Hitech Electronics Industry Operating Benchmarks

Operational and market capitalization data for 208 Hitech Electronics companies

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worldlocity

Version

VERSION	NOTES
2021.1.1	Initial version, dated 04.01.21
2021.2.1	Updated financial and market cap data for 06.25.21. Removed companies that merged or were taken private.
2021.3.1	Updated financial and market cap data for 11.30.21. Removed companies that merged or were taken private.
2022.1.1	Updated financial and market cap data for 01.01.22. Added companies and removed those that merged or were taken private.
2022.2.1	Updated financial and market cap data for 05.16.22. Added companies and removed those that merged or were taken private.
2022.3.1	Updated financial and market cap data for 10.07.22. Added companies and removed those that merged or were taken private.
2023.1.1	Updated financial and market cap data for 12.01.23. Added companies and removed those that merged or were taken private.

Versioning convention: This document is versioned as follows: **YYYY.N.n**, where **YYYY** is the year, **N** is the major release number, and **n** is the minor release number. A major release includes one or more of the following: the number of companies changes; reports and analyses change; financial and market cap information are updated, and a new date is attached to the report. A minor fixes errors, including data errors, formatting errors, and inconsistencies.

Contents

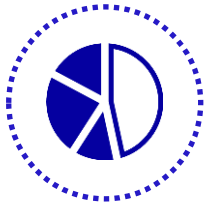
2025 Hitech Electronics Industry Report: Key Takeaways

- The Hitech Electronics industry 3-year CAGR is 3.6% (overall dollars growth). The average company 3-year CAGR is 0.6%.
- The average Hitech Electronics company has gross margins of 32.6%, invests 19.0% of revenue in selling, general, and administrative expense, 7.8% in research and development, and generates 7.8% operating margin, 15.0% EBITDA margin, 3.6% free cash flow, and 9.5% return on invested capital.
- The Hitech Electronics company average inventory turns is 4.6. The median is 4.0. The difference between the average and the median indicates a few outliers raise the average. The median is more in line with the industry operational structure.
- The average Hitech Electronics company has 37.1% PP&E, and 32.9% in goodwill and intangibles, all as a percentage of revenue. Goodwill and intangibles are a proxy for mergers and acquisitions; based on this measure, Hitech Electronics is among the top industries in mergers and acquisitions. In a sign of the "intangibles economy," and of increasing IP content in their products and services, Hitech Electronics companies have almost as many intangible assets as physical assets.
- As expected, Hitech Electronics companies that lead in operating profit, net profit, cash flow, and return on investment (ROA, ROIC, economic profit) are also leaders in market cap multiple.
- Hitech Electronics companies with higher inventory turns tend to have significantly lower market cap multiples than companies with lower inventory turns. This is an indication that inventory turns is a poor indicator of company market performance. (Note: controlling for gross margin yields the same conclusion).
- Hitech Electronics companies with higher IP content in their products invest more in R&D, have higher gross margins, and significantly higher market cap multiples. There is a symbiotic relationship between gross margin and R&D investment: higher R&D investment leads to more differentiated products and higher gross margins; on the other hand, differentiated products create higher gross margins, which allows for higher R&D investment. Companies in a low gross margin trap may have challenges breaking out of it without multi-year increases in R&D investment (or M&A).
- Historical analysis (using aggregate data and ratios) indicates the operational structure is essentially the same as it was a decade ago. This includes similar gross margins, operating margins, asset intensity, inventory turns, and cash flows. This indicates the industry has a certain physical setpoint and that there are individual winners and losers around that setpoint, but that the overall industry is not operationally performing better than it was a decade ago.
- Individual operational measures are poor statistical predictors of market cap multiple. Quartile analysis was performed to contrast the operational characteristics of market cap multiple leaders with others.
- Market cap multiple leaders have cap multiples that are 2.5X average and 17.3X laggards. Leaders have significantly higher gross margins, invest significantly more in R&D, and generate significantly higher operating margins, cash flow, and return on investment (ROA, ROIC, and economic profit).
- From a supply chain management perspective, data in this report supports the thesis that market leaders run their supply chains with more of a profit center mentality than a cost center mentality, which has historically been the case. This further suggests supply chain management has evolved to a sophisticated multivariate decision science, rather than a unidimensional cost management function.

Data Set

Information on the companies and the data set used in the analysis.

Data Set



COMPANIES

The data set includes 208 publicly-traded Hitech Electronics companies.

208

REVENUE

Aggregate revenue for companies in the data set is $2.3 trillion for the latest reporting fiscal year as of the date on the cover of this report.

$2.3T

MARKET CAPITALIZATION

Aggregate market cap for companies in the data set is $7.4 trillion as of date on the cover of this report.

$7.4T

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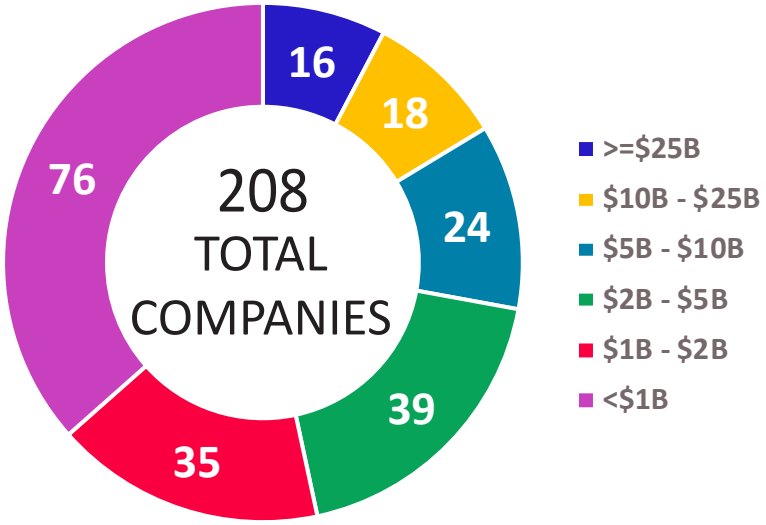
3. M=million; B=billion; T=trillion.

