Industrial Industry Operating Benchmarks

Benchmarking data for 142 public industrial companies, along with implications for supply chain management

Version 2020-1.1

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worldlocity

Welcome

Welcome to the 2020 Industrial Industry Report. This is the first of the Worldlocity Industry Series reports, in which we provide operational, financial, and market performance benchmarking for each major industry that has a physical supply chain. The industries series is a spinoff from the Worldlocity Software Report, which established the foundation and infrastructure for developing reports for any industry.

This report is designed for supply chain, finance, operations, and technology professionals with an interest in understanding industrial company operations and how they can be improved. The report also provides management and boards with a useful data set for comparison and discussion. This information can be very helpful in developing an operating model specific to your goals within your specific competitive context.

The first version of this report can be viewed as sort of a "minimum viable product." We put forward the basic framework, data and insights, distribute it, get feedback, and then incorporate more useful and tailored insights in future versions. These insights will be increasingly tailored to supply chain management and technology professionals seeking to improve supply chains.

It's important to note that this report is being first published in Q4, 2020, in the middle of a global crisis in which foundations of society are being shaken to their core. Individuals, businesses, and governments are reacting to the crisis and at the same time are wondering what things will look like once we reach the other side. In the midst of fear, uncertainty, and the fog of war, it is difficult to think longer term. That said, it is inevitable that there is an other side; the collective power, ingenuity, and perseverance of humankind will allow us to not just get through the crisis but will enable us to create a future that is stronger and more resilient. Industrial companies are already playing a key part in reviving the global economy.

This report is based solely on public companies for which key data are readily available. The report considers public industrial companies with revenue greater than $200M, for which data are available through the US SEC EDGAR database. "Industrial companies" are derived from a set of SIC codes, which are described in more detail in the report. The list of companies is evaluated regularly based on companies going public, companies going private, and company revenue changes.

The "industrial industry" has a high degree of diversity. Companies make a diverse set of products for a diverse set of customers and use cases. That said, when grouped together, they have a set of common characteristics that offer useful insights for operations and company valuation. At an aggregate level there are certain deductions one can make about how supply chain operations help drive company valuation. These deductions can help in formulating individual company supply chain strategies.

How a specific industrial company goes about executing its strategy can differ dramatically based on a host of factors, including their product portfolio, market position, product strength, and capital structure. Making the right decisions and investments depends on correctly assessing the company's position across a number of variables. While this report does not address the different situations and possible decisions, it does offer information that could be important to your particular situation and in your associated decision-making process. Our aspiration is to continuously add to this information in each future report and to provide increasingly tangible insights that are directly useful to a broad set of specific situations. This is just the start. Please provide feedback and suggestions. If you would like additional analyses or insights, please send your thoughts to info@worldlocity.com.

Notes

- The analysis in this report makes use of Calcbench as the foundational data sourcing and analysis tool. Calcbench (www.calcbench.com) is an excellent tool for pulling XBRL-tagged financial data directly from financial reports contained in the US EDGAR database. It has full support for XBRL tags and allows for rapid cross-referencing between data points and their sources embedded in financial documents.
- Whenever SIC codes or some similar filtering mechanism is used, invariably some companies look like they shouldn't be part of the data set; conversely, some companies classified to other industries look like they should belong. This is due to historical classifications that have not changed or kept up with the evolution of the individual companies. In initial versions of these reports, no attempt has been made to apply judgment to correct these classifications. Consideration for this will be given in future versions, with the goal of providing data sets that are as clean as possible for company-to-company comparison purposes.
- All financial numbers in this report are for the most recent fiscal year (MRY) for each company as of the date on the cover of this report. All market capitalization information is as of the date on the cover of this report. Historical data is for 2010-2019 (fiscal years that end in each of those years).
- It's important to note that the many of the averages found in this report are averages of percentages. For example, to calculate the average investment in research and development as a percentage of revenue, it simply takes the sum of all the percentages for all 142 companies and then divides by 142. This contrasts with what the overall industry is spending on research and development as a percentage of revenue, which is obtained by summing up the research and development investment numbers for all companies and dividing it by the sum of all the revenues in a given year.
  - This report provides both views – an average of the percentages view, which provides percentages for each company; and a summed view, which is a market level view of absolute dollars.
  - This report also provides distribution charts for all companies. This negates distortions that may be caused by averages of percentages, by showing each individual company percentage, along with quartile analysis.
- This report includes 142 industrial companies. However, not all companies report all variables included in this report. Each chart includes the number of companies that report on the variable(s) included in the chart. For a number of variables, this will be less than 142. Furthermore, historical data for a given year in the past includes only those companies that 1) were public for that year; and 2) reported the variable that is being reported.
- 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 is when the number of companies changes and/or reports and analyses change. A minor release is an update to the numbers based on most recent data retrieved from the database as of the date of the report and/or formatting and data error fixes.

Version

| VERSION	NOTES
2020-1.1	Initial version, dated 10.28.20

# Contents

2020 Industrial Industry Report: Key Takeaways

- The industrial market grew by 1.4% in 2019, which is slightly below global GDP. The average company growth rate was 3.3% (the difference between the 1.4% and the 3.3% is because large companies grew slower, and smaller companies grew faster).
- The average industrial company has gross margins of 33.9% , invests 19.2% of revenue in selling, general, and administrative expense, 4.7% in research and development, and generates 8.5% operating margin, 14.2% EBITDA margin, 7.9% free cash flow, and 5.7% return on invested capital.
- The industrial company average inventory turns is 6.5 . The median is 4.3. 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 industrial company has 19.4% PP&E, 33.5% goodwill, and 19.1% in intangibles, all as a percentage of revenue. Goodwill is a proxy for mergers and acquisitions; based on this measure, industrial 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, industrial companies have almost as many intangible assets as physical assets.
- As expected, industrial 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.
- Industrial 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).
- Industrial 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 of the ten years from 2010 to 2019 shows remarkable consistency in the average value of operational variables from year-to-year (this analysis was done using aggregate values across all companies; this approach is more indicative of overall industry operational structure than averages of individual percentages). Averages for gross margins, SG&A, R&D, operating margin, net margin, and ROIC are all consistent across the ten years, with the following exception:
  - In 2010 and 2011 (and to a lesser extent in 2012 and 2013) the industrial industry overall ran higher operating margins by investing less in SG&A and R&D. This is consistent with companies emerging from the great recession of 2008-2010. It may also be a harbinger of things to come as companies start the 2020s with a significant shock caused by the coronavirus pandemic.
- 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 14.0X 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.
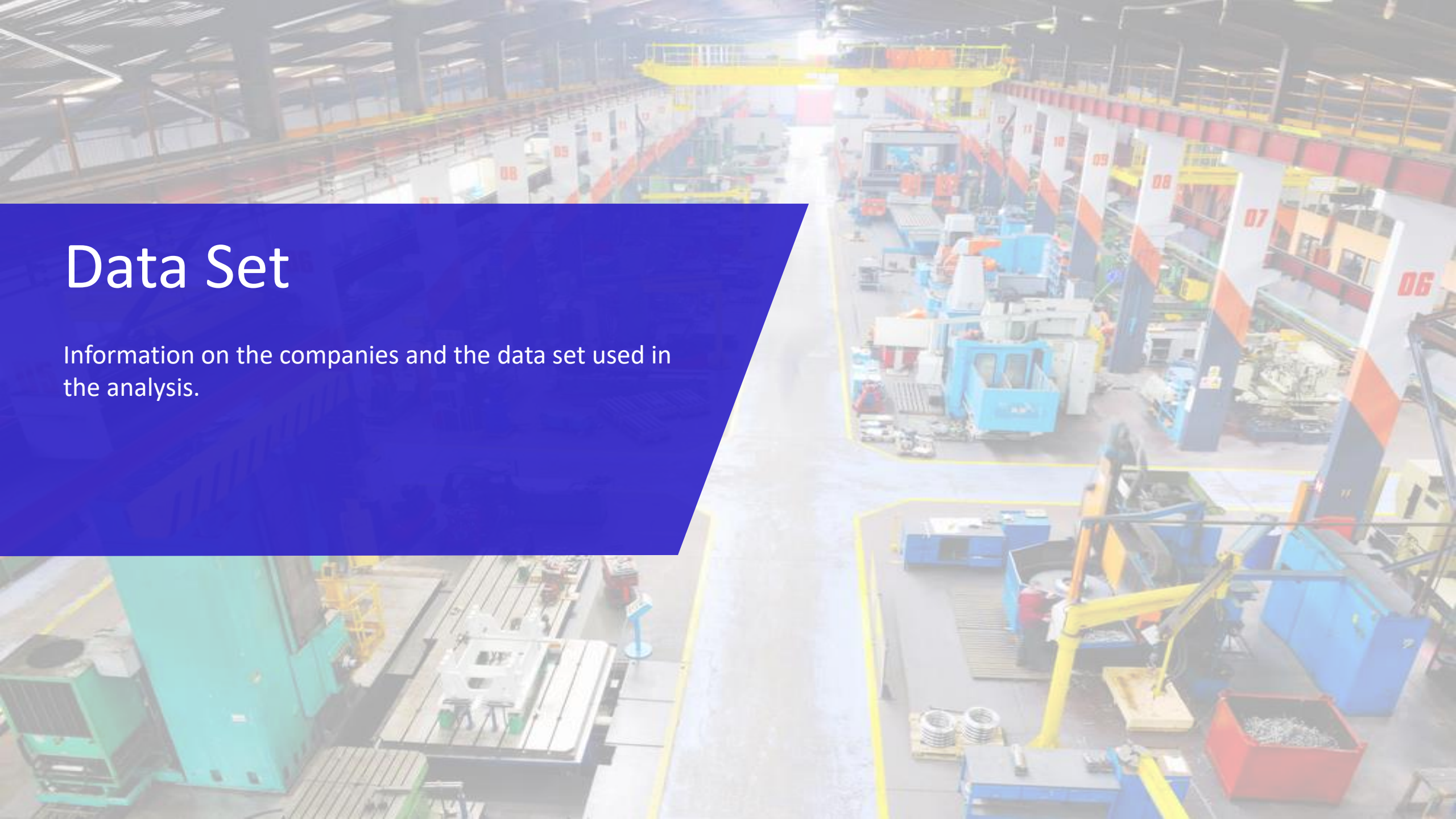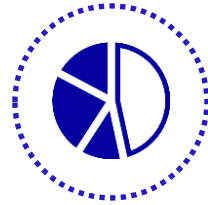
Data Set

COMPANIES

The data set includes 142 publicly-traded industrial companies.

142

REVENUE

Aggregate revenue for companies in the data set is $741 billion for the latest reporting fiscal year as of the date on the cover of this report.

$741 B

MARKET CAPITALIZATION

Aggregate market cap for companies in the data set is $1.7 trillion as of date on the cover of this report.

$1.7 T

Notes:
1. Unless otherwise noted, all data are based on the most recent fiscal year (MRY) as of the date on the cover of this report, and as reported in a company 10-K or 20-F and published in the SEC EDGAR database.
2. All market capitalizations are as of the date on the cover of this report.
3. B=billion; T=trillion.

Data Set
Companies included in this report

Public companies with >$200M in revenue in these industry categories and SIC codes.

n = 142

Category	SIC	Description
Electrical	3613	SWITCHGEAR & SWITCHBOARD APPARATUS
	3620	ELECTRICAL INDUSTRIAL APPARATUS
	3621	MOTORS & GENERATORS
	3670	ELECTRONIC COMPONENTS & ACCESSORIES
	3690	MISCELLANEOUS ELECTRICAL MACHINERY, EQUIPMENT & SUPPLIES
	3822	AUTO CONTROLS FOR REGULATING RESIDENTIAL & COMML ENVIRONMENTS
Engines, Pumps, Oil&Gas Field	3510	ENGINES & TURBINES
	3533	OIL & GAS FIELD MACHINERY & EQUIPMENT
	3561	PUMPS & PUMPING EQUIPMENT
Farm and Construction Equipment	3523	FARM MACHINERY & EQUIPMENT
	3530	CONSTRUCTION, MINING & MATERIALS HANDLING MACHINERY & EQUIP
	3531	CONSTRUCTION MACHINERY & EQUIP
	3537	INDUSTRIAL TRUCKS, TRACTORS, TRAILORS & STACKERS
General	3541	MACHINE TOOLS, METAL CUTTING TYPES
	3540	METALWORKG MACHINERY & EQUIPMENT
	3550	SPECIAL INDUSTRY MACHINERY (NO METALWORKING MACHINERY)
	3559	SPECIAL INDUSTRY MACHINERY, NEC
	3560	GENERAL INDUSTRIAL MACHINERY & EQUIPMENT
	3562	BALL & ROLLER BEARINGS
	3569	GENERAL INDUSTRIAL MACHINERY & EQUIPMENT, NEC
	3590	MISC INDUSTRIAL & COMMERCIAL MACHINERY & EQUIPMENT
	3600	ELECTRONIC & OTHER ELECTRICAL EQUIPMENT (NO COMPUTER EQUIP)
	3640	ELECTRIC LIGHTING & WIRING EQUIPMENT
	3990	MISCELLANEOUS MANUFACTURING INDUSTRIES
HVAC	3433	HEATING EQUIPMENT, EXCEPT ELECTRIC & WARM AIR FURNACES
	3564	INDUSTRIAL & COMMERCIAL FANS & BLOWERS & AIR PURIFING EQUIP
	3580	REFRIGERATION & SERVICE INDUSTRY MACHINERY
	3585	AIR-COND & WARM AIR HEATG EQUIP & COMM & INDL REFRIG EQUIP
Industrial Controls	3823	INDUSTRIAL INSTRUMENTS FOR MEASUREMENT, DISPLAY, AND CONTROL
	3825	INSTRUMENTS FOR MEAS & TESTING OF ELECTRICITY & ELEC SIGNALS
	3829	MEASURING & CONTROLLING DEVICES, NEC
Tools and Appliances	3420	CUTLERY, HANDTOOLS & GENERAL HARDWARE
	3524	LAWN & GARDEN TRACTORS & HOME LAWN & GARDENS EQUIP
	3630	HOUSEHOLD APPLIANCES

