berg	Fiscal	Last	EPS Growth (%)		Revenue Growth (%)		EBIT Growth (%)		ROE (%)		ROA (%)		Net Debt / Cap (%)		Net Debt / Eq (%)	
	Name	Code	Code	Year End	Rep Yr	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
Software																			
CEEMEA	CheckPoint Software Technolo	CHKP.O	CHKP US	31-Dec	2012	8.6	11.0	4.0	6.0	3.8	0.3	18.9	18.3	13.8	13.0	(74.1)	(96.9)	(42.6)	(49.2)
						8.6	11.0	4.0	6.0	3.8	0.3	18.9	18.3	13.8	13.0	(74.1)	(96.9)	(42.6)	(49.2)
Europe	AVEVA Plc	AVV.L	AVV LN	31-Mar	2012	17.7	15.4	11.8	11.0	13.9	13.1	20.2	20.5	14.5	15.0	nm	nm	(78.3)	(82.1)
	Micro Focus International Plc	MCRO.L	MCRO LN	30-Apr	2012	15.3	14.0	(4.5)	4.2	2.3	8.1	nm	nm	21.5	21.9	88.7	nm	nm	na
	Telecity Group Plc	TCY.L	TCY LN	31-Dec	2012	17.4	17.9	16.0	14.0	18.0	19.9	18.7	19.1	8.4	9.0	37.5	29.2	60.0	41.3
						16.8	15.7	7.8	9.7	11.4	13.7	19.4	19.8	14.8	15.3	63.1	29.2	(9.2)	(20.4)
North America	Adobe Systems Inc.	ADBE.O	ADBE US	30-Nov	2012	(39.1)	61.6	(7.3)	20.8	(52.7)	nm	5.5	11.6	3.6	7.6	(58.1)	(78.0)	(36.7)	(43.8)
	Autodesk, Inc.	ADSK.O	ADSK US	31-Jan	2013	10.8	12.1	4.4	5.5	(1.7)	33.5	12.6	16.7	6.6	7.8	nm	nm	(59.2)	(70.5)
	BMC Software, Inc.	BMC.O	BMC US	31-Mar	2012	4.6	5.1	2.9	3.8	(8.2)	4.0	32.4	45.6	7.4	7.7	(8.3)	(28.2)	(7.7)	(22.0)
	CA Inc.	CA.O	CA US	31-Mar	2012	7.5	1.7	(3.1)	0.4	(0.5)	0.1	17.0	17.3	7.7	7.8	(33.1)	(45.8)	(24.8)	(31.4)
	Citrix Systems, Inc.	CTXS.O	CTXS US	31-Dec	2012	7.5	13.4	14.5	12.3	8.7	39.9	10.7	13.5	6.9	8.4	(37.2)	(68.0)	(27.1)	(40.5)
	Fortinet, Inc.	FTNT.O	FTNT US	31-Dec	2012	(9.3)	22.7	12.6	14.9	(20.1)	29.4	8.6	8.7	4.6	4.8	nm	nm	(85.5)	(90.0)
	Guidewire Software, Inc.	GWRE.N	GWRE US	31-Jul	2012	0.2	(21.7)	25.9	17.6	(42.3)	29.4	6.0	5.3	4.1	4.0	nm	nm	(85.8)	(83.1)
	Intuit Inc.	INTU.O	INTU US	31-Jul	2012	13.7	10.1	7.9	7.8	11.8	10.8	28.3	24.9	17.1	15.6	(49.8)	(79.5)	(33.2)	(44.3)