Data Set
Companies included in this report

2CRSI SA
3D Systems Corp.
AAC Technologies Holdin
ADTRAN Holdings, Inc.
Adtran Networks SE
Allied Telesis Holdings
Allient, Inc.
Alps Alpine Co., Ltd.
Amano Corp.
Amphenol Corp.
Anritsu Corp.
Apple, Inc.
Applied Optoelectronics
Arista Networks, Inc.
Array Technologies, Inc
Asia Vital Components C
ASUSTek Computer, Inc.
AT & S Austria Technolo
AudioCodes Ltd.
AUO Corp.
Aviat Networks, Inc.
Badger Meter, Inc.
Bang & Olufsen A/S
Barco NV
Bel Fuse, Inc.
Belden, Inc.
Benchmark Electronics,
BGIN Blockchain Ltd.
BOE Varitronix Ltd.
BYD Electronic (Interna
Canaan, Inc.
Canadian Solar, Inc.
Canon, Inc.
Casio Computer Co., Ltd
Celestica, Inc.
Ceragon Networks Ltd.
China Aerospace Interna
China Shuifa Singyes En
Ciena Corp.
Cisco Systems, Inc.
Codan Ltd.
Cognex Corp.
Coherent Corp.
Comba Telecom Systems H
CommScope Holding Co.,
Comtech Telecommunicati
Corning, Inc.
Corsair Gaming, Inc.
Cricut, Inc.
CTS Corp.
Daktronics, Inc.
Datalogic SpA
Dell Technologies, Inc.
Dexerials Corp.
Diebold Nixdorf, Inc.
Digi International, Inc
DKK Co., Ltd.
Elecom Co., Ltd.
Enphase Energy, Inc.
Enplas Corp.
ESCO Technologies, Inc.
Eutelsat Communications
Evertz Technologies Ltd
EVS Broadcast Equipment
Extreme Networks, Inc.
Fabrinet
FIH Mobile Ltd.
First Solar, Inc.
FIT Hon Teng Ltd.
Flat Glass Group Co., L
Flex Ltd.
Fortive Corp.
Furuno Electric Co., Lt
Futaba Corp.
Garmin Ltd.
GCL Technology Holdings
Gilat Satellite Network
GoPro, Inc.
Hamamatsu Photonics KK
Harmonic, Inc.
Hewlett Packard Enterpr
Hexagon AB
Hexatronic Group AB
HIROSE ELECTRIC CO., LT
HMS Networks AB
Hon Hai Precision Indus
Horiba Ltd.
HP, Inc.
HUBER+SUHNER AG
IBIDEN Co., Ltd.
Inficon Holding AG
Itron, Inc.
Ituran Location & Contr
Jabil, Inc.
Japan Aviation Electron
Japan Display, Inc.
Jenoptik AG
JEOL Ltd.
JinkoSolar Holding Co.,
JVCKenwood Corp.
Key Tronic Corp.
KEYENCE Corp.
Keysight Technologies,
Kingboard Laminates Hol
Knowles Corp.
Koa Corp.
Legend Holdings Corp.
LEM Holding SA
Lenovo Group Ltd.
LG Display Co., Ltd.
Littelfuse, Inc.
Logitech International
LSI Industries, Inc.
Lumentum Holdings, Inc.
MARUWA CO., LTD.
Maxell Ltd.
Meiko Electronics Co.,
Mesa Laboratories, Inc.
Methode Electronics, In
Minebea Mitsumi, Inc.
MKS, Inc.
Motorola Solutions, Inc
Murata Manufacturing Co
NCAB Group AB
NETGEAR, Inc.
Nextpower, Inc.
Nichicon Corp.
Nippon Electric Glass C
Nokia Oyj
Noritsu Koki Co., Ltd.
Novanta, Inc.
Oki Electric Industry C
OMRON Corp.
OSI Systems, Inc.
Panasonic Holdings Corp
PC Partner Group Ltd.
Penguin Solutions, Inc.
Plexus Corp.
Pure Storage, Inc.
Quanta Computer, Inc.
Quantum Corp.
Ralliant Corp.
Renishaw Plc
Richardson Electronics
Rogers Corp.
Samsung Electronics Co.
Sandisk Corp.
Sanmina Corp.
Seagate Technology Hold
Seiko Epson Corp.
Sensata Technologies Ho
Sharp Corp.
Shibaura Mechatronics C
Shimadzu Corp.
Shoals Technologies Gro
SIIX Corp.
Skyworth Group Ltd.
SMA Solar Technology AG
SolarEdge Technologies,
Solargiga Energy Holdin
Sonos, Inc.
Sony Group Corp.
Spectris Plc
Stratasys Ltd.
Sumida Corp.
Sunny Optical Technolog
Sunrun, Inc.
Super Micro Computer, I
Taiyo Yuden Co., Ltd.
Tazmo Co., Ltd.
TCL Electronics Holding
TDK Corp.
TE Connectivity Plc
Teledyne Technologies,
Telefonaktiebolaget LM
Telesat Corp.
TOKYO OHKA KOGYO CO.,
Topcon Corp.
Toshiba Tec Corp.
Trimble, Inc.
Truly International Hol
Tt Electronics Plc
TTM Technologies, Inc.
Turtle Beach Corp.
Ubiquiti, Inc.
u-blox Holding AG
Universal Display Corp.
Universal Electronics,
Vaisala Oyj
Vecima Networks, Inc.
Venture Corp. Ltd.
ViaSat, Inc.
Viavi Solutions, Inc.
Vicor Corp.
Videndum Plc
Vishay Precision Group,
Volex Plc
Vontier Corp.
VTech Holdings Ltd.
Wacom Co., Ltd.
Western Digital Corp.
Xerox Holdings Corp.
Xiaomi Corp.
Xinyi Solar Holdings Lt
Yageo Corp.
Yangtze Optical Fibre &
Zebra Technologies Corp
ZTE Corp.