Data Set
Company distribution

BY ANNUAL REVENUE

142 TOTAL COMPANIES

- 6
- 12
- 8
- 41
- 30
- 45

Legend:
- ■ >=$25B
- ■ $10B - $25B
- ■ $5B - $10B
- ■ $2B - $5B
- ■ $1B - $2B
- ■ <$1B
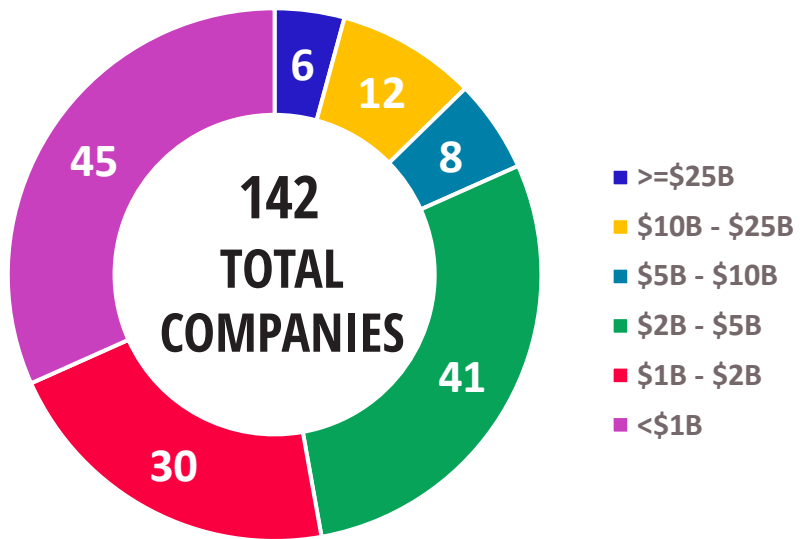
MEDIAN REVENUE = $1,890 M

BY SUB-INDUSTRY

142 TOTAL COMPANIES

- 11
- 24
- 26
- 14
- 38
- 9
- 20

Legend:
- ■ Electrical
- ■ Engines, Pumps, Oil&Gas Field
- ■ Farm and Construction Equipment
- ■ General
- ■ HVAC
- ■ Industrial Controls
- ■ Tools and Appliances

FISCAL YEAR TIMING

74% ALIGN FISCAL YEAR TO CALENDAR YEAR

- 37
- 105
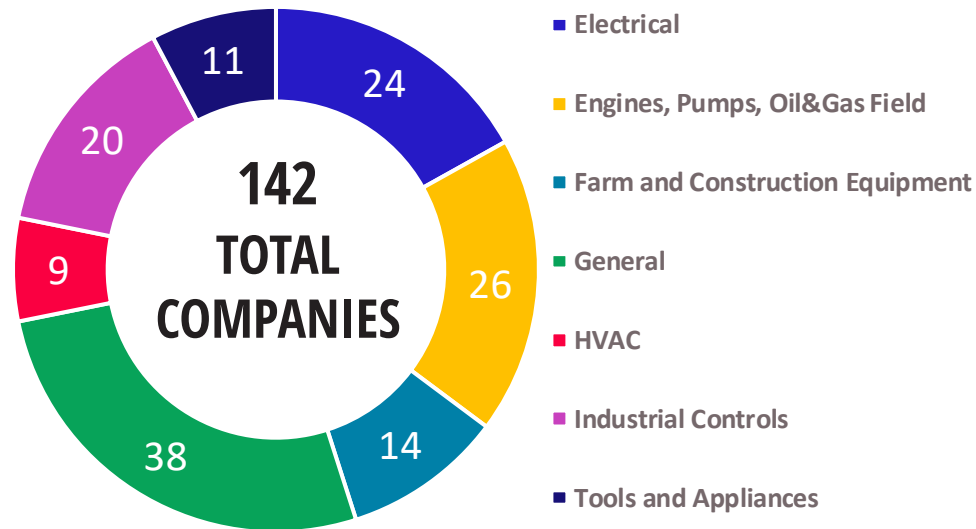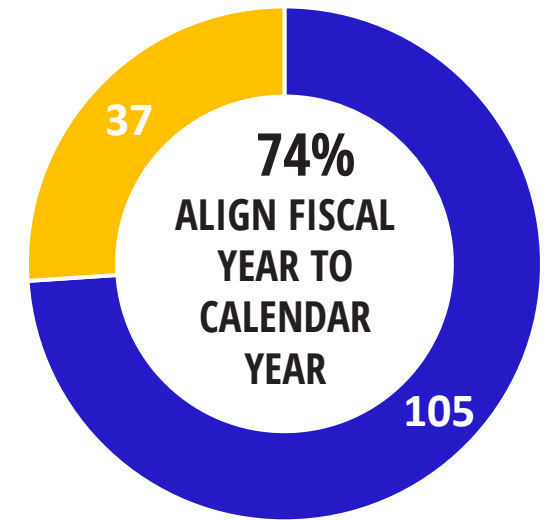
- ■ Fiscal Year = Calendar Year

Data Set
Index of key variables included in this report

This report provides analysis of the following variables (and derivatives) for the most recent fiscal year (MRY) and for the ten-year period from 2010-2019.

REVENUE	CASH	INVENTORY
GROWTH RATE	DEBT	DAYS IN PAYABLES
GROSS MARGIN	NET CASH	DAYS IN RECEIVABLES
SELLING, GENERAL, AND ADMIN	EBITDA	CASH-TO-CASH CYCLE
RESEARCH & DEVELOPMENT	EQUITY	CAPITALIZATION TO REVENUE
REVENUE PER EMPLOYEE	CAPITAL EXPENDITURES (CAPEX)	CAPITALIZATION TO EBITDA
OPERATING PROFIT	PROPERTY, PLANT, AND EQUIPMENT (PP&E, NET)	RETURN ON INVESTED CAPITAL
NET PROFIT	GOODWILL	RETURN ON ASSETS
FREE CASH FLOW	DEFERRED REVENUE	RETURN ON PHYSICAL ASSETS
STOCK COMPENSATION	REMAINING PERFORMANCE OBLIGATIONS (RPOS)	ECONOMIC PROFIT

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 industrial market. Charts in this section use the "aggregate averages" approach.

YOY Market Growth Rate (based on aggregate revenue)

Industrial Companies

World GDP

BEA Industrial

US GDP
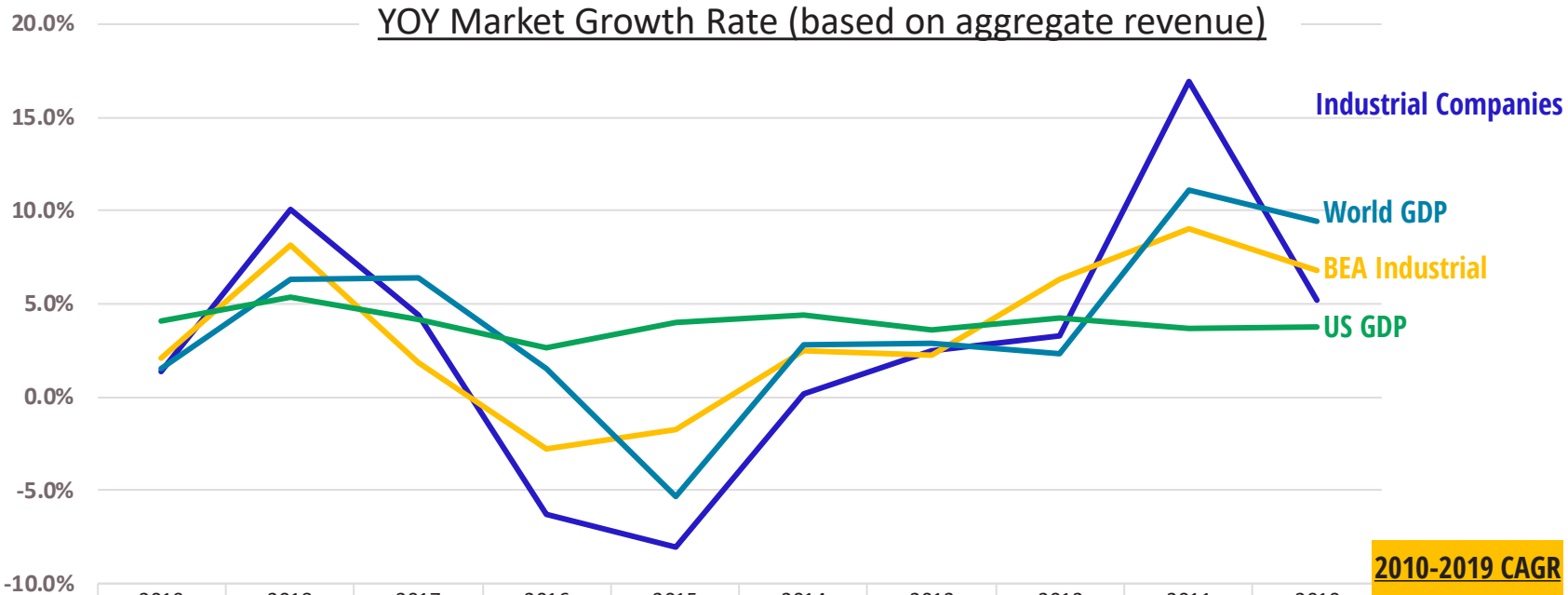
	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2010-2019 CAGR
Industrial Companies	1.4%	10.0%	4.4%	-6.3%	-8.1%	0.2%	2.5%	3.3%	16.9%	5.2%	**3.0%**
BEA Industrial Output	2.1%	8.1%	1.8%	-2.8%	-1.7%	2.5%	2.3%	6.4%	9.0%	6.8%	**3.0%**
World GDP (current $)	1.6%	6.3%	6.4%	1.5%	-5.4%	2.8%	2.9%	2.3%	11.1%	9.5%	**3.2%**
US GDP (current $)	4.1%	5.4%	4.2%	2.7%	4.0%	4.4%	3.6%	4.2%	3.7%	3.8%	**4.0%**

NOTES & INSIGHTS

- Industrial market CAGR for the decade of the 2010s was 3.0%, which is roughly in line with global current dollar GDP growth rate.
- The data set is a good proxy for the industrial market overall. While YOY growth rates differ from BEA industrial numbers, CAGR for the decade is the same.
- Growth rates in the early part of the decade were higher, probably due to the rebound from the great recession of 2009-2010.

Notes:
1. "Industrial 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 Industrial 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. Industrial output as defined here is based on output of the following sub-industries: wood products; fabricated metal products; electrical equipment, appliances, and components; furniture and related products; miscellaneous manufacturing; plastics and rubber products.
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 industrial 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.

Overall Market
Based on aggregate revenues, costs, and market caps

A composite view of the market can be attained by adding up revenues and costs for all companies and then looking at ratios using the aggregate data. This provides a different view from the "averages of the percentages" view in the next and subsequent sections of this report. This is a more reliable view of the operational structure of the industry, while the views in later sections provide a more reliable view of the competitive environment.

Measure	Aggregate Value
Revenue	$740,888,112,847
Cost of Revenue	$503,453,250,561
Operating Income	$68,958,158,943
Net Income	$45,610,148,442
EBITDA	$109,134,232,445
Free Cash Flow	$55,352,465,918
SG&A	$120,696,558,570
R&D	$27,194,467,206
Inventory	$115,951,847,159
PP&E	$158,915,916,671
Goodwill and Intangibles	$401,719,631,700
Market Capitalization	$1,716,930,196,858

Ratio	Value
Gross Margin	32.0%
Operating Margin	9.3%
Net Income	6.2%
EBITDA	14.7%
Free Cash Flow	7.5%
SG&A	16.3%
R&D	4.4%
Inventory Turns	4.3
PP&E % of Revenue	21.4%
1-Year Growth 2019/18	1.4%
Market Cap / Revenue	2.3
Market Cap / EBITDA	15.7

This dollar growth rate is below the BEA overall output growth rate of 2.1% for industrial sub-industries for 2019. BEA sub-industries used for this are found in the notes on the previous slide.

Notes:
1. All revenue and cost numbers are aggregate values for all companies for the most recent fiscal year (MRY) as of the date on the cover of this report.
2. Market capitalization is aggregate market capitalization for all companies as of the date on the cover of this report.

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.

Analysis Summary
Average and median for different variables, most recent fiscal year (MRY)

The table below contains the average and median values for the 142 companies investigated. This shows that the average industrial company operates with a gross margin of 33.9%, spends 19.2% of revenue on SG&A, 4.7% on R&D, and has inventory turns of 6.5, operating income of 8.5%, net income of 5.6%, free cash flow of 7.9%, and return on invested capital of 5.7%.

	REVENUE		OPERATIONS				PROFIT AND CASH			
	Annual Revenue[1]	Growth Rate (1YR)[2]	Gross Margin[3]	SG&A[3]	R&D[3]	Inventory Turns[3]	Operating Income[3]	Net Income[3]	Free Cash Flow[3]	ROIC[4]
Average	$5,217,521,921	3.3%	33.9%	19.2%	4.7%	6.5	8.5%	5.6%	7.9%	5.7%
Median	$1,890,112,500	1.8%	33.4%	18.6%	2.9%	4.3	10.3%	7.0%	8.6%	7.1%

Notes:
1. MRY = most recently reported fiscal year for each company, as of the date on the cover of this report.
2. Growth rate is based on the most recent fiscal year's revenue minus the previous fiscal year.
3. All percentage numbers are a percentage of revenue. Average is the average of all the percentages for each of the companies.
4. Inventory turns = cost of goods sold divided by inventory (based on end-of-year numbers for each company).
5. Return on invested capital = Net profit divided by (total assets minus total liabilities).