	Jive Software, Inc.	JIVE.O	JIVE US	31-Dec	2012	(38.0)	40.8	31.7	35.7	(49.6)	14.7	(62.9)	(70.9)	(24.6)	(19.6)	nm	nm	nm	nm
	Microsoft Corp.	MSFT.O	MSFT US	30-Jun	2012	2.1	3.3	6.7	5.6	32.3	1.8	32.1	27.6	17.9	16.1	nm	nm	(77.9)	(85.8)
	Oracle Corporation	ORCL.O	ORCL US	31-May	2012	9.5	10.7	0.6	4.4	6.5	6.5	24.0	23.8	13.3	13.4	(51.7)	(80.8)	(34.1)	(44.7)
	Palo Alto Networks, Inc.	PANW.N	PANW US	31-Jul	2012	33.5	79.8	56.5	35.0	nm	nm	(3.9)	2.2	(2.0)	1.0	nm	nm	nm	nm
	Qlik Technologies Inc.	QLIK.O	QLIK US	31-Dec	2012	43.5	76.0	21.5	18.0	66.1	nm	6.2	13.0	3.6	7.9	nm	nm	(84.3)	(86.1)
	Red Hat, Inc.	RHT.N	RHT US	28-Feb	2013	11.3	10.7	17.3	14.7	0.6	11.1	10.3	9.3	5.7	5.0	nm	nm	(57.9)	(73.2)
	salesforce.com, inc.	CRM.N	CRM US	31-Jan	2013	19.6	27.7	34.6	29.7	nm	8.1	(13.4)	(6.3)	(5.6)	(2.7)	(10.2)	(28.3)	(9.3)	(22.1)
	ServiceNow, Inc.	NOW.N	NOW US	31-Dec	2012	76.2	nm	63.6	59.7	(39.4)	36.2	(20.0)	(7.4)	(9.3)	(3.0)	nm	nm	nm	nm
	Sourcefire, Inc.	FIRE.O	FIRE US	31-Dec	2012	9.8	20.5	21.4	19.6	nm	68.4	3.7	5.5	2.4	3.6	nm	nm	(89.8)	(95.9)
	Symantec Corp.	SYMC.O	SYMC US	31-Mar	2012	7.1	12.5	2.4	0.7	5.6	17.9	13.5	15.6	5.1	5.9	(57.8)	nm	(36.6)	(54.5)
	Verisign, Inc.	VRSN.O	VRSN US	31-Dec	2012	12.5	7.9	9.4	5.4	13.4	4.0	na	na	13.2	12.2	89.9	82.1	na	na
	VMware, Inc.	VMW.N	VMW US	31-Dec	2012	14.3	14.2	12.2	14.0	9.6	32.4	13.2	13.7	7.3	7.9	nm	nm	(81.6)	(91.3)
	Web.Com Group	WWWV.O	WWWV U	31-Dec	2012	26.8	13.9	21.9	17.0	nm	nm	(35.8)	32.4	(3.9)	4.0	82.3	69.1	nm	nm
	WebSense, Inc.	WBSN.O	WBSN US	31-Dec	2012	(36.5)	8.6	(1.4)	4.1	(40.1)	19.0	18.3	18.4	2.9	3.2	(39.0)	(60.6)	(28.0)	(37.7)
	Workday Inc	WDAY.N	WDAY US	31-Jan	2013	43.8	49.0	nm	56.7	(50.3)	(28.9)	(57.5)	(27.8)	(20.1)	(16.1)	nm	nm	nm	nm
						10.1	21.8	16.2	17.5	(7.9)	17.8	2.2	8.8	2.8	4.5	(15.7)	(31.8)	(50.6)	(59.8)