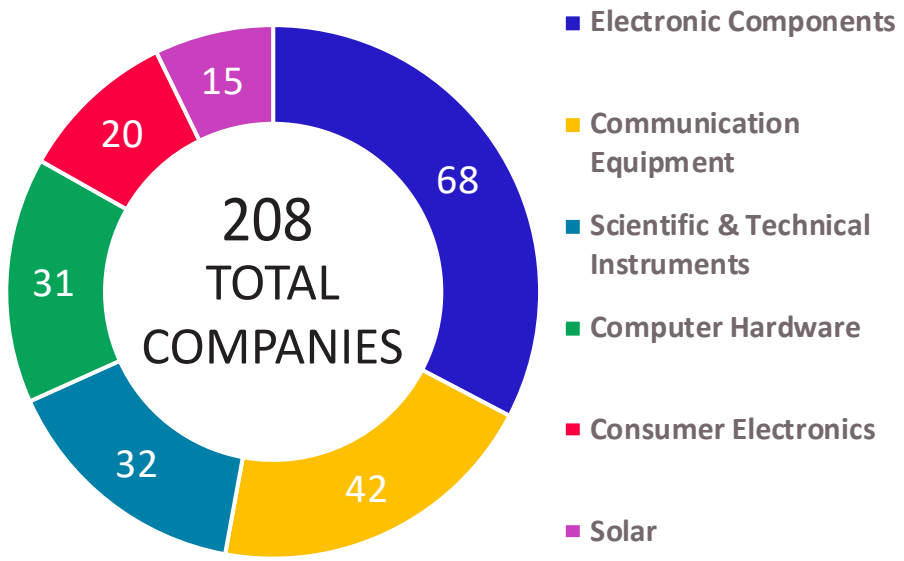
Data Set
Company distribution

BY ANNUAL REVENUE

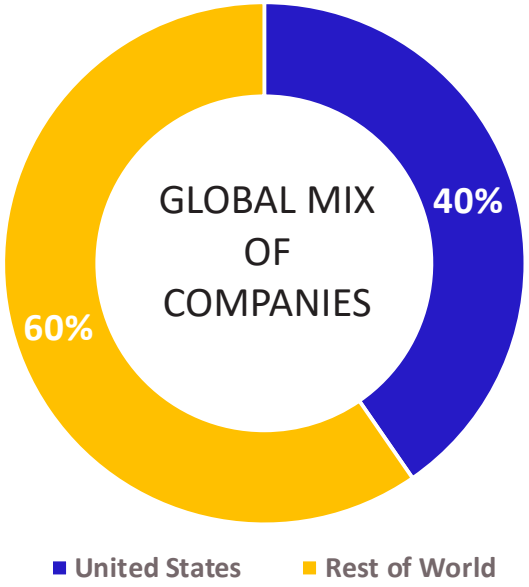


MEDIAN REVENUE = **$1,725M**

BY SUB-INDUSTRY



GEOGRAPHIC REGION



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Data Set

Index of key metrics included in this report

This report provides analysis of the following variables (and derivatives) for trailing twelve months (TTM) results and for the past ten years.

OPERATIONS

REVENUE
GROWTH RATE
GROSS MARGIN
SALES AND MARKETING
GENERAL AND ADMINISTRATIVE
RESEARCH & DEVELOPMENT
REVENUE PER EMPLOYEE
STOCK COMPENSATION
GROSS MARGIN ROI
TURN AND EARN

ASSETS

TOTAL ASSETS
CASH AND CASH EQUIVALENTS
DEBT AND DEBT RATIOS
EQUITY
PROPERTY, PLANT, AND EQUIPMENT (PP&E)
GOODWILL & INTANGIBLES
OPERATING ASSETS
INVESTED CAPITAL
CAPITAL EMPLOYED
INVENTORY
DEFERRED TAX ASSETS
RECEIVABLES
PAYABLES

CASH FLOW

OPERATING CASH FLOW
FREE CASH FLOW
CAPITAL EXPENDITURES (CAPEX)
DAYS IN RECEIVABLES
DAYS IN PAYABLES
INVENTORY TURNS
CASH CONVERSION CYCLE

ROI

RETURN ON ASSETS (ROA)
RETURN ON INVESTED CAPITAL (ROIC)
RETURN ON CAPITAL EMPLOYEED (ROCE)
ECONOMIC PROFIT (EP)
RETURN ON OPERATING ASSETS (ROOA)
RETURN ON FIXED ASSETS (ROFA)
RETURN ON PHYSICAL ASSETS (ROPA)

VALUATION

MARKET CAPITALIZATION
ENTERPRISE VALUE (EV)
MARKET CAP / REVENUE
ENTERPRISE VALUE / REVENUE
MARKET CAP / EBITDA
ENTERPRISE VALUE / EBITDA
MARKET CAP / NET INCOMEE
ENTERPRISE VALUE / NET INCOME

PROFIT

OPERATING PROFIT
NET OPERATING PROFIT AFTER TAXES (NOPAT)
EARNINGS BEFORE INTEREST AND TAXES (EBIT)
EARNINGS BEFORE INTEREST, TAXES, AND AMORTIZATION (EBITDA)
ADJUSTED EBITDA
NET PROFIT
TAX RATE

Notes:
1. For definitions and notes on these metrics and their use in this report, refer to the **Appendix**.

Data Set

Three different analysis approaches in this analysis

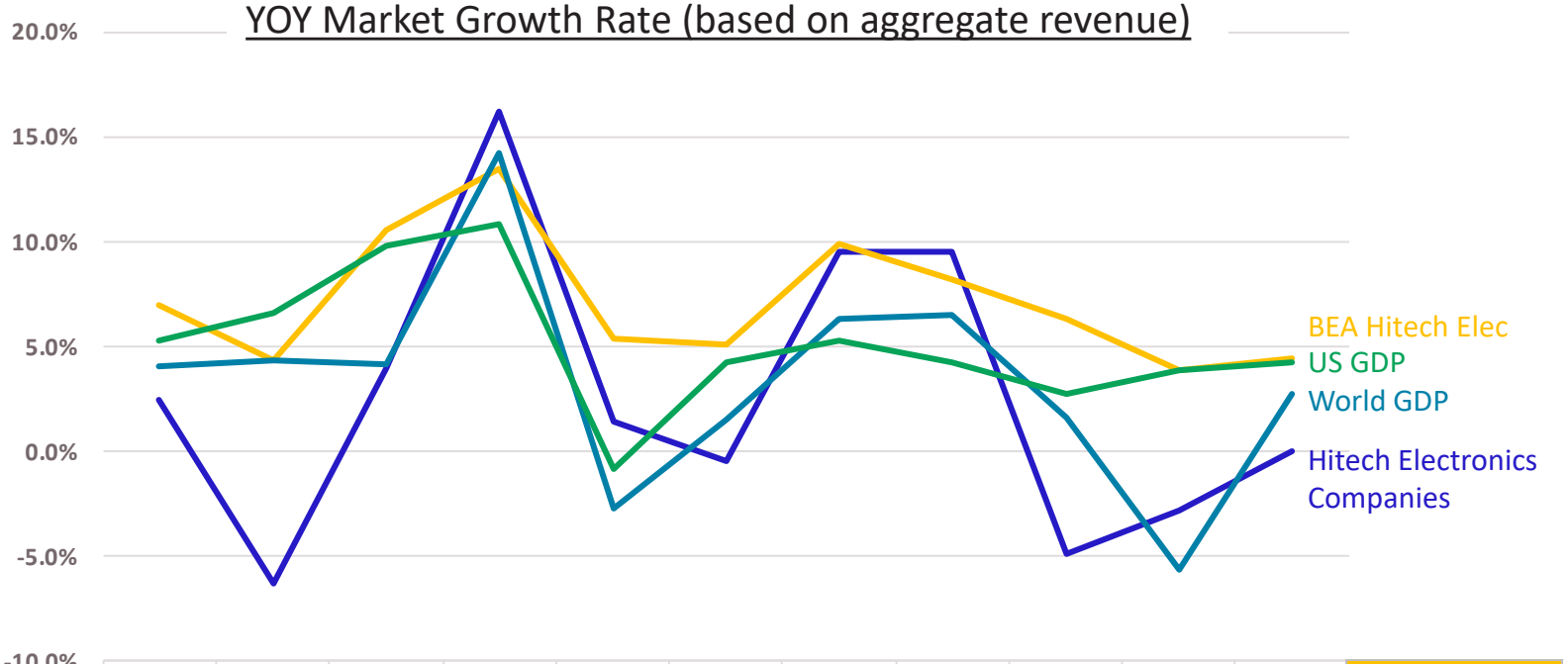
APPROACH	DESCRIPTION	EXAMPLE	GOOD FOR
1. Aggregate averages	Averages are computed by adding up all numbers from all companies. For example, the gross margin for the industry would be the sum of all revenue for all companies minus the sum of all COGS for all companies (divided by the sum of all revenue for all companies).	Average Gross Margin % = (sum of all revenues minus sum of all COGS) / sum of all revenues	Overall industry structure and operations; smooths outliers.
2. Averages of percentages	Averages are computed by taking the averages of all percentages for all the companies. For example, the average gross margin % is the sum of all gross margin %s for all companies divided by the number of companies.	Average Gross Margin % = (sum of all gross margin %s) / (number of companies)	Comparison across companies.
3. Quartile analysis	The market cap multiples of all companies are divided into quartiles. The operating characteristics of the top quartile companies are compared to the others. Likewise, measures for each company are divided into quartiles and the average market cap multiple within each quartile is shown.	1) Isolate each quartile of market cap multiples; compare gross margin of leaders to others. 2) Isolate each quartile of gross margin; display average market cap multiple within each gross margin quartile.	Understanding characteristics of leaders.