Analysis Summary
Average values by revenue quartile, MRY[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		MKT CAP	OPERATIONS				PROFIT AND CASH			
		Revenue[1]	1-Year Growth	Mkt Cap/ Revenue	Gross Margin[3]	SG&A[3]	R&D[3]	Inventory Turns[3]	Operating Income[3]	Net Income[3]	Free Cash Flow[3]	ROIC[4]
Quartile 4	36	$16,272,792,833	1.5%	2.7	33.7%	17.9%	4.8%	4.9	9.1%	8.6%	8.8%	9.5%
Quartile 3	35	$2,716,132,692	4.0%	2.3	34.8%	18.7%	3.6%	6.6	12.3%	8.7%	9.6%	9.5%
Quartile 2	35	$1,268,569,486	3.4%	1.6	31.6%	19.7%	3.3%	10.4	5.4%	2.4%	6.6%	1.7%
Quartile 1	36	$433,416,517	4.3%	3.5	35.4%	20.4%	7.2%	4.3	7.0%	2.6%	6.6%	2.1%

REVENUE QUARTILES

Quartile 4 >= $3,799,050,000
Quartile 3 >= $1,890,112,500 , < $3,799,050,000
Quartile 2 >= $729,321,250   , < $1,890,112,500
Quartile 1 < $729,321,250

Notes:
1. MRY = most recently reported fiscal year for each company, as of the date on the cover of this report.
2. Growth rate is based on the most recent fiscal year's revenue minus the previous fiscal year.
3. All percentage numbers are a percentage of revenue. Average is the average of all the percentages for each of the companies.
4. ROIC = Return on invested capital = net income divided by (assets minus liabilities).
5. All market capitalizations are as of the date on the cover of this report.

Analysis Summary
Average values by market cap quartile, MRY[1]

Large cap companies have significantly higher market cap multiples, gross margins, income, and return on invested capital. This indicates that scale is important in the industrial market.

All numbers are averages within each quartile

| Market Cap | # | REVENUE | | MKT CAP | OPERATIONS | | | | PROFIT AND CASH | | | |
		Revenue[1]	1-Year Growth[2]	Mkt Cap / Revenue	Gross Margin[3]	SG&A[3]	R&D[3]	Inventory Turns[3]	Operating Income[3]	Net Income[3]	Free Cash Flow[3]	ROIC
Quartile 4	36	$15,189,409,417	3.6%	4.8	42.1%	19.7%	6.3%	4.7	16.2%	13.0%	13.6%	12.6%
Quartile 3	35	$3,146,705,232	4.6%	3.0	32.2%	18.4%	3.7%	6.4	8.4%	5.6%	8.6%	6.4%
Quartile 2	35	$1,490,171,571	4.8%	1.7	33.0%	20.4%	3.7%	10.3	8.0%	3.0%	6.8%	4.1%
Quartile 1	36	$882,741,270	0.2%	0.8	28.2%	18.4%	4.9%	4.8	1.2%	0.8%	2.8%	-0.3%

MARKET CAP QUARTILES

Quartile 4 >= $9,069,827,332
Quartile 3 >= $2,908,166,677 , < $9,069,827,332
Quartile 2 >= $916,441,742 , < $2,908,166,677
Quartile 1 < $916,441,742

Notes:
1. MRY = most recently reported fiscal year for each company, as of the date on the cover of this report.
2. Growth rate is based on the most recent fiscal year's revenue minus the previous fiscal year.
3. All percentage numbers are a percentage of revenue. Average is the average of all the percentages for each of the companies.
4. ROIC = Return on invested capital = net income divided by (assets minus liabilities).
5. Al market capitalizations are as of the date on the cover of this report.

Analysis Summary
Average numbers for the entire data set, MRY[1]
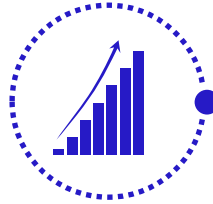
1-YEAR GROWTH[2]
3.3%
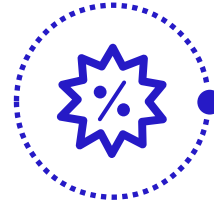
GROSS MARGIN
33.9%
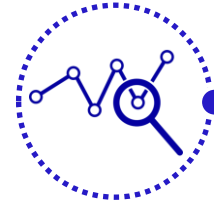
MARKET CAP[3]
2.5X

NET PROFIT[4]
5.6%

SG&A
19.2%
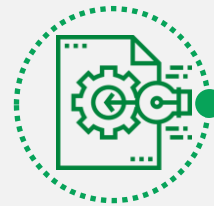
R&D
4.7%

INVENTORY TURNS
6.5

C2C (DAYS)[5]
103.1

PP&E
19.4%

CAPEX
3.4%
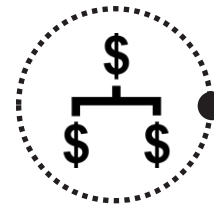
FREE CASH FLOW[6]
7.9%
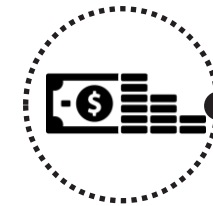
ECONOMIC PROFIT[6]
-1.8%

Notes:
1. MRY = most recently reported fiscal year for each company, as of the date on the cover of this report. All percentage numbers are a percentage of revenue (except growth rate). Average is the average of all the percentages for each of the companies.
2. Growth rate is based on the most recent fiscal year's revenue minus the previous fiscal year. Since some companies have only recently gone public, not all companies are included.
3. Market cap is expressed as a multiple of annual revenue and is based on market capitalizations as of the date on the cover of this report. For market cap multiple calculations, the revenue use is for the most recent fiscal year for each company as of the date on the cover of this report.
4. C2C = cash-to-cash and is calculated as: Days of receivables plus days of inventory minus days of payables.
5. Free cash flow = operating cash flow minus CAPEX.
6. Economic profit = (Net profit minus cost of capital) / Revenue. Cost of capital = (Assets minus liabilities) * WACC. WACC is industry-specific, as publicly reported by Aswath Damodaran, NYU Stern Business School

Analysis Summary
Average numbers for the <u>top-quartile market cap[3] multiple leaders</u>

1-YEAR CAGR[2]
5.4%
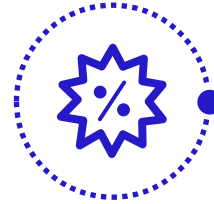
GROSS MARGIN
44.8%
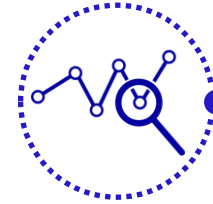
MARKET CAP[3]
6.3X

NET PROFIT[4]
13.2%

SG&A
22.3%
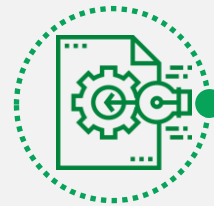
R&D
7.5%

INVENTORY TURNS
4.1

C2C (DAYS)[5]
128.0

PP&E
14.5%

CAPEX
3.3%
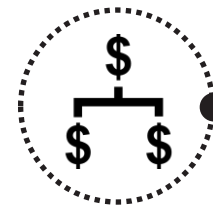
FREE CASH FLOW[6]
14.2%

ECONOMIC PROFIT[6]
3.7%

Notes:
1. MRY = most recently reported fiscal year for each company, as of the date on the cover of this report. All percentage numbers are a percentage of revenue (except growth rate). Average is the average of all the percentages for each of the companies.
2. Growth rate is based on the most recent fiscal year's revenue minus the previous fiscal year. Since some companies have only recently gone public, not all companies are included.
3. Market cap is expressed as a multiple of annual revenue and is based on market capitalizations as of the date on the cover of this report. For market cap multiple calculations, the revenue use is for the most recent fiscal year for each company as of the date on the cover of this report.
4. C2C = cash-to-cash and is calculated as: Days of receivables plus days of inventory minus days of payables.
5. Free cash flow = operating cash flow minus CAPEX.
6. Economic profit = (Net profit minus cost of capital) / Revenue. Cost of capital = (Assets minus liabilities) * WACC. WACC is industry-specific, as publicly reported by Aswath Damodaran, NYU Stern Business School

Analysis Summary
Quartile summary, key variables[1]

Legend:
- Maximum — Quartile 4
- Median — Quartile 3, Quartile 2
- Minimum — Quartile 1
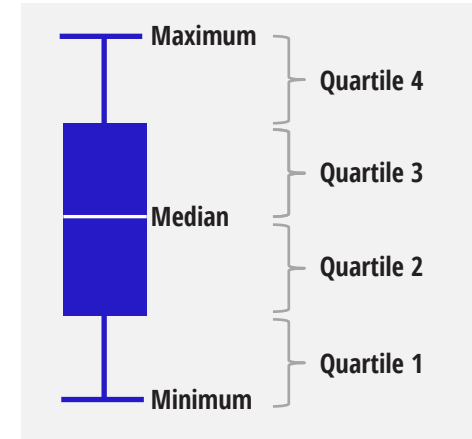
Notes:
1. Outliers have been eliminated to improve chart readability. Outliers are calculated as 1.5X the inner quartile range (Q3 value minus Q1 value).
2. SG&A=selling, general and administrative; R&D=research and development; FCF=free cash flow; OP=operating, PP&E = property, plant, and equipment (net of depreciation)
3. ROIC = return on invested capital = Net profit / (assets – liabilities)
4. CAGR is a growth rate; all other percentages are percentages of revenue.

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.

VARIABLE	DATA SET AVG	QUARTILE (AVGS WITHIN EACH CAP QUARTILE)				DIFFERENCE TOP-BOTTOM
		TOP (Q4)	Q3	Q2	BOTTOM (Q1)	
Market Cap Multiple	2.5	6.3	2.1	1.3	0.5	14.0X
1-Year Growth	3.3%	5.4%	2.3%	4.7%	0.8%	4.6 pps
Gross Margin	33.9%	44.8%	33.7%	34.2%	22.6%	22.2 pps
SG&A	19.2%	22.3%	18.8%	19.9%	15.8%	6.5 pps
R&D	4.7%	7.5%	3.9%	3.5%	3.1%	4.5 pps
Operating Profit	8.5%	14.8%	10.8%	10.0%	-2.0%	16.8 pps
Net Profit	5.6%	13.2%	5.2%	5.5%	-1.7%	14.9 pps
Inventory Turns	6.5	4.1	6.6	4.9	10.6	-6.6 Turns
C2C Cycle (days)	103.1	128.0	97.6	96.4	89.6	38.4 Days
Net Cash	-19.9%	-6.6%	-26.1%	-27.8%	-19.0%	12.3 pps
CAPEX	3.4%	3.3%	4.0%	3.8%	2.7%	0.6 pps
Free Cash Flow	7.9%	14.2%	8.1%	7.9%	1.2%	13.0 pps
ROIC	5.7%	12.3%	6.6%	6.0%	-2.2%	14.5 pps
Return on Physical Assets	22.9%	61.2%	17.0%	14.6%	-2.2%	63.4 pps
Economic Profit	-1.8%	3.7%	-2.2%	-1.9%	-7.0%	10.7 pps

NOTES & INSIGHTS

- Leaders have market cap multiples that are 2.5X average, and 14X 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.
- Leaders do not have significantly different CAPEX 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 most recent fiscal year 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.

Operational Analysis

Charts that provide analysis and distribution for key variables for the most recent fiscal year for all companies. Distribution charts also provide quartile breakdowns and average market cap multiples within each quartile.
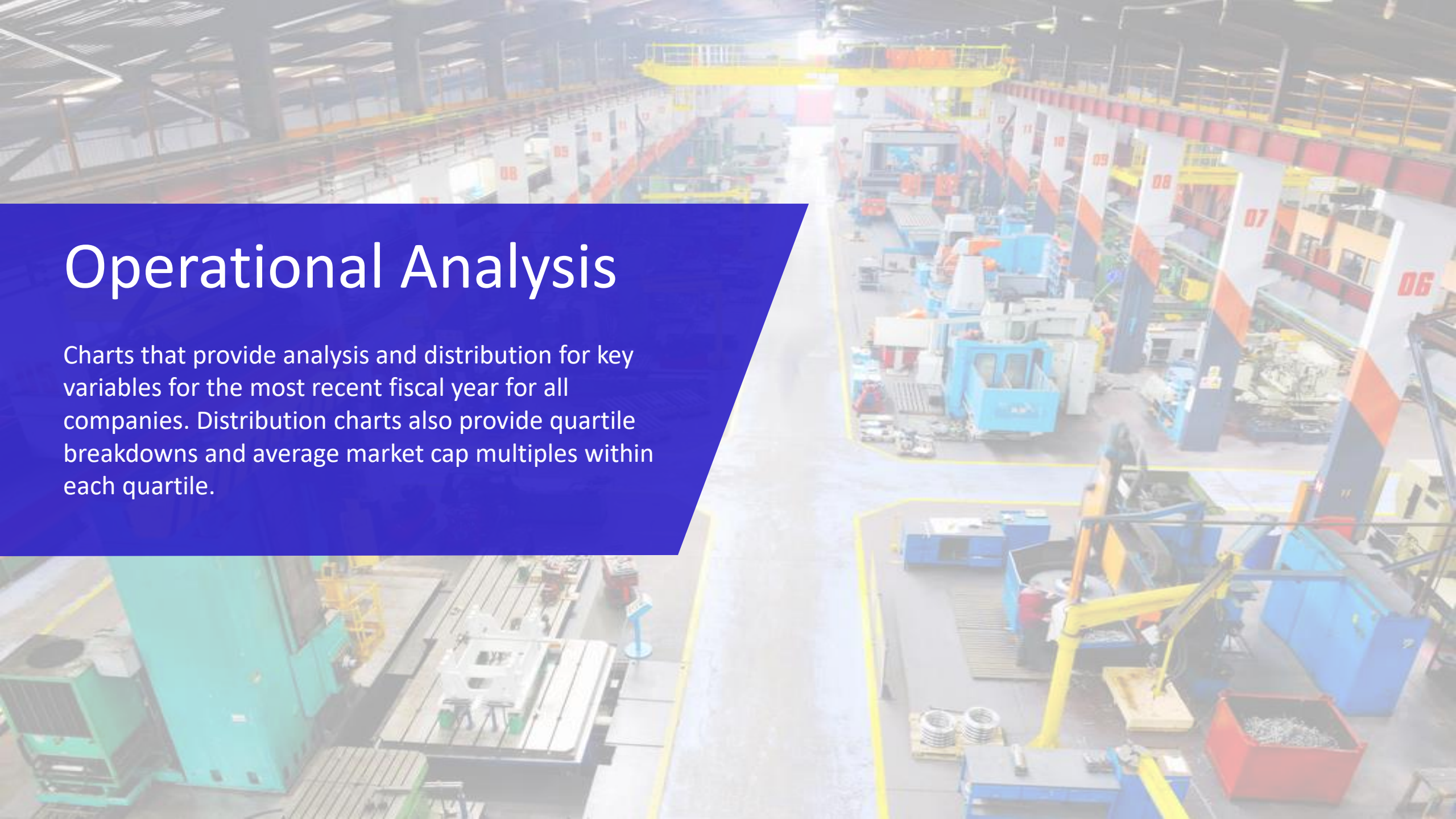
Average revenue for all companies in the data set is **$5,217,521,921** *. Median revenue is* **$1,890,112,500** *.*