Source: Citi Research

Figure 683. Growth Rates and Key Ratios for Technology – General Stocks

	Company	Reuters	B'berg	Fiscal	Last	EPS Growth (%)		Revenue Growth (%)		EBIT Growth (%)		ROE (%)		ROA (%)		Net Debt / Cap (%)		Net Debt / Eq (%)	
	Name	Code	Code	Year End	Rep Yr	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
Technology - General																			
Asia	AAC Technologies Holdings	2018.HK	2018 HK	31-Dec	2011	21.9	8.5	20.6	2.2	22.6	8.5	32.9	31.0	22.7	21.6	(7.0)	(16.7)	(6.5)	(14.3)
	Chicony Electronics	2385.TW	2385 TT	31-Dec	2012	16.4	13.3	13.6	7.7	19.6	16.4	25.2	26.1	9.6	10.3	1.1	(0.6)	1.1	(0.6)
	Delta Electronics	2308.TW	2308 TT	31-Dec	2011	1.1	12.7	1.1	13.2	17.1	11.4	18.6	19.6	8.5	9.1	(36.7)	(44.3)	(26.9)	(30.7)
	Foxconn International Holdings	2038.HK	2038 HK	31-Dec	2011	nm	nm	nm	41.8	nm	nm	7.0	13.7	3.5	6.0	(50.8)	(51.4)	(33.7)	(33.9)
	Foxconn Technology	2354.TW	2354 TT	31-Dec	2011	(6.9)	(3.8)	2.0	(1.9)	(6.3)	(6.3)	12.3	10.8	6.0	5.5	(77.8)	nm	(43.7)	(67.9)
	Hon Hai Precision	2317.TW	2317 TT	31-Dec	2011	14.8	23.4	(2.1)	18.3	15.7	23.8	14.2	15.5	4.8	5.5	(54.8)	(77.7)	(35.4)	(43.7)
	LG Electronics	066570.KS	066570 KS	31-Dec	2012	nm	13.8	18.3	8.9	29.5	11.6	9.7	10.1	3.6	3.6	32.2	30.2	47.6	43.3
	LG Innotek	011070.KS	011070 KS	31-Dec	2012	nm	42.4	27.6	7.2	92.9	30.9	7.2	9.4	1.9	2.6	54.6	50.3	nm	nm
	Samsung Electro-Mechanics	009150.KS	009150 KS	31-Dec	2012	7.7	5.7	23.1	7.2	21.7	5.4	11.6	11.2	6.6	6.4	14.8	10.8	17.3	12.1
	Samsung SDI	006400.KS	006400 KS	31-Dec	2011	(73.0)	27.6	(1.4)	10.0	(87.8)	68.7	5.1	6.1	3.7	4.4	2.1	6.1	2.1	6.5
	Samsung Techwin	012450.KS	012450 KS	31-Dec	2011	13.9	49.3	10.9	16.6	20.0	45.2	9.2	12.5	4.9	6.9	11.9	3.4	13.5	3.5
	Simplo Technology	6121.TWO	6121 TT	31-Dec	2012	5.3	6.1	3.3	22.2	(2.3)	9.0	19.0	17.5	9.3	8.7	(68.7)	(86.6)	(40.7)	(46.4)
	SK Hynix	000660.KS	000660 KS	31-Dec	2012	nm	20.0	38.9	11.3	nm	22.0	25.3	23.7	14.4	15.6	17.7	3.1	21.5	3.1
	Venture	VENM.SI	VMS SP	31-Dec	2012	16.5	7.3	6.6	6.4	21.6	7.6	9.0	9.5	6.8	7.2	(20.2)	(20.2)	(16.8)	(16.8)
	WPG Holdings	3702.TW	3702 TT	31-Dec	2012	6.5	6.9	8.9	6.5	1.2	7.6	12.3	12.7	3.7	3.6	52.2	54.0	nm	nm
						2.2	16.7	12.2	11.8	12.7	18.7	14.6	15.3	7.3	7.8	(8.6)	(10.0)	(7.7)	(14.3)
Japan	Fujitsu	6702.T	6702 JP	31-Mar	2012	nm	nm	(2.1)	0.7	(5.0)	42.9	(12.1)	9.1	(3.2)	2.3	21.9	14.9	28.1	17.6
	GS Yuasa	6674.T	6674 JP	31-Mar	2012	(24.1)	44.9	(1.6)	13.2	(31.4)	40.9	7.5	10.3	3.1	4.2	29.2	31.9	41.2	46.9
	Hitachi	6501.T	6501 JP	31-Mar	2012	(53.5)	46.7	(7.8)	0.9	3.7	20.5	8.4	10.7	1.7	2.4	34.7	31.5	53.1	46.0
	Mitsubishi Electric	6503.T	6503 JP	31-Mar	2012	(39.0)	90.9	(3.2)	1.9	(26.6)	15.9	5.7	9.9	2.0	3.7	12.9	7.4	14.8	8.0
	NEC	6701.T	6701 JP	31-Mar	2012	nm	26.4	3.7	(0.8)	77.6	(1.5)	5.3	6.4	1.4	1.7	32.7	27.0	48.5	37.1
	Toshiba	6502.T	6502 JP	31-Mar	2012	54.7	66.7	(3.1)	4.8	20.5	43.8	13.2	20.5	2.0	3.4	42.3	35.6	73.3	55.3
						(15.5)	55.1	(2.3)	3.5	6.5	27.1	4.7	11.1	1.2	3.0	28.9	24.7	43.2	35.1
North America	Ingram Micro Inc	IM.N	IM US	31-Dec	2012	11.5	17.1	15.2	3.3	20.1	14.1	8.9	9.7	2.8	3.1	8.3	4.3	9.0	4.5
	Synnex Corp	SNX.N	SNX US	30-Nov	2012	(2.5)	10.8	1.2	3.6	(0.3)	11.0	10.7	10.9	5.0	5.4	(8.0)	(6.9)	(7.4)	(6.5)
	Tech Data Corp	TECD.O	TECD US	31-Jan	2013	(5.4)	2.6	(4.3)	6.2	(14.9)	(2.6)	9.5	9.2	3.0	2.7	6.0	2.8	6.4	2.9
							1.2	10.1	4.1	4.4	1.6	7.5	9.7	9.9	3.6	3.7	2.1	0.1	2.7