Overall Market

Summary of the market using the companies in this report as a proxy for the overall Hitech Electronics market. Charts in this section use the “aggregate averages” approach.

Overall Market

YOY growth rates, past ten years



	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014	2024-2014 CAGR
Hitech Electronics Companies	2.5%	-6.3%	3.9%	16.2%	1.4%	-0.4%	9.5%	9.6%	-4.8%	-2.8%	0.0%	**2.6%**
BEA Hitech Electronics Output	7.0%	4.4%	10.6%	13.5%	5.4%	5.1%	9.9%	8.2%	6.3%	3.8%	4.4%	**7.4%**
World GDP (current $)	4.0%	4.4%	4.1%	14.2%	-2.7%	1.5%	6.4%	6.5%	1.6%	-5.6%	2.8%	**3.7%**
US GDP (current $)	5.3%	6.6%	9.8%	10.9%	-0.9%	4.3%	5.3%	4.3%	2.8%	3.9%	4.3%	**4.6%**

NOTES & INSIGHTS

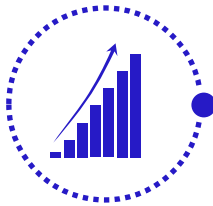
- Hitech electronics market CAGR for the past decade was lower than the global current dollar GDP growth rate. CAGR is skewed because of the volatility and dislocation caused by the pandemic.
- BEA numbers are for US domestic output only. They are shown here for comparison purposes only.

Notes:

1. "Hitech Electronics Companies" represents all companies in the data set for which there are year-over-year revenue numbers. The number of companies varies from year-to-year based on companies going public and some companies merging or being taken private as the decade progresses.
2. "BEA Hitech Electronics Output" growth is calculated from the US Bureau of Economic Analysis (https://apps.bea.gov/iTable/iTable.cfm?reqid=150&step=2&isuri=1&categories=gdpxind), GDP by Industry. Hitech Electronics output as defined here is based on output of the following sub-industries: computer and electronics products; data processing, internet publishing, and other information services; and computer systems design and related services. BEA updates its past numbers periodically, so past reports may not reflect the same past BEA numbers.
3. World GDP and US GDP numbers are sourced from The World Bank (data.worldbank.org)
4. World GDP and US GDP growth rates are based on *current* dollars. This means they have not been adjusted for inflation. *Current* numbers are used to ensure apples-to-apples comparisons with Hitech electronics market growth rates. Note that GDP growth rates are typically reported in constant dollars pegged to a certain year in order to account for the effect of price inflation. Thus, GDP growth rates commonly reported in media are typically lower than those shown here.

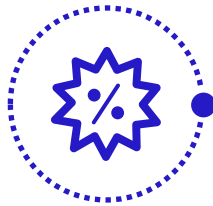
Analysis Summary

Operational ratios based on aggregate data, TTM[1]



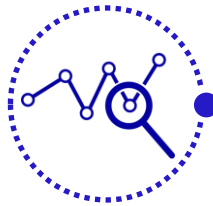
3-YEAR CAGR[2]

4.5%



GROSS MARGIN

29.3%

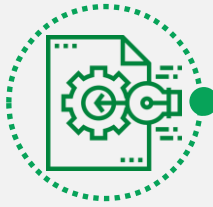


MARKET CAP[3]

3.2X

NET PROFIT

9.8%



R&D

6.8%

SG&A

12.4%

INVENTORY TURNS

5.3

C2C (DAYS)

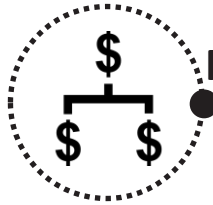
44.0

PP&E

22.4%

CAPEX

5.2%



FREE CASH FLOW

9.4%

ROIC

16.0%

Notes:

1. All revenue and cost numbers are aggregate values for all companies for the trailing twelve months (TTM) as of the date on the cover of this report.
2. Growth rate is based on total dollars growth of the industry over the past four years.
3. Market capitalization ratio is aggregate market capitalization for all companies as of the date on the cover of this report divided by total revenue for all companies on TTM basis.