Revenue – Distribution Across 142 Industrial Companies

Average market cap / revenue multiple within each quartile

- 2.7
- 2.3
- 1.6
- 3.5

Quartile 4: >= $3,799,050,000

Average = $5,217,521,921

Quartile 3: >=$1,890,112,500
< $3,799,050,000

Quartile 2: >=$729,321,250 ;
< $1,890,112,500

Quartile 1: < $729,321,250
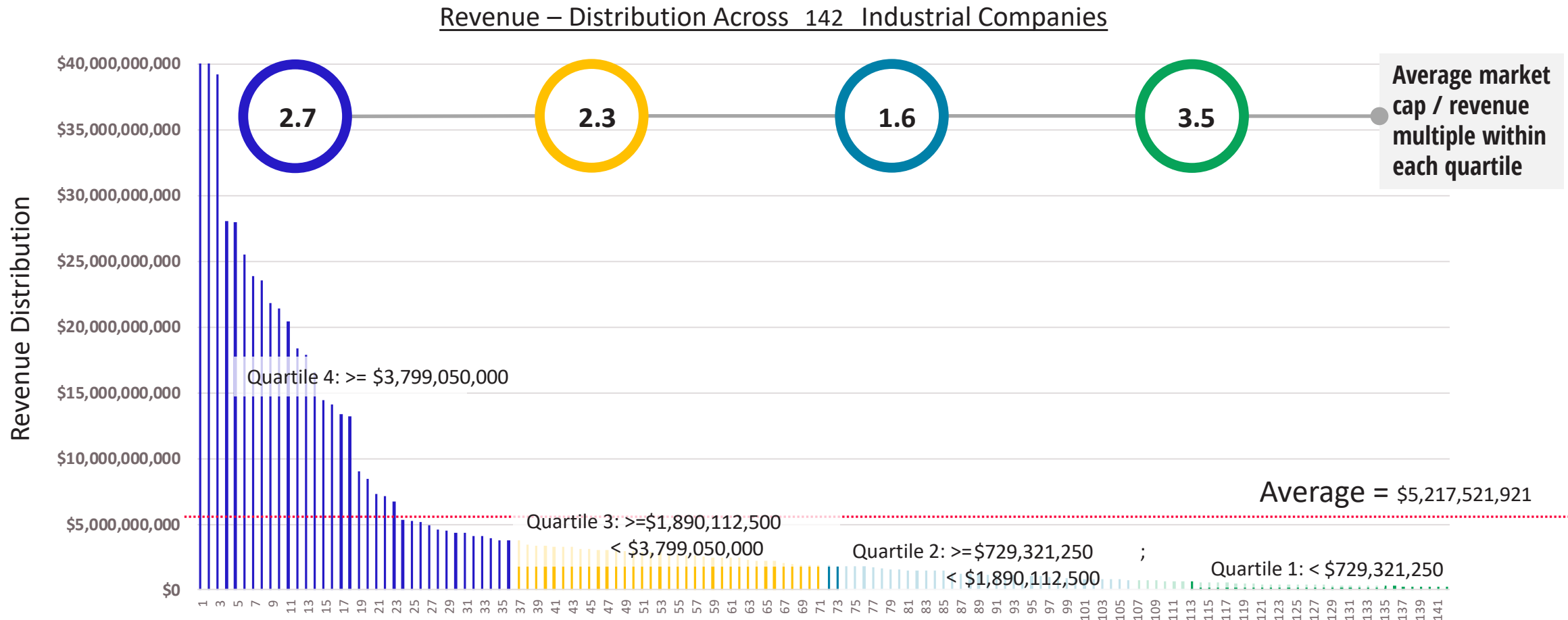
Notes:
1. Revenue is for the most fiscal year (MRY) for each company as of the date on the cover of this report.

Operational Analysis
1-year growth rate

The average 1-year growth rate across all industrial companies is **3.3%**. The median is **1.8%**.

1-Year Growth – Distribution Across 142 Industrial Companies[1]

3.4 **2.8** **2.0** **1.9**

Average market cap / revenue multiple within each quartile

Quartile 4: >= 7.4%

Quartile 3: >= 1.8% ; < 7.4%

Quartile 2: >= -4.3% ; < 1.8%

Quartile 1: < -4.3%

Average = 3.3%

1-Year Growth
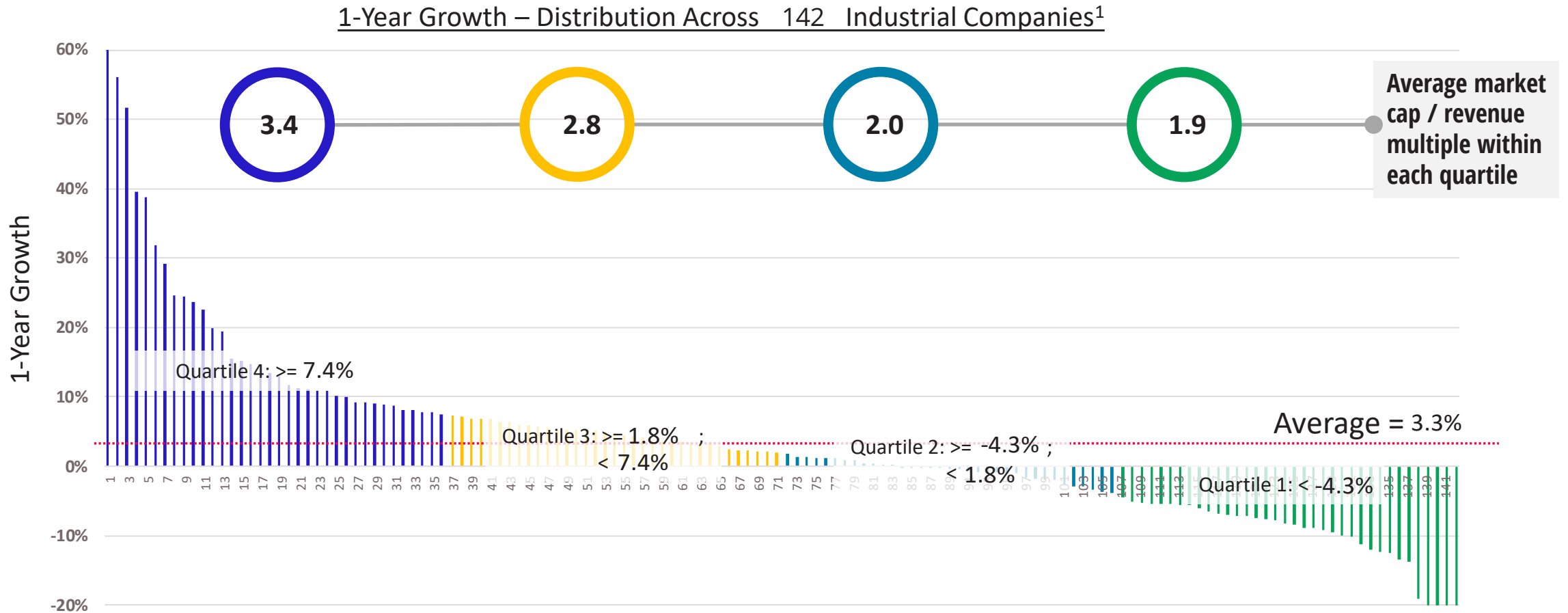
Notes:
1. Chart is truncated for readability.
2. Average = average of the percentages for all companies. Growth rate is calculated based on the most recent fiscal year (MRY) as of the date on the cover of this report and the previous fiscal year.

Operational Analysis
Gross margin

Industrial companies have a wide range of gross margins. The industry average places it in the lower range across all industries. The average gross margin is **33.9%** *. The median is* **33.4%** *. Companies with higher gross margins have significantly higher market cap multiples. In general, industrial is a relatively low gross margin industry, with high degree of purchasing and value-add conversion.*

Gross Margin – Distribution Across 142 Industrial Companies

4.8 2.2 1.6 1.5

Average market cap / revenue multiple within each quartile

Quartile 4: >= 41.4%

Average = 33.9%

Quartile 3: >= 33.4%; < 41.4%

Quartile 2: >=25.6% ; < 33.4%

Quartile 1: < 25.6%

Gross Margin

In general, higher gross margin industrial companies are in the industrial controls market or similar markets that have a high IP, digital, and/or software content. Note: these are general statements; individual companies may vary significantly.

Industrial controls and other high IP products

Tools, appliances, electrical equipment, engineered mechanical products

Farm and construction equipment, HVAC, engines, pumps

Quartile 4: >= 41.4%

Quartile 3: >= 33.4%; < 41.4%

Quartile 2: >=25.6% ; < 33.4%

Quartile 1: < 25.6%

Gross Margin (y-axis: -10% to 70%)
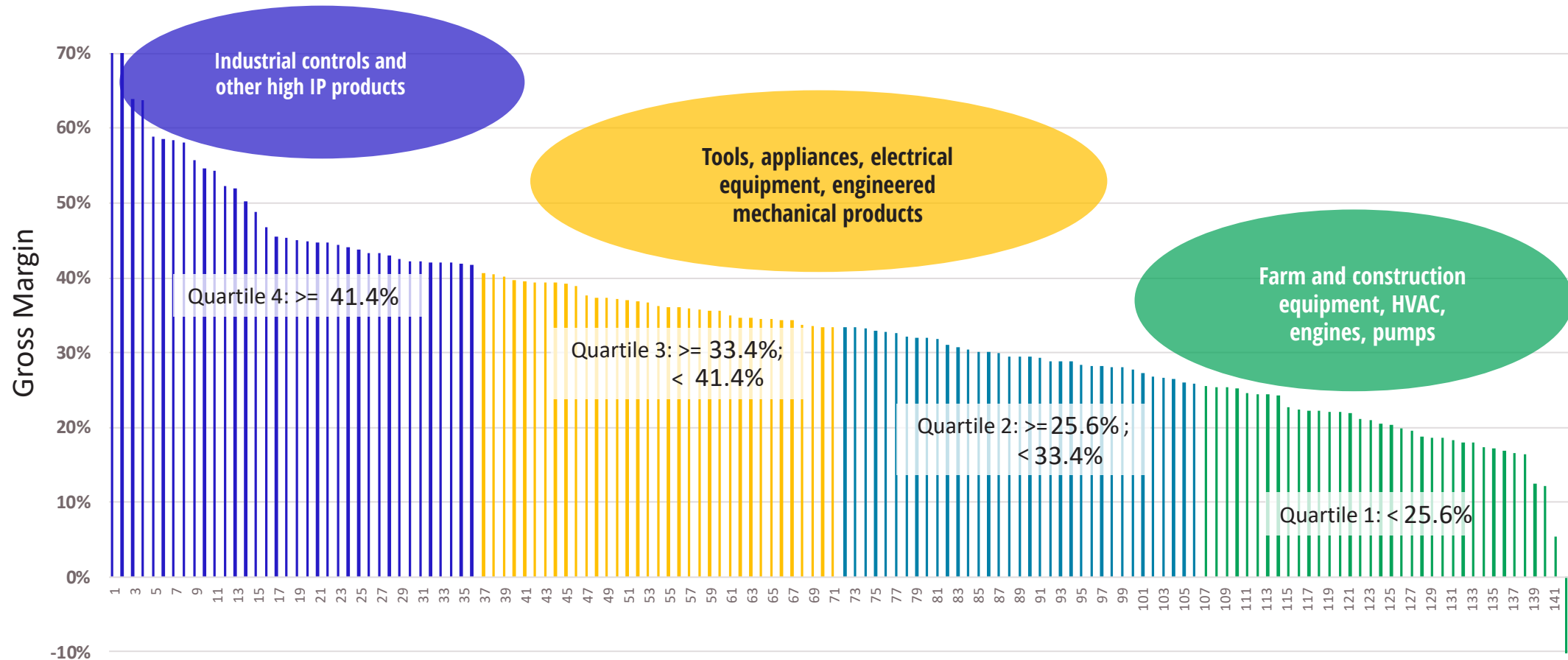
Operational Analysis
SG&A % of revenue

*Industrial companies invest an average of **19.2%** in selling, general, and administrative expense, which is relatively high across all industries.*

SG&A – Distribution Across 138 Industrial Companies

3.0   **3.1**   **2.5**   **1.6**

Average market cap / revenue multiple within each quartile

SG&A% of Revenue

Quartile 4: >= 24.0%

Quartile 3: >= 18.6%; < 24.0%

Average = 19.2%

Quartile 2: >= 14.0%; < 18.6%

Quartile 1: < 14.0%
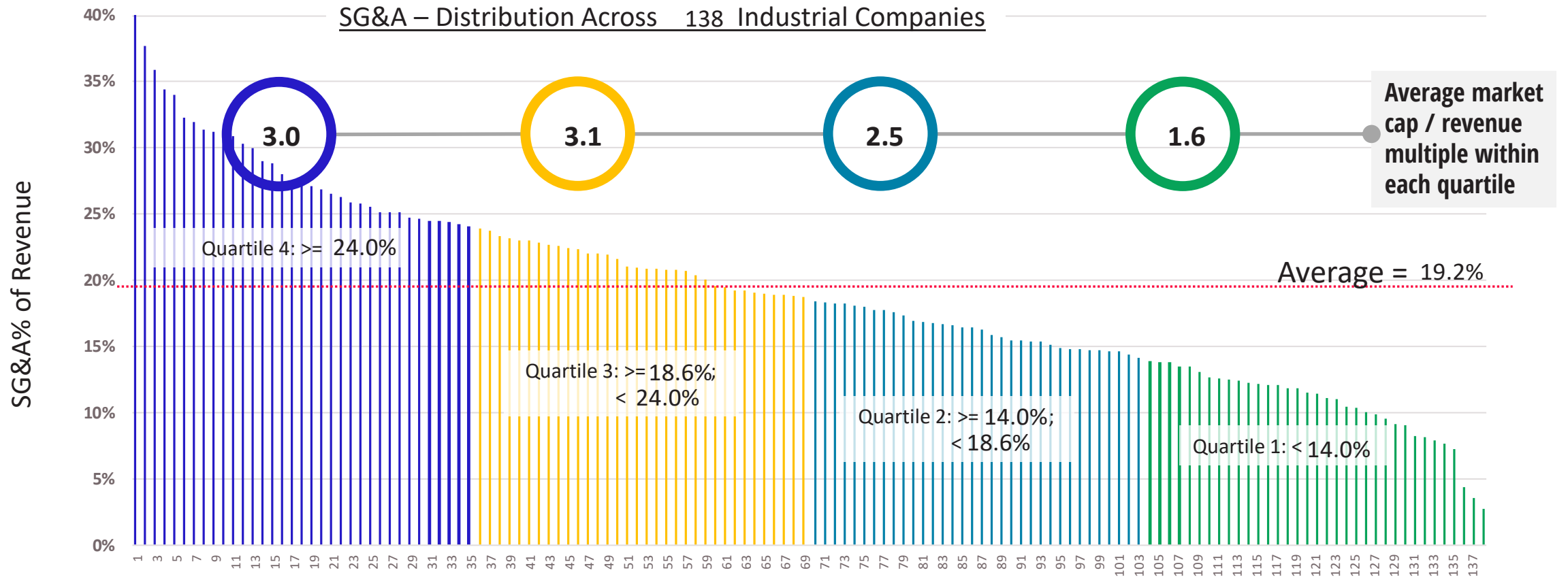
Notes:
1. Only 138 out of the 142 companies in the dataset break out SG&A in their income statements.