Source: Citi Research

Figure 684. Growth Rates and Key Ratios for Telecommunications Equipment Stocks

	Company	Reuters	B'berg	Fiscal	Last	EPS Growth (%)		Revenue Growth (%)		EBIT Growth (%)		ROE (%)		ROA (%)		Net Debt / Cap (%)		Net Debt / Eq (%)	
	Name	Code	Code	Year End	Rep Yr	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
	Telecommunications Equipment																		
Asia	ZTE	0763.HK	763 HK	31-Dec	2012	nm	22.0	16.2	14.3	nm	14.8	10.7	11.8	2.1	2.5	25.0	19.9	33.3	24.8
						na	22.0	16.2	14.3	na	14.8	10.7	11.8	2.1	2.5	25.0	19.9	33.3	24.8
Europe	Alcatel-Lucent	ALUA.PA	ALU FP	31-Dec	2012	77.0	94.4	(1.5)	2.8	nm	nm	(22.6)	(1.6)	(1.9)	(0.1)	0.9	15.0	0.9	17.6
	EI Towers SpA	EIT.MI	EIT IM	31-Dec	2012	14.2	15.4	(0.2)	2.3	11.4	12.6	5.0	5.6	3.1	3.5	20.9	16.1	26.4	19.2
	Ericsson LM	ERICb.ST	ERICB SS	31-Dec	2012	13.0	(0.4)	2.1	4.6	(26.6)	49.0	7.5	11.2	3.7	5.6	(25.7)	(27.3)	(20.4)	(21.5)
	Nokia Oyj	NOK1V.HE	NOK1V FH	31-Dec	2012	70.7	nm	(14.7)	8.9	82.0	nm	(8.2)	7.2	(2.2)	1.9	nm	nm	(50.9)	(51.3)
	Spirent Communications Plc	SPT.L	SPT LN	31-Dec	2012	(13.9)	14.4	(4.0)	5.0	(15.8)	14.5	14.1	15.0	10.7	11.7	nm	nm	(52.9)	(58.9)
North America						32.2	31.0	(3.6)	4.7	12.8	25.4	(0.8)	7.5	2.7	4.5	(1.3)	1.2	(19.4)	(19.0)
	Adtran Technology	ADTN.O	ADTN US	31-Dec	2012	(3.0)	46.6	(0.8)	9.2	(3.6)	67.3	6.7	9.5	5.3	7.5	(45.7)	(59.4)	(31.4)	(37.3)
	ARRIS Group, Inc.	ARRS.O	ARRS US	31-Dec	2012	67.5	34.1	nm	28.0	32.9	64.5	1.9	6.3	0.9	2.6	51.0	40.7	nm	68.7
	Ciena Corp	CIEN.O	CIEN US	31-Oct	2012	nm	nm	10.4	13.8	nm	85.5	na	na	(3.7)	3.9	nm	95.4	na	nm
	Corning Incorporated	GLW.N	GLW US	31-Dec	2012	0.6	8.5	1.8	4.5	6.6	4.7	9.1	9.1	6.6	6.5	(15.9)	(12.7)	(13.7)	(11.3)
	Finisar Corp	FNSR.O	FNSR US	30-Apr	2012	(30.7)	63.0	(1.9)	15.8	(29.8)	69.2	(0.8)	5.7	(0.6)	4.6	(33.6)	(41.4)	(25.2)	(29.3)
	Infinera Corp	INFN.O	INFN US	31-Dec	2012	69.7	nm	19.8	6.9	69.2	nm	(13.0)	(6.3)	(8.8)	(4.2)	(93.4)	nm	(48.3)	(56.1)
	JDSU Corp	JDSU.O	JDSU US	30-Jun	2012	(7.0)	32.3	0.3	10.3	(3.4)	29.1	(5.2)	(1.3)	(3.1)	(0.8)	(69.7)	(76.9)	(41.1)	(43.5)
	Polycom Inc	PLCM.O	PLCM US	31-Dec	2012	(19.1)	24.0	0.1	12.8	(42.4)	75.8	0.0	0.9	0.0	0.7	nm	nm	(52.8)	(57.4)
	Tellabs Inc	TLAB.O	TLAB US	31-Dec	2012	(70.1)	nm	(18.4)	0.4	(1.5)	nm	(8.8)	(1.8)	(5.8)	(1.2)	nm	nm	(60.0)	(62.0)
						1.0	34.8	1.4	11.3	3.5	56.6	(1.2)	2.8	(1.0)	2.2	(34.6)	(9.0)	(38.9)	(28.5)

Source: Citi Research

Notes

Notes

Appendix A-1

Analyst Certification

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