Overall Market

Historical key metrics based on aggregate data, past ten years

	METRIC	TTM	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014	AVG14-24	2013	2000
															HISTORY	
OPERATIONS	Growth Rate (3YRCAGR)	4.5%	3.6%	3.4%	5.3%	6.7%	4.8%	3.3%	2.9%	0.4%	-4.8%	-2.8%	0.0%	2.1%		
	Gross Margin	29.3%	29.6%	28.5%	28.5%	29.0%	27.9%	27.5%	28.8%	29.0%	28.1%	27.7%	27.7%	28.4%	27.4%	32.4%
	SG&A % of Revenue	12.4%	13.2%	13.0%	12.2%	12.4%	13.8%	13.9%	13.7%	14.3%	14.3%	14.0%	13.0%	13.4%	12.6%	17.7%
	R&D % of Revenue	6.8%	6.8%	6.7%	5.9%	5.8%	6.3%	5.9%	5.6%	5.6%	5.4%	5.0%	5.2%	5.8%	5.1%	7.1%
	Inventory Turns (COGS/Inv)	5.3	5.6	5.5	5.5	6.1	6.6	7.4	6.9	7.0	7.9	8.0	8.3	6.8	8.6	4.9
	Days in Inventory	68.5	65.7	66.9	66.1	59.7	55.6	49.3	53.0	52.3	46.2	45.4	43.8	54.9	42.7	74.0
	Revenue / Employee ($K)	$476	$438	$413	$426	$408	$352	$355	$366	$343	$274	$296	$339	$364	$380	$281
PROFIT & CASH FLOW	Operating Income	12.4%	11.9%	11.0%	12.4%	13.0%	10.2%	9.8%	11.6%	11.2%	10.5%	10.6%	10.0%	11.1%	9.7%	7.9%
	Net Profit	9.8%	8.8%	8.5%	10.6%	10.9%	7.7%	7.6%	8.1%	7.3%	7.5%	7.6%	7.6%	8.4%	6.4%	5.0%
	EBITDA	17.4%	18.8%	16.0%	17.2%	18.0%	15.6%	15.2%	16.8%	16.3%	15.5%	15.8%	15.2%	16.4%	14.9%	12.9%
	Operating Cash Flow	14.4%	15.3%	13.8%	13.2%	14.2%	15.1%	12.6%	13.3%	13.2%	13.6%	13.7%	13.3%	13.8%	12.8%	7.0%
	FCF % of Revenue	9.4%	9.9%	7.7%	7.7%	8.8%	10.0%	7.7%	7.7%	6.8%	8.0%	8.4%	8.3%	8.3%	7.7%	0.1%
	CAPEX % of Revenue	5.2%	5.4%	6.1%	5.4%	5.4%	5.1%	4.9%	5.6%	6.4%	5.7%	5.3%	5.0%	5.5%	5.1%	6.9%
	Stock Compensation	1.6%	1.6%	1.5%	1.3%	1.3%	1.3%	1.2%	1.4%	1.3%	1.2%	1.1%	0.9%	1.3%	0.8%	0.1%
	Days in Receivables	58.1	55.3	54.0	53.4	56.4	56.0	58.2	56.7	58.0	52.4	50.7	56.7	55.3	56.0	69.0
	Days in Payables	82.6	78.5	73.0	76.2	78.4	74.2	71.7	75.9	79.1	67.0	58.8	61.0	72.2	56.1	59.6
	Cash-to-Cash Cycle (Days)	44.0	42.4	47.9	43.3	37.7	37.4	35.8	33.8	31.2	31.6	37.3	39.5	38.0	42.5	83.4
ASSETS	Property, Plant, Equipment %	22.4%	23.1%	23.8%	21.1%	21.2%	23.6%	20.3%	20.5%	21.1%	19.5%	18.2%	18.8%	21.0%	18.8%	21.5%
	Cash % of Revenue	18.9%	21.2%	21.3%	19.7%	23.3%	29.4%	23.5%	24.7%	28.3%	28.4%	23.2%	21.4%	24.0%	21.6%	20.0%
	Debt % of Revenue	25.9%	27.5%	27.0%	25.4%	26.6%	30.7%	28.1%	27.1%	30.8%	26.1%	22.2%	18.7%	26.4%	16.4%	22.9%
	Goodwill and Intangibles % of I	23.0%	23.3%	22.1%	20.1%	19.6%	22.6%	21.0%	20.8%	19.3%	16.0%	13.5%	14.7%	19.4%	14.0%	14.4%
ROI	ROIC	16.0%	15.6%	14.2%	17.1%	18.1%	14.9%	17.6%	16.1%	14.5%	15.0%	19.2%	19.2%	16.5%	19.6%	17.7%
	ROCE	16.2%	14.6%	13.2%	16.2%	15.8%	11.6%	11.8%	14.0%	12.5%	12.0%	13.6%	13.5%	13.5%	13.5%	10.6%
	ROA	7.9%	7.0%	6.7%	8.9%	8.7%	5.8%	6.1%	6.5%	5.5%	6.0%	6.8%	6.9%	6.8%	6.0%	4.5%
	ROOA	13.7%	13.2%	12.2%	14.4%	15.1%	11.6%	11.8%	13.3%	12.3%	12.8%	14.7%	13.6%	53.2%	13.4%	9.9%
	EP	5.6%	5.0%	2.4%	6.7%	7.7%	4.6%	4.1%	5.3%	4.4%	3.6%	4.9%	4.8%	4.9%	4.7%	3.5%

NOTES & INSIGHTS

- This chart shows the operational structure of the industry today and for the past decade.
- These data indicate that the operational structure of the industry has remained relatively constant for the past decade.
- This indicates that industry operates around a certain “setpoint” driven by physics and physical characteristics.
- That said, individual companies deviate significantly from the overall structural setpoint, resulting in significantly different company-level operational results (next section).
- The final three years of CAGR are one-year growth rates (due to lack of data).
- Historical numbers beyond ten years have fewer companies and need further analysis for apples-to-apples comparisons.

Analysis Summary

Charts that summarize key variables in the report. Charts in this section use the “averages of percentages” approach. In other words, it shows the averages of all percentages for all companies. (These numbers will differ from industry structural numbers in the previous section)

Analysis Summary

Average and median for different variables, TTM

The table below contains the average and median values for the 208 companies investigated. This shows that the average hitech electronics company operates with a gross margin of 32.6% , spends 19.0% of revenue on SG&A, 7.8% on R&D, and has inventory turns of 4.6 , operating income of 7.8% , net income of 2.4%, free cash flow of 3.6% , and return on invested capital of 9.5% .

	REVENUE (TTM)		OPERATIONS				PROFIT AND CASH			
	Annual Revenue ($M)	3-Year CAGR	Gross Margin	SG&A	R&D	Inventory Turns	Operating Income	Net Income	Free Cash Flow	ROIC
Average	$11,081	0.6%	32.6%	19.0%	7.8%	4.6	7.8%	2.4%	3.6%	9.5%
Median	$1,725	-0.2%	33.2%	18.6%	5.9%	4.0	7.5%	4.6%	6.2%	8.1%

Notes:

1. TTM = trailing twelve months. All revenue and cost numbers are based on trailing twelve months results as of the date on the cover of this report. This report provides the averages of the percentages of all companies, including outliers.
2. Growth rate is based on the past four years of financial results
3. All percentage numbers are a percentage of revenue. Average is the average of all the percentages for each of the companies.

Analysis Summary

Average values by revenue quartile, TTM[1]

Market cap multiples for smaller companies are larger than larger companies. SG&A and R&D costs are also significantly higher, with operating income, free cash flow and return on invested capital all significantly lower.