Operational Analysis
R&D % of revenue

*Leadership in the industrial industry requires significant investment in R&D. The average R&D investment is **4.7%** . Companies in the top quartile of R&D investment have significantly higher average market cap multiples.*

Research & Development – Distribution Across 120 Industrial Companies

5.6   **2.4**   **1.6**   **1.6**

Average market cap / revenue multiple within each quartile

Quartile 4: >=4.8%

Average = 4.7%

Quartile 3: >=2.9% ;
< 4.8%

Quartile 2: >=1.6% ;
< 2.9%

Quartile 1: < 1.6%

Research & Development % of Revenue
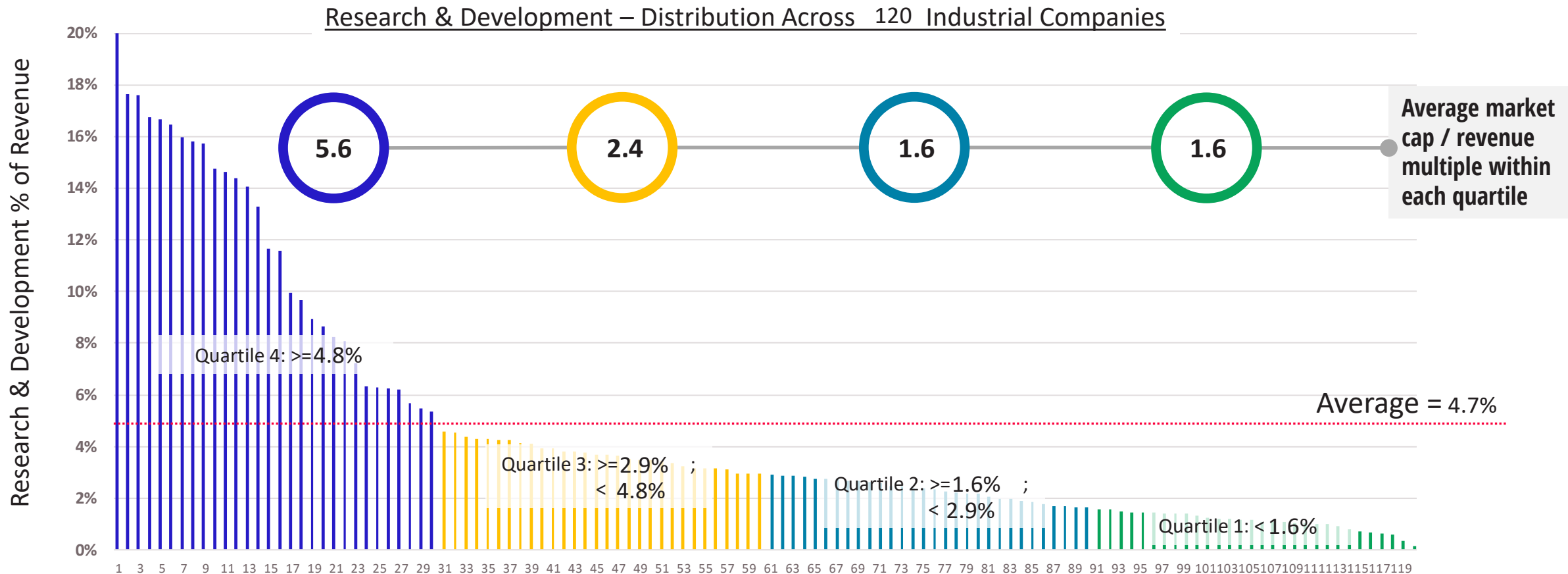
Notes:
1. Chart is truncated for readability.
2. Only 120 out of the 142 companies in the dataset break out R&D in their income statements.

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Operational Analysis
EBITDA % of revenue

*Average EBITDA margin is **14.2%** and the median is   **14.6%** , with a wide range across the data set. As expected, top quartile EBITDA performers have significantly higher market cap multiples than all other quartiles.*

EBITDA – Distribution Across 142 Industrial Companies

4.8 — **2.2** — **1.7** — **1.4** — Average market cap / revenue multiple within each quartile

EBITDA % of Revenue

Quartile 4: >= 19.1%

Quartile 3: >=14.6% ; < 19.1%

Quartile 2: >= 8.8% ; < 14.6%

Quartile 1: < 8.8%

Average = 14.2%
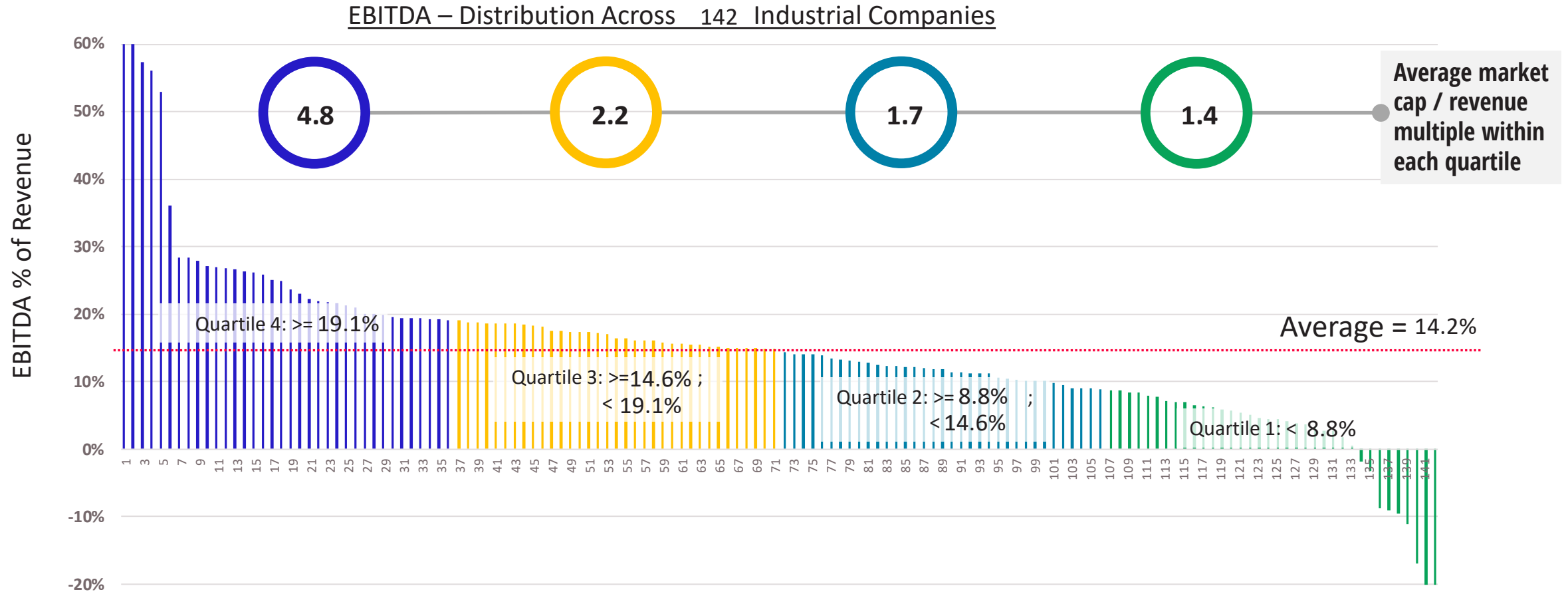
Notes:
1. EBITDA is calculated as operating profit plus depreciation and amortization,.

Operational Analysis
Operating profit margin % of revenue

Operating profit is typically gross margin minus the operating costs of sales and marketing, research and development, and general and administrative expenses. It also typically includes depreciation, amortization, and stock-based compensation, which are non-cash charges. The average operating profit margin for industrial companies is **8.5%** .

Operating Profit Margin – Distribution Across 142 Industrial Companies

Average market cap / revenue multiple within each quartile

Circles: 4.8 | 2.2 | 1.5 | 1.7

Quartile 4: >= 14.6%
Quartile 3: >= 10.3% ; < 14.6%
Quartile 2: >= 4.7% ; < 10.3%
Quartile 1: < 4.7%

Average = 8.5%

Y-axis: Operating Profit % of Revenue (25% to -15%)
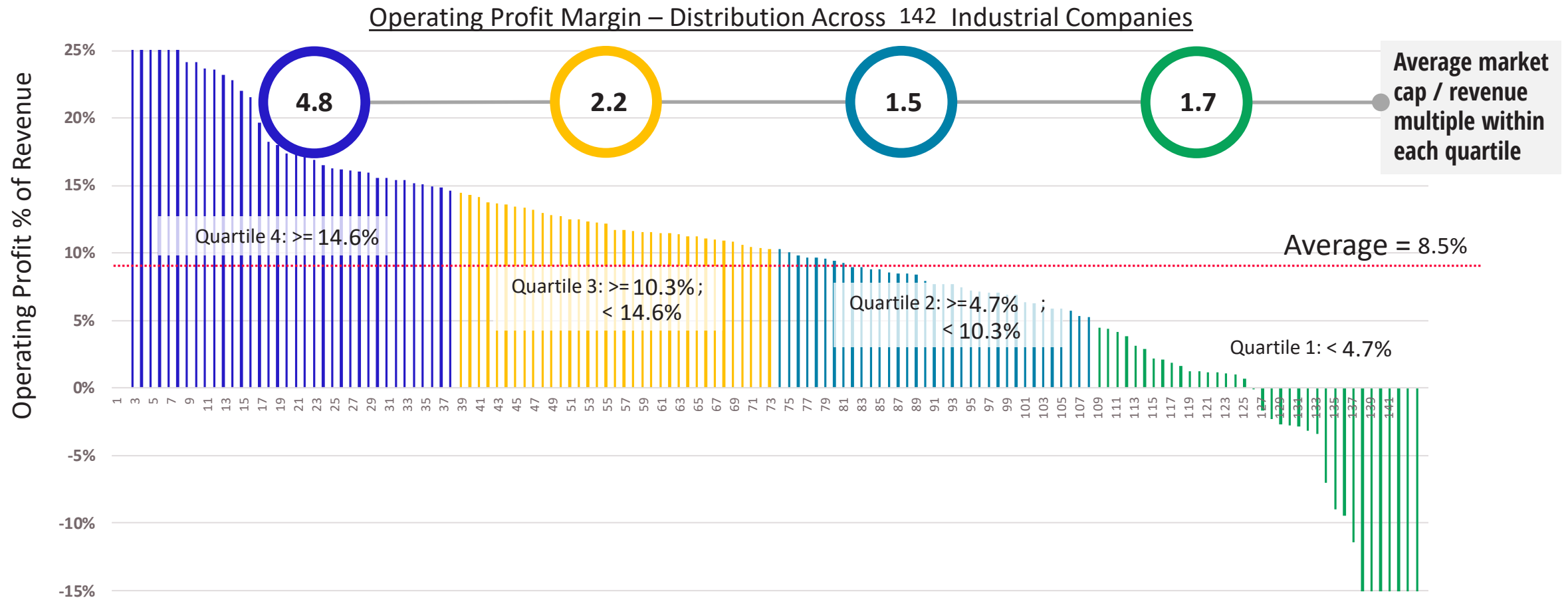
Notes:
1. Adjusted EBITDA is calculated as operating profit plus depreciation, amortization, and stock compensation.