All numbers are averages within each quartile

		REVENUE (TTM)		MKT CAP	OPERATIONS				PROFIT AND CASH			
	#	Revenue($M)	3-Year CAGR	Mkt Cap/ Revenue	Gross Margin	SG&A	R&D	Inventory Turns	Operating Income	Net Income	Free Cash Flow	ROIC
Quartile 4	52	$39,703	2.4%	2.6	29.1%	13.3%	6.7%	5.3	10.7%	6.2%	8.3%	14.9%
Quartile 3	52	$3,165	2.0%	2.5	29.3%	15.9%	6.3%	4.6	8.5%	0.8%	4.2%	10.9%
Quartile 2	52	$1,060	-0.4%	1.9	35.9%	22.7%	8.0%	4.1	7.9%	-1.1%	7.3%	6.3%
Quartile 1	52	$394	-1.4%	2.0	35.9%	24.2%	10.3%	4.5	4.2%	-6.1%	-5.4%	5.8%

REVENUE QUARTILES ($M)

Quartile 4 >= $5,533
Quartile 3 >= $1,725 , < $5,533
Quartile 2 >= $639 , < $1,725
Quartile 1 < $639

Notes:

1. TTM = trailing twelve months. All revenue and cost numbers are based on trailing twelve months results as of the date on the cover of this report. This report provides the averages of the percentages of all companies, including outliers.
2. Growth rate is based on the past four years of financial results
3. All percentage numbers are a percentage of revenue. Average is the average of all the percentages for each of the companies.

Analysis Summary

Average numbers for the entire data set, TTM[1]

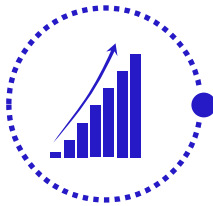
3-YEAR CAGR	GROSS MARGIN	MARKET CAP	NET PROFIT
0.6%	32.6%	2.3X	2.4%
R&D	SG&A	INVENTORY TURNS	C2C (DAYS)
7.8%	19.0%	4.6	116.4
PP&E	CAPEX	FREE CASH FLOW	ROIC
37.1%	7.8%	3.6%	9.5%

Notes:

1. All revenue and cost numbers are based on trailing twelve months (TTM) results as of the date on the cover of this report for all companies in the data set.
2. All ratios shown here are averages of the ratios of each company.

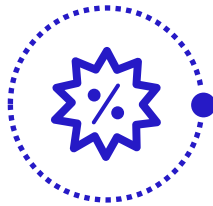
Analysis Summary

Average numbers for the top-quartile market cap[1] multiple leaders



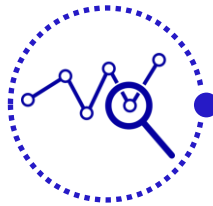
3-YEAR CAGR[2]

4.0%



GROSS MARGIN

45.5%

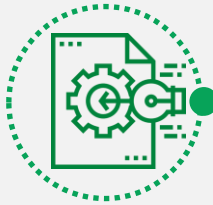


MARKET CAP

5.7X

NET PROFIT

12.5%



R&D

10.6%

SG&A

19.5%

INVENTORY TURNS

4.5

C2C (DAYS)

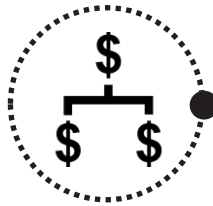
134.8

PP&E

27.4%

CAPEX

6.2%



FREE CASH FLOW

12.3%

ROIC

18.7%

Notes:

1. All revenue and cost numbers are based on trailing twelve months (TTM) results as of the date on the cover of this report for all companies in the top quartile of market cap multiple performance.
2. All ratios shown here are averages of the ratios of each company.

Analysis Summary

Key metric benchmarks and relationship to market cap multiple

Average metric value within the quartile and corresponding average market cap within the quartile

	n=208 METRIC	INDUSTRY BENCHMARKS Q4 AVG	MEDIAN	Q1 AVG	MARKET CAP MULTIPLE Q4 AVG	Q1 AVG
OPERATIONS	3-Year CAGR	14.5%	-0.2%	-11.7%	3.2	1.4
	Gross Margin	54.7%	33.2%	10.5%	4.2	0.9
	SG&A	33.8%	18.6%	5.6%	2.5	2.1
	R&D	16.9%	7.5%	1.9%	3.5	1.6
PROFIT	Operating Margin	22.1%	7.5%	-6.5%	4.6	1.3
	EBITDA Margin	31.4%	12.9%	0.7%	4.5	0.9
	Net Profit Margin	17.3%	4.6%	-18.1%	4.7	1.1
CASH	Free Cash Flow	19.7%	6.2%	-18.4%	4.3	1.2
	CAPEX % of Revenue	22.8%	3.4%	1.2%	2.5	2.4
	PP&E (net) % of Revenue	105.2%	17.4%	6.3%	2.2	2.4
ROI	ROIC % of Revenue	30.3%	8.1%	-8.8%	3.7	1.4
	ROCE % of Revenue	26.5%	8.0%	-8.9%	4.3	1.1
	ROA % of Revenue	13.0%	3.7%	-10.1%	4.3	1.1
	EP % of Revenue	10.9%	0.8%	-14.2%	4.1	1.4
	ROOA % of Revenue	30.9%	8.3%	-6.8%	4.0	1.1
	ROPA % of Revenue	83.5%	17.2%	-13.1%	4.4	1.1
C2C	Inventory Turns	8.7	4.0	2.0	1.8	3.5
	Payables (days)	190.1	91.1	51.6	3.5	1.8
	Receivables (days)	120.7	70.6	43.1	1.9	2.5
	Cash-to-Cash (days)	127.3	107.1	35.3	3.1	1.9

Gross margin is important to market performance, indicating product superiority and pricing power are paramount.

All forms of profitability have a high correlation with market performance.

All forms of ROI are strong indicators of market performance.

Inventory turns and cash-to-cash (days) correlate little or negatively with market performance

Notes:

1. All metric numbers are based on trailing twelve months (TTM) results as of the date on the cover of this report. Market capitalization numbers are as of the date on the cover of this report.
2. This chart uses the averages and medians of the percentages of each company within a quartile and across the entire data set. Q4=top quartile; Q1=bottom quartile.
3. Source of all data is Calcbench and YCharts and Worldlocity analysis.