Operational Analysis
Net operating profit after taxes (NOPAT) margin

Industrial company average net profit is **5.6%** *, which is towards the average range across all industries. As with operating profit, top quartile net profit performers have significantly higher market cap multiples. NOPAT for some companies is higher than operating profit because of one-time events.*

NOPAT – Distribution Across 142 Industrial Companies

Quartile 4: >= 11.2%
Quartile 3: >= 7.0% ; < 11.2%
Quartile 2: >=1.6% ; < 7.0%
Quartile 1: < 1.6%

4.9   2.1   1.4   1.7

Average market cap / revenue multiple within each quartile

Average = 5.6%

NOPAT % of Revenue
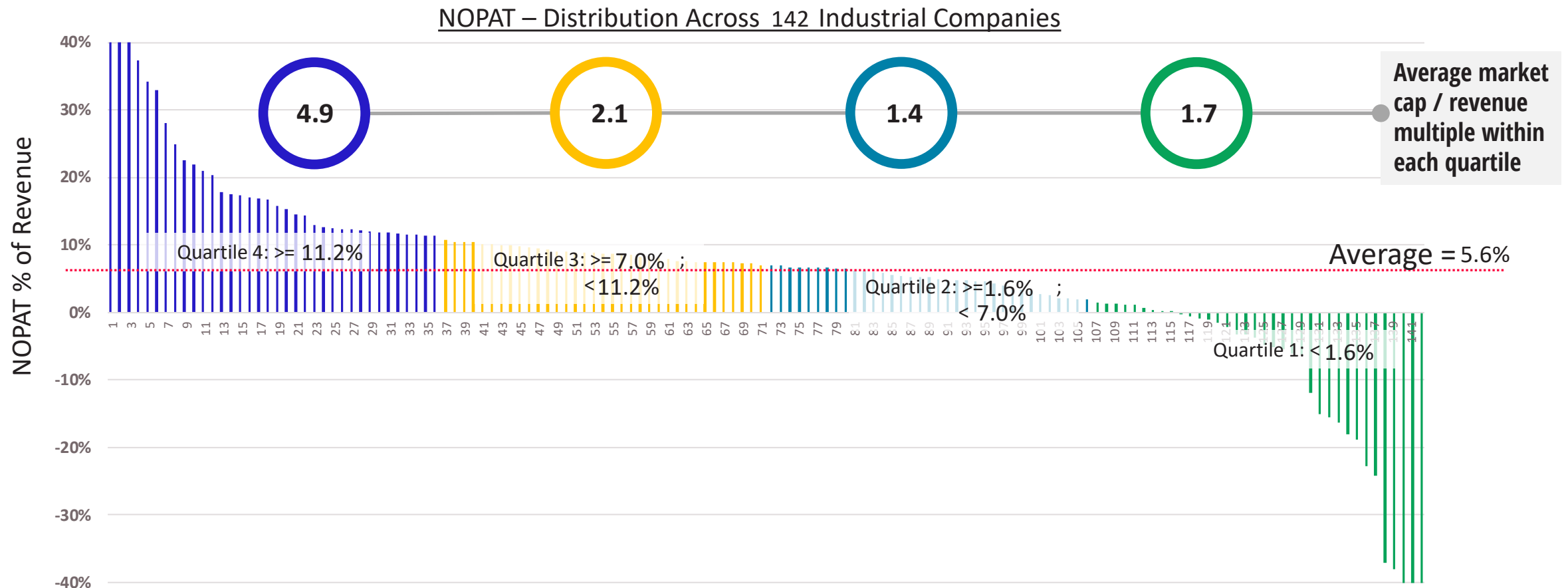
Notes:
1. Chart is truncated for readability.

Operational Analysis
Free cash flow % of revenue

*Industrial companies have an average free cash flow of **7.9%** of revenue. The median is **8.6%** . As expected, free cash flow leaders have significantly higher market cap multiples.*

Free Cash Flow – Distribution Across 140   Industrial Companies

Average market cap / revenue multiple within each quartile

5.0   2.1   1.6   1.6

Quartile 4: >= 12.9%

Quartile 3: >= 8.6%   ; < 12.9%

Quartile 2: >= 3.4%   ; < 8.6%

Quartile 1: < 3.4%

Average = 7.9%

Free Cash Flow % of Revenue
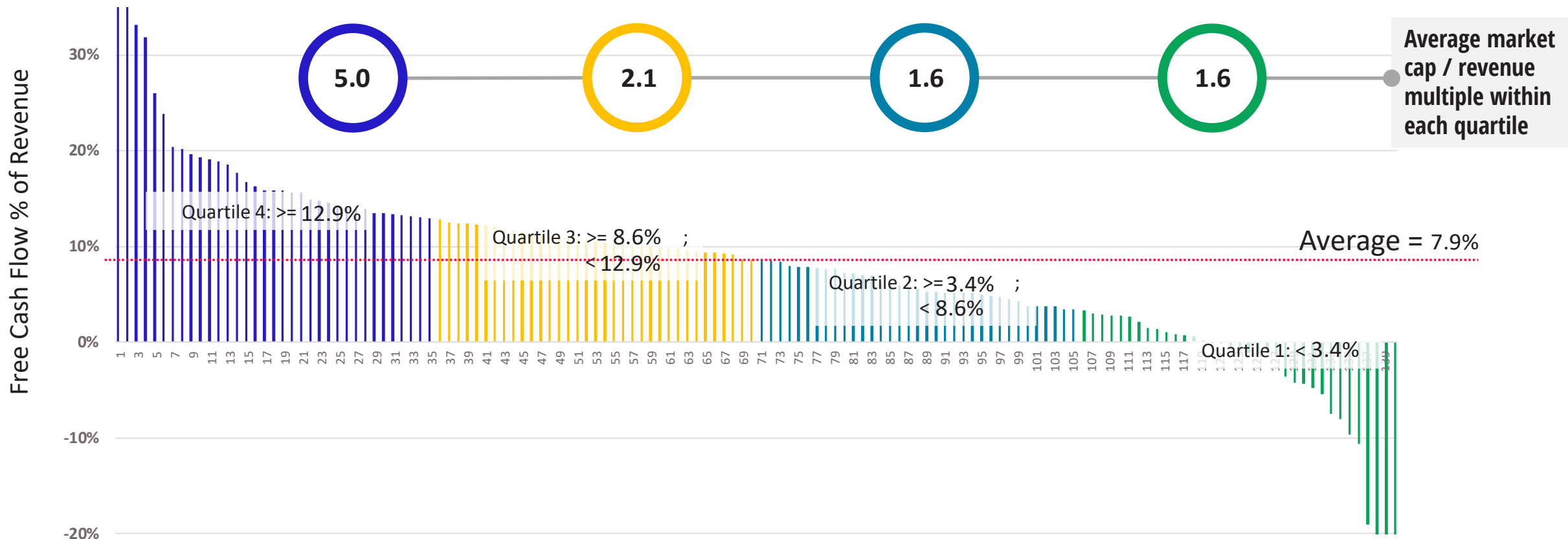
Notes:
1.   Free cash flow = cash flow from operations minus CAPEX.

Operational Analysis
Cash % of revenue

Balance sheet cash position is an indicator of financial health. Industrial companies have an average cash position of **17.6%** *of revenue on their balance sheets. Companies with strong cash positions have significantly higher market cap multiples.*

Cash Position – Distribution Across 141 Industrial Companies

4.3 — **2.4** — **1.7** — **1.6** — **Average market cap / revenue multiple within each quartile**

Cash % of Revenue (y-axis: 0%, 20%, 40%, 60%, 80%, 100%)

Quartile 4: >= 21.5%

Average = 17.6%

Quartile 3: >= 10.9% < 21.5%

Quartile 2: >= 5.7% ;
< 10.9%

Quartile 1: < 5.7%

(x-axis: 1 to 141)
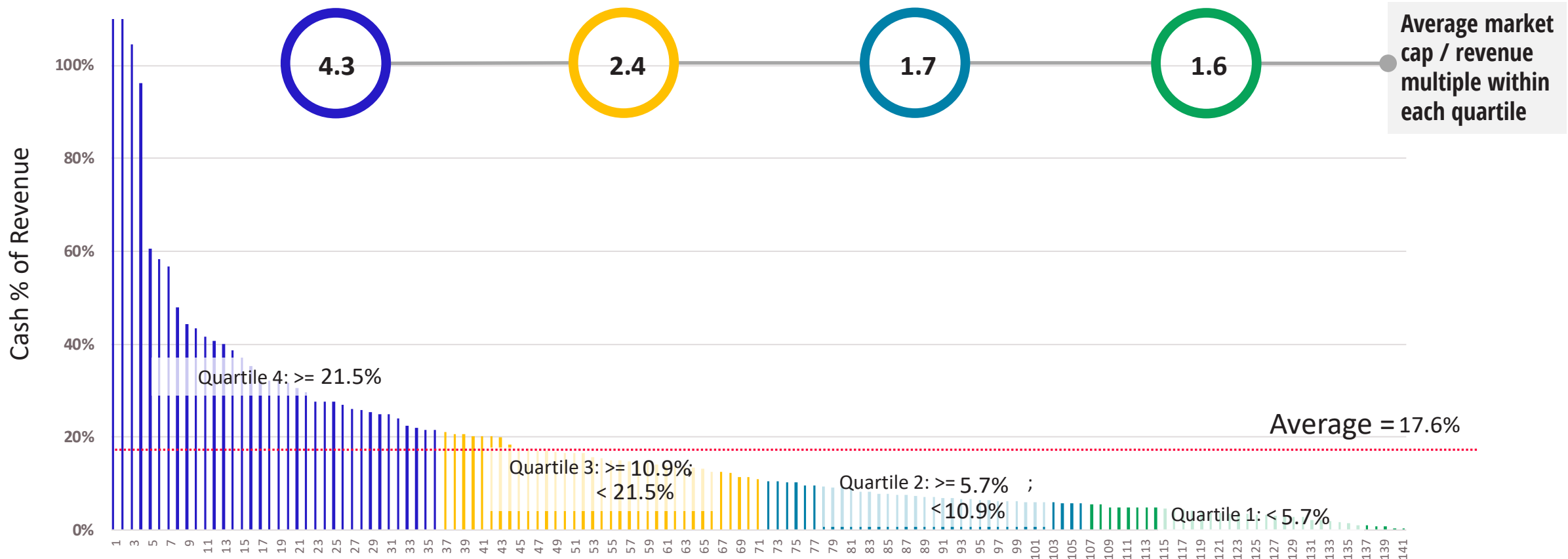
Notes:
1. Cash includes cash, cash equivalents, and marketable securities.

Operational Analysis
Total debt % of revenue[1]

Industrial companies carry an average debt position of **42.4%** of revenue on their balance sheets.

Debt Position – Distribution Across 129 Industrial Companies
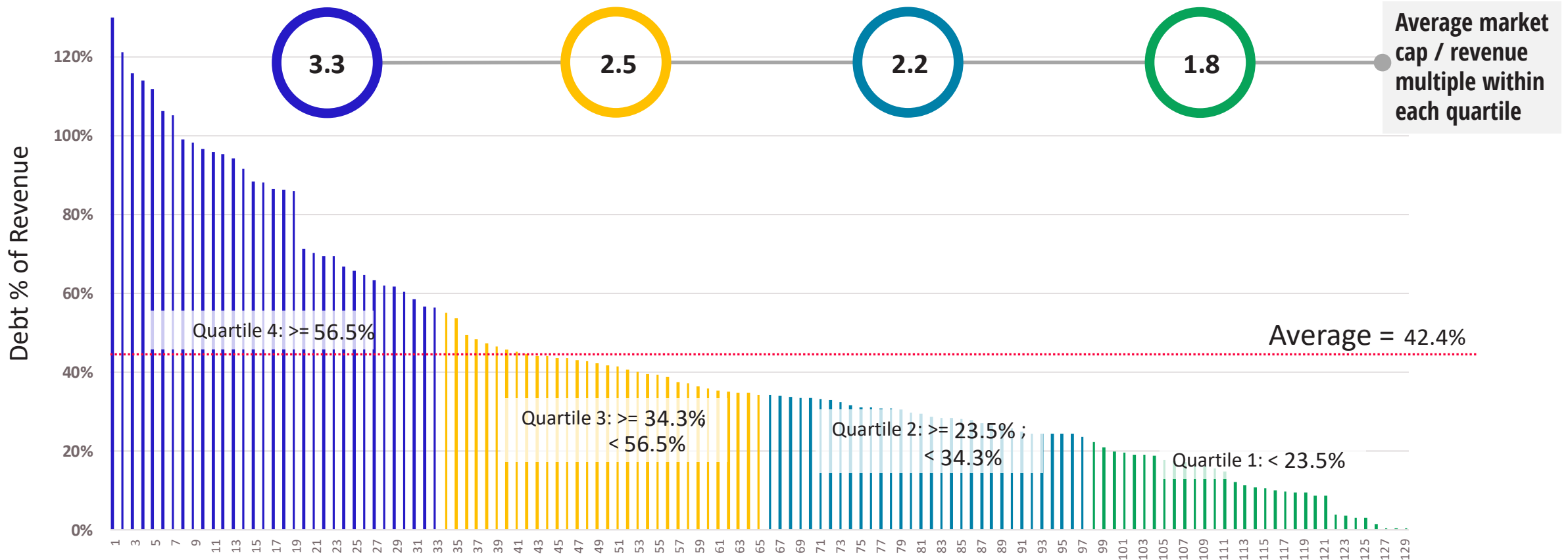
3.3 — **2.5** — **2.2** — **1.8** — Average market cap / revenue multiple within each quartile

Debt % of Revenue

Quartile 4: >= 56.5%

Quartile 3: >= 34.3% < 56.5%

Quartile 2: >= 23.5% ; < 34.3%

Quartile 1: < 23.5%

Average = 42.4%

Operational Analysis
Net cash % of revenue

Net cash position is a simple measure of balance sheet health. Industrial companies have an average net cash position of **-19.9%** *of revenue.*

Net Cash Position – Distribution Across 141 Industrial Companies

3.5 — **1.7** — **2.4** — **2.4** — **Average market cap / revenue multiple within each quartile**

Net Cash % of Revenue

Quartile 4: >= -0.5%

Quartile 3: >= -21.5%; < -0.5%

Quartile 2: >= -37.7%; < -21.5%

Quartile 1: < -37.7%

Average = -19.9%
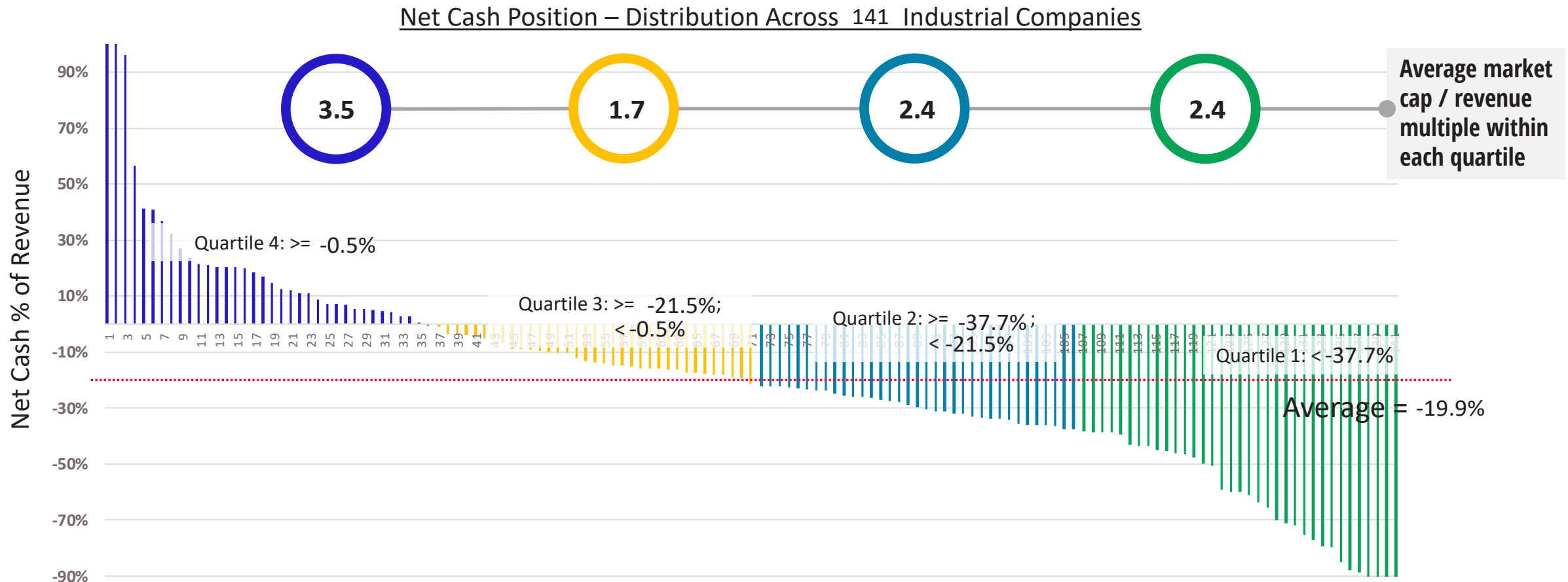
Notes:
1. Net cash = cash on hand minus total debt. Cash includes cash, cash equivalents, and marketable securities.

Operational Analysis
Stock compensation % of revenue

Industrial companies employ an average of **1.0%** *of revenue in stock-based compensation. This is a sizable amount, but significantly less than high-tech companies.*

Stock Compensation – Distribution Across 119 Industrial Companies

Average market cap / revenue multiple within each quartile

Quartile 4: >= 1.2%

Quartile 3: >= 0.7% ; < 1.2%

Quartile 2: >= 0.5% ; < 0.7%

Quartile 1: < 0.5%

Average = 1.0%

4.4   2.6   2.4   1.3
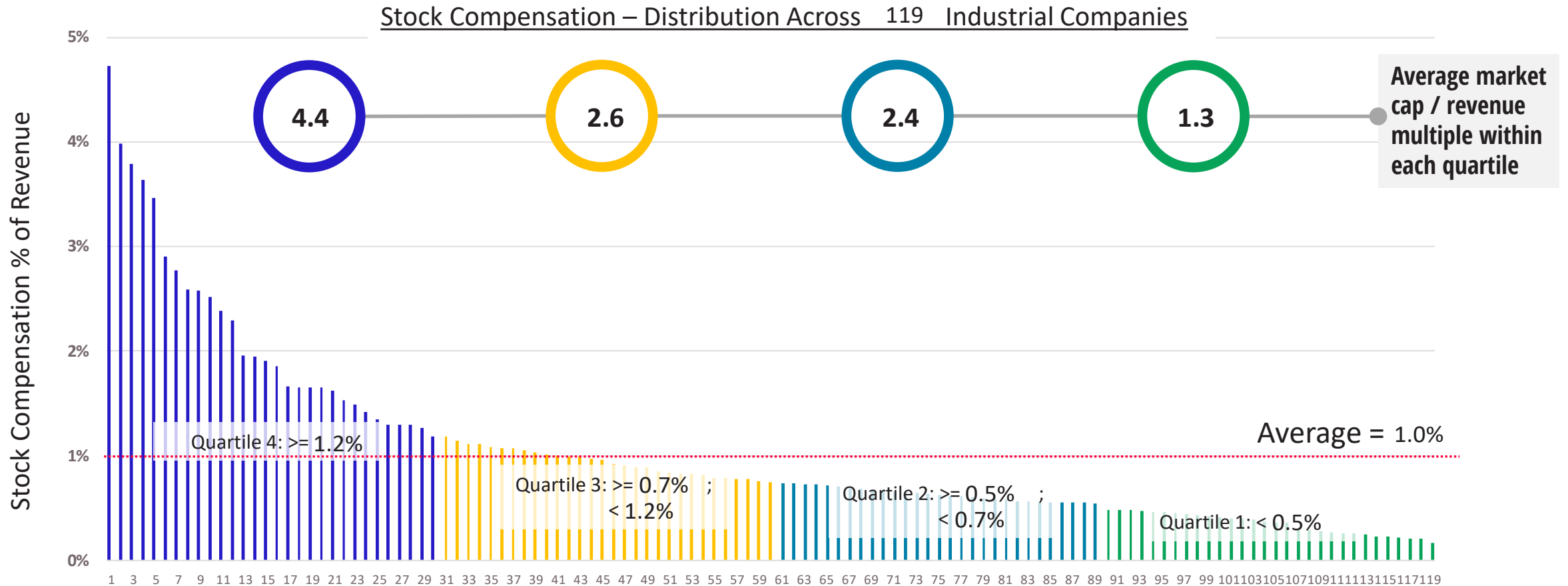
Operational Analysis
Equity % of revenue

Industrial companies have average deployment of equity of **64.8%** of revenue.

Equity – Distribution Across 142 Industrial Companies

Average market cap / revenue multiple within each quartile

4.1 — 3.3 — 1.5 — 1.3

Quartile 4: >= 81.6%

Quartile 3: >= 58.2% ; < 81.6%

Quartile 2: >= 35.3% ; < 58.2%

Quartile 1: < 35.3%

Average = 64.8%

Equity % of Revenue
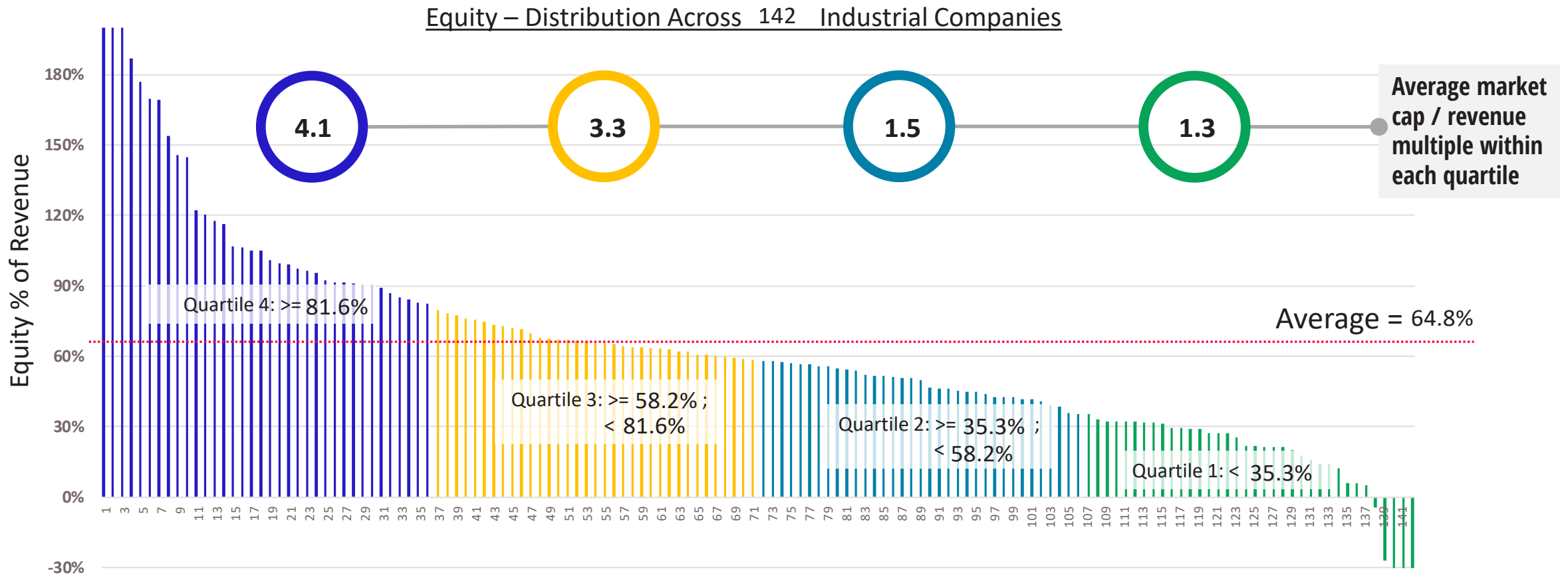
Operational Analysis
Intangible assets % of revenue

Intangible assets usually represent the amount of intellectual property owned by a company and can include technology, software, techniques, relationships, and ecosystem. Industrial companies have an average of **19.1%** of revenue in intangible assets.

Intangible Assets – Distribution Across 128 Industrial Companies

Intangible Assets % of Revenue

2.7 — **2.8** — **2.2** — **2.9** —

Average market cap / revenue multiple within each quartile

Quartile 4: >= 22.5%

Quartile 3: >= 14.0% ; < 22.5%

Quartile 2: >= 5.5% ; < 14.0%

Quartile 1: < 5.5%

Average = 19.1%
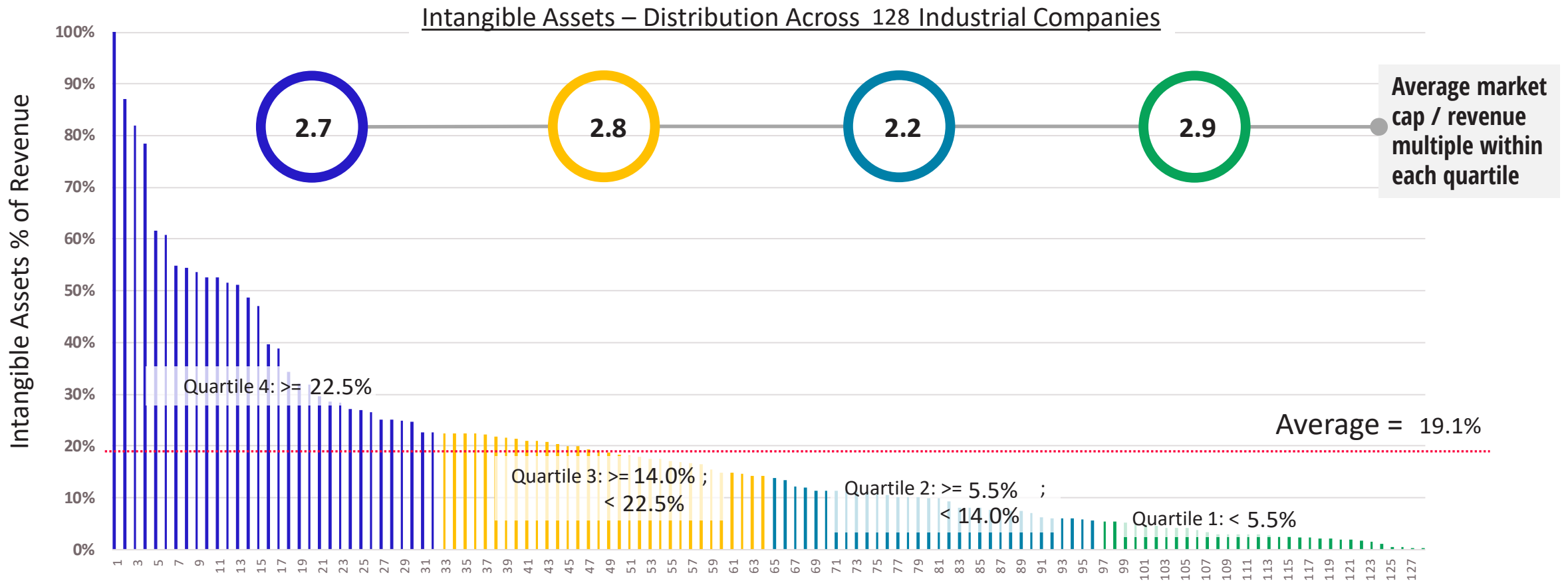
Operational Analysis
PP&E % of revenue

Property, plant, and equipment (PP&E) is a measure of the physical asset intensity of an industry. Industrial companies deploy an average of **19.4%** of revenue PP&E, making in the lower half of all industries. Companies with the largest level of physical assets have lower market cap multiples.