Analysis Summary
Market cap multiple quartile comparison

This chart compares the operating characteristics of each market cap multiple quartile in order to glean insights into what cap leaders do differently. It summarizes the difference between the top and bottom quartiles in order to draw contrasts.

	n=208 METRIC	DATA SET AVG	QUARTILE (AVGS WITHIN EACH MKT CAP QUARTILE) TOP (Q4)	Q3	Q2	BOTTOM (Q1)	DIFFERENCE TOP-BOTTOM
	Market Cap Multiple	2.3	5.7	2.0	1.0	0.3	17.3X
OPERATIONS	1-Year Growth	0.6%	4.0%	-0.1%	0.8%	-2.2%	6.1 pps
OPERATIONS	Gross Margin	32.6%	45.5%	36.5%	27.9%	20.4%	25.1 pps
OPERATIONS	SG&A	19.0%	19.5%	21.8%	17.9%	16.8%	2.7 pps
OPERATIONS	R&D	7.8%	10.6%	9.0%	7.1%	4.4%	6.2 pps
PROFIT	Operating Profit	7.8%	17.4%	7.8%	4.9%	1.2%	16.2 pps
PROFIT	Net Profit	2.4%	12.5%	1.2%	-1.4%	-2.6%	15.1 pps
PROFIT	EBITDA	15.0%	23.9%	17.2%	12.3%	6.7%	17.1 pps
CASH	Inventory Turns	4.6	4.5	4.0	4.6	5.5	-1.0 Turns
CASH	C2C Cycle (days)	116.4	134.8	124.8	113.0	92.8	42.0 Days
CASH	Net Cash	-13.7%	-2.6%	-12.3%	-24.8%	-15.0%	12.4 pps
CASH	CAPEX	7.8%	6.2%	8.2%	11.6%	5.1%	1.1 pps
CASH	Free Cash Flow	3.6%	12.3%	6.0%	-4.9%	0.9%	11.4 pps
ROI	ROA	2.7%	8.6%	3.7%	1.8%	-3.3%	11.9 pps
ROI	ROIC	9.5%	18.7%	9.2%	8.0%	2.0%	16.8 pps
ROI	EP	-0.4%	5.8%	-1.1%	-2.8%	-3.8%	9.6 pps
ROI	ROOA	10.2%	21.2%	10.5%	7.6%	1.4%	19.8 pps
ROI	ROPA	27.1%	62.4%	27.2%	16.8%	2.1%	60.3 pps

NOTES & INSIGHTS

- Leaders have market cap multiples that are 2.5X average, and 17.3X laggards.
- Leaders have significantly higher gross margins and investments in R&D. This is perhaps a chicken-and-egg question: does the higher investment in R&D result in a higher gross margin product, or does the higher gross margin product allow for a higher investment in R&D? It is likely a symbiotic and self-reinforcing relationship.
- Leaders excel in all forms of profitability, cash flow, and return on investment.
- Paradoxically, cap leaders do not lead in inventory turns. Cap laggards are more likely to lead in inventory turns than cap leaders. This is likely because cap leaders are managing their supply chains as profit centers and cap laggards are solely focused on cost.
- All financial numbers are for the trailing twelve months as of the date on the cover of this report. All market cap numbers are as of the date on the cover of this report.

Appendix

Additional supporting material and notes.

Notes and Definitions (1 of 4)

1	**Primary data sources** for the analysis are YCharts and Worldlocity research using data publicly available through the Internet.
2	**Company data filtering** - Companies included in this analysis are filtered based on available financial, operational, and market cap data. Generally, companies must have revenue, COGS, and market cap data to be included in the analysis.
3	**Industry classification** - companies are classified to industries using 1) Morningstar industry classifications; 2) Global Industry Classification System (GICS); and 3) Manual adjustments in those cases where either Morningstar is incorrect, GICS is incorrect, or both are incorrect. Both Morningstar and GICS are incorrect in a small percentage of cases. An attempt has been made to correct all of these, but there are probably still a small number of companies that may misclassified.
4	**TTM** = trailing twelve months = last four fiscal quarters.
5	**Weighted Average Cost of Capital (WACC)** = represents a company's average cost of raising funds from both debt and equity, weighted by their portion of the firm's capital structure. It's essentially the company's hurdle rate for new investments. WACC for each industry and each year is as reported by Aswath Damodaran, NYU Stern Business School. This is reported annually in January using data from the previous year. For a given year, this analysis uses the values reported in January for that year and uses the data set for US companies, only. Global WACC numbers for each industry will be slightly higher.
6	**Tax Rates** used in any financial calculations (for example NOPAT) are global industry averages for the money-making companies in each industry, as reported each year by Aswath Damodaran, NYU Stern Business School. This is reported annually in January using data from the previous year. For a given year, this analysis uses the values reported in January for that year.
7	**Gross Profit** = Revenue minus Cost of Goods Sold (COGS)
8	**Gross Margin** = Gross profit divided by Revenue
9	**Operating Income** = Gross profit minus operating costs, which typically include sales and marketing, general and administrative, and research and development costs.
10	**EBIT** = earnings before interest and taxes
11	**EBITDA** = earnings before interest, taxes, and amortization. EBITDA is calculated as operating income plus depreciation and amortization.
12	**Adjusted EBITDA** = EBITDA plus stock compensation.
13	**Net Operating Profit After Taxes (NOPAT)** = Operating Income times (1 minus Tax Rate). NOPAT is used in some ROI equations to focus on the operating aspects of a company, while also recognizing the reality of taxes.
14	**Free Cash Flow** = operating cash flow minus CAPEX.
15	**Cash** = cash, cash equivalents, and marketable securities.
16	**Non-Operating Cash and Cash Equivalents** is calculated as Cash and Cash Equivalents minus 3.5% times Revenue. The assumption here is that 3.5% of revenue is the amount of cash needed to fund opeations. The amount of operating cash for each company and industry may be different, but this rule of thumb is used for scalability across a large number of companies. In those cases where the Non-Operating Cash and Cash Equivalents results in a negative number, it is set to zero.

Notes and Definitions (2 of 4)

17	**Total Debt** = short-term debt, the current portion of long-term debt, long-term debt, borrowings under credit facility, capital lease obligations, convertible notes, and deferred rent.
18	**Operating Assets** = total receivables + inventories + deferred tax assets + Net PP&E + goodwill and intangibles. Operating assets are the assets needed to drive operations in a manufacturing, distribution, retail, transportation or other company engaged in supply chains. Deferred Tax Assets are considered part of operating assets since they were created by opeating activities and represent a future tax savings. Receivables are included because they are a direct result of operations. Goodwill and Intangibles are included because they are presumably used in the producing, selling, and distributing goods and services.
19	**Capital Employed** = Total Assets minus Current Liabilities, or alternatively, Shareholders Equity plus Non-Current Liabilities. This is intended to capture all the long-term capital invested in the business.
20	**Invested Capital** = Total Debt + Total Equity minus Non-Operating Cash and Cash Equivalents. In those cases where equity is negative, equity is set to zero. Invested capital is intended to represent the amount of capital invested in a buinsess by shareholders and debtholders. Non-operating cash is subtracted in order to arrive at the net debt invested in the business.
21	**Return on Assets (ROA)** = Net Income divided by Total Assets.
22	**Return on Invested Capital (ROIC)** = NOPAT (defined above) divided by Invested Capital (defined above). If a company's Invested Capital is negative, ROIC is meaningless and not calculated for that company.
23	**Return on Capital Employed (ROCE)** = EBIT (defined above) dividied by capital employed (defined above). If a company's Capital Employed is negative, ROCE is meaningless and not calculated for that company.
24	**Economic Profit (EP)** = Net Operating Profit after Taxes (NOPAT) minus Weighted Average Cost of Capital (WACC) times Invested Capital. WAAC, NOPAT, and invested Capital are defined above. EP is also known as Economic Value Added (EVA). EVA is a trademark of Stern Value Management. A company is deemed to be creating value if its EP is greater than zero. The idea is that the cost of capital represents a hurdle rate for investors and debtholders and must be exceeded by NOPAT in order for value to be created.
25	**Return on Operating Assets (ROOA)** = NOPAT / Operating Assets. ROOA is a measure of operational efficiency and can be used to compare the supply chain operational efficiency of different companies.
26	**Return on Fixed Assets (ROFA)** = Operating Profit divided by Property, Plant, and Equipment (PP&E, net of depreciation). ROFA is sometimes used as supply chain metric to show how much operating profit is being generated by a company's fixed assets.
27	**Return on Physical Assets (ROPA)** = Operating Profit divided by (PP&E (net) plus Inventory). ROPA is sometimes used as a supply chain metric to show how much operating profit is being generated by a company's physical assets.
28	**Inventory Turns** = COGS (end of period) divided by Inventory (end of period). A more precise definition is the average COGS over a period divided by average Inventory over that period. In this analysis, the end of period (typically the end of the most recent fiscal year, or trailing twelve months (TTM)) is used for ease of calculation and scalability.

Notes and Definitions (3 of 4)

29	**Gross Margin ROI = GMROI** = Gross Profit divided by Inventory. GMROI is typically used in the retail industry to understand how much gross profit is generated by a certain amount of inventory. Diferent product lines and products will have different GMROI values. In this analysis we use Gross Profit and Inventory at the end of a reporting period. A more precise calculation would use the average inventory over the reporting period.
30	**Turn and Earn** = Inventory Turnover times Gross Margin %. Turn and Earn is a metric that shows the tradeoff between inventory turns and gross margin. High gross margin targets with low inventory turns can result in the same results as low gross margin targets with high inventory turns. In the automotive retail business, "Earn" has a double meaning - it also means that the faster you turn inventory, the more product allocation you will "earn" from the manufacturer.
31	**Cash-to-Cash (C2C)** = Days in Receivables plus Days in Inventory minus Days in Payables. This is also called the Cash Convesion Cycle (CCC).
32	**Capital Expenditures (CAPEX)** = gross CAPEX, in other words it does not net out the sale of assets.
33	**Enterprise Value (EV)** = Market Capitalization plus Total Debt minus Cash.
34	**Mergers and Acquisitions** - In the case of companies formed from mergers, the oldest company is used to designate the resultant company founding year.
35	**Depreciation** is the systematic allocation of a fixed asset over its useful lifetime. The useful life of production and other machinery for accounting purposes is typically somewhere between 7 and 20 yars. Enterprise software, can be a significant part of the fixed asset base of companies, typically has a useful life for depreciation purposes of 3-10 years. This does not apply to Software as a Service (SaaS) or subscription software, which are treated as an expense, not an asset that has to be depreciated.
36	**Amortization** is the expensing of the cost of an intangible asset over time. Intangible assets include goodwill, intellectual property, patents, and software. Amortization is a non-cash charge that shows up in various elements of a company's income statement. The costs of obtaining a contract - typically sales commissions - are also amortized under accounting standards ASC 606 and IFRS 15.
37	**Allocation of Depreciation and Amortization** - Most companies allocate depreciation and amortization costs to individual cost buckets, including COGS, SG&A, and R&D. This is done based on where the depreciated or amortized asset is used. For example, depreciation of manufacturing equipment, which is used in production, would be allocated to COGS, while the amortization of intellectual property used in sales and marketing would be allocated to that cost bucket. Some subset of companies explicitly show depreciation and amortization costs on the income statement after the other cost buckets. No attempt was made to reallocate these costs for this subset of companies. This has the effect of understating COGS, SG&A, and R&D for those companies.
38	**3-Year Compound Annual Growth Rate (CAGR)** is based on the past four years of annual financial data.
39	**Market Capitalization** is based on the stock prices as of the date on the cover of this report for each company. Market Cap to Revenue Ratios or Enterprise Value to Revenue ratios are market capitalization divided by trailing twelve months (TTM) revenue through the most recently reported fiscal quarter as of the date on the cover of this report.

Notes and Definitions (4 of 4)

40	**Mergers and Acquisitions** - Individual company YOY numbers may be distorted due to mergers and acquisitions. No attempt has been made to normalize for mergers, acquisitions, and divestitures.
41	**All Financial Data** is based on what has been reported as of the date on the cover of this report. Data is captured for Trailing Twelve Months (last four quarters) and for the last fiscal year that occurred on or before the calendar year end (12/31) for each year.
42	**Historical data** is the past eleven fiscal years for all companies. The number of companies grows for each year in the historical analysis, as more companies became public across the decade.
43	**Aggregate Inventory Turns** is calculated as follows: sum of all COGS for all companies in an industry divided by sum of all inventories for all companies in an industry at the end of the calendar year or for the most recent trailing twelve months (TTM). The aggregate COGS number that is used for aggregate inventory calculations is the sum of COGS for those companies that have non-zero inventory. This has been found to be more accurate due to missing inventory data for certain companies in out years (several years beyond the present).
44	**Research and Development** - A good percentage of companies in various industries do not report research and development separately on their income statements. In these companies, R&D is included in COGS. This has the effect of overstating COGS for those companies, which by extension understates their gross margins and overstates their inventory turns. Aerospace & Defense, Automotive, Industrials, and Hitech Electronics are the industries in which a significant number of companies do not report R&D separately, and in which R&D represents a significant percentage of revenue. R&D as a percentage of revenue in these industries can average 4%-8% of revenue. This can result in understating aggregate and average gross margins for an industry and overstating aggregate and average inventory turns. No attempt has been made to normalize for this effect (it will be studied in later reports). Other industries that have significant R&D such as Hitech Semiconductors, Pharmaceuticals, and Medical Equipment have this problem, but only for a small percentage of companies that do not report R&D.

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