PP&E – Distribution Across   142   Industrial Companies

1.6   **2.9**   **3.1**   **2.6**

Average market cap / revenue multiple within each quartile

Quartile 4: >= 23.1%

Quartile 3: >= 15.2% ; < 23.1%

Quartile 2: >= 11.3% ; < 15.2%

Quartile 1: < 11.3%

Average = 19.4%
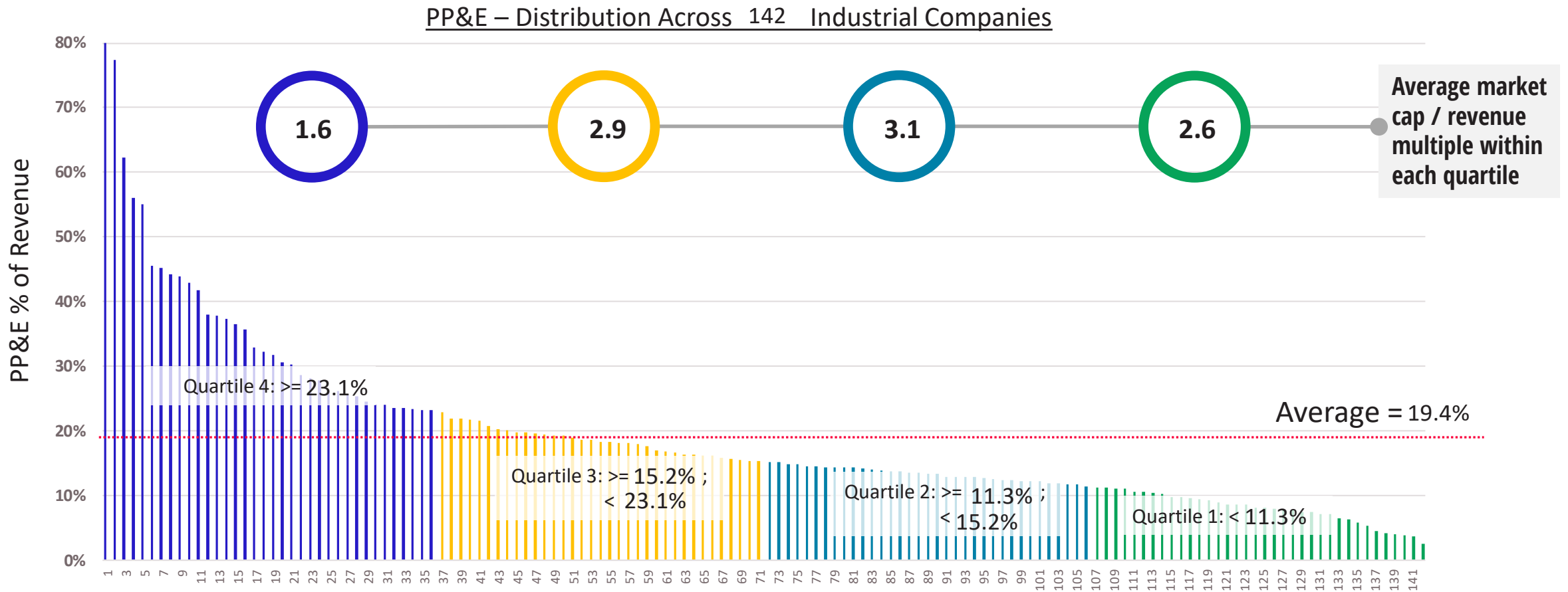
PP&E % of Revenue

Operational Analysis
Goodwill assets % of revenue

Goodwill is a proxy for the acquisition intensity of a company, which translates to the amount of M&A activity. Industrial companies are among the leaders across all industries in this measure. Industrial companies have an average of **33.5%** *of revenue in goodwill.*

Goodwill – Distribution Across 142 Industrial Companies

3.1   **2.6**   **2.1**   **2.6**

Average market cap / revenue multiple within each quartile

Goodwill % of Revenue

Quartile 4: >= 46.8%

Quartile 3: >= 28.6%; < 46.8%

Average = 33.5%

Quartile 2: >= 9.6% ; < 28.6%

Quartile 1: < 9.6%
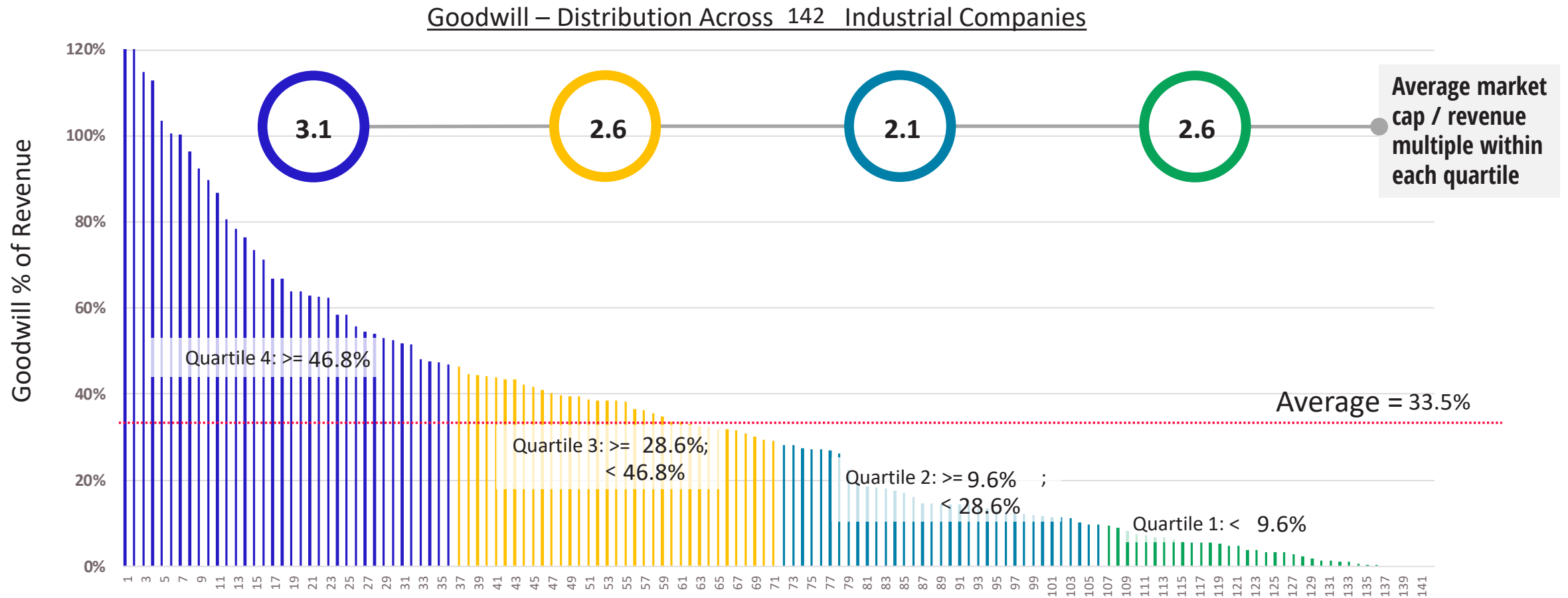
Operational Analysis
Capital expenditure (CAPEX) % of revenue

Industrial companies have average capital expenses of **5.2%** of revenue on an annual basis. Most of this goes towards property, plant, and equipment, and intangibles such as software and intellectual property.

CAPEX – Distribution Across 140 Industrial Companies

3.6   **2.5**   **2.2**   **1.9**

Average market cap / revenue multiple within each quartile

CAPEX % of Revenue

Quartile 4: >= 4.0%

Quartile 3: >= 2.8% ; < 4.0%

Quartile 2: >= 2.0% ; < 2.8%

Quartile 1: < 2.0%

Average = 5.2%

The analysis captures stock repurchases for **88** of the companies. For this cohort, average repurchases were **3.3%** of revenue.
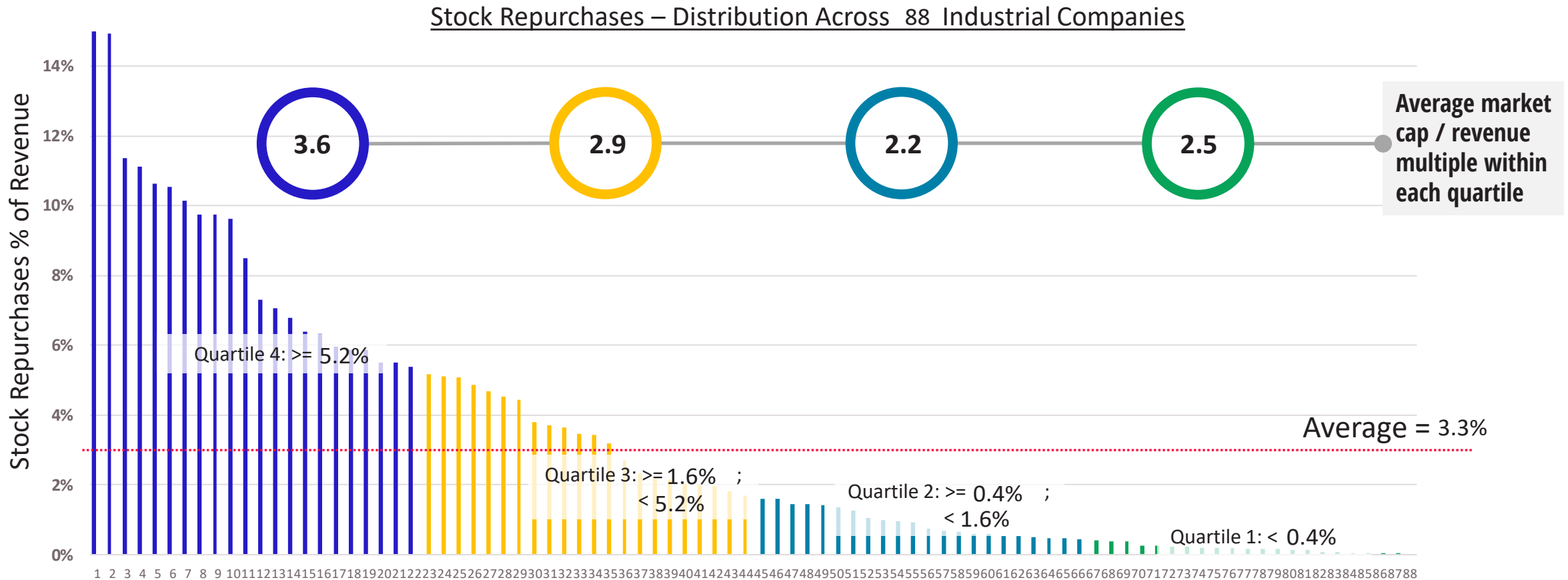
Stock Repurchases – Distribution Across 88 Industrial Companies

3.6   **2.9**   **2.2**   **2.5**

Average market cap / revenue multiple within each quartile

Stock Repurchases % of Revenue (y-axis: 0% to 14%)

Quartile 4: >= 5.2%

Quartile 3: >= 1.6% ; < 5.2%

Quartile 2: >= 0.4% ; < 1.6%

Quartile 1: < 0.4%

Average = 3.3%

Notes:
1. Chart is truncated for readability.

Deferred revenue is revenue that has been booked for which work has not yet been completed and thus cannot yet be include in the income statement. It is sometimes confused with backlog, but cannot be equated with backlog. Deferred revenue is a measure that is more relevant to subscription-based businesses. That said, as industrial companies evolve towards solutions companies, this measure might become more relevant. The average deferred revenue as a percentage of total revenue is **4.5%**. The median is **2.1%**.
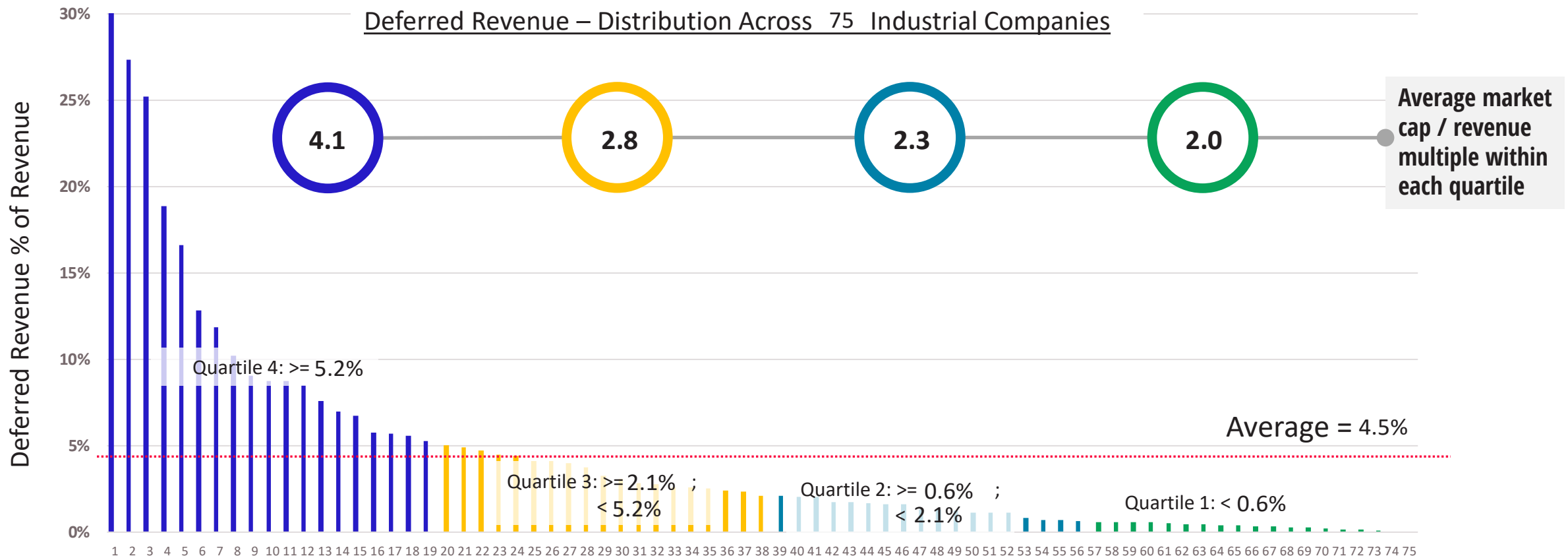
Deferred Revenue – Distribution Across 75 Industrial Companies

Remaining performance obligations (RPOs) % of revenue

*Remaining performance obligations are a measure of the backlog of business that a company has booked but not yet delivered. This is essentially the amount of future revenue that has already been booked. Companies have started disclosing RPOs in the past couple of years as part of compliance to new accounting standards. RPO information is available for   66   of the companies in the analysis. Average RPOs as a percent of revenue is **51.9%** .*

RPOs % of Revenue – Distribution Across   66   Industrial Companies

RPOs % of Revenue (y-axis: 0% to 300%)

(3.5)   (2.2)   (3.0)   (2.1)

Average market cap / revenue multiple within each quartile

Quartile 4: >= 47.7%

Average = 51.9%

Quartile 3: >=13.9% ; < 47.7%

Quartile 2: >= 3.9% ; < 13.9%

Quartile 1: <3.9%

x-axis: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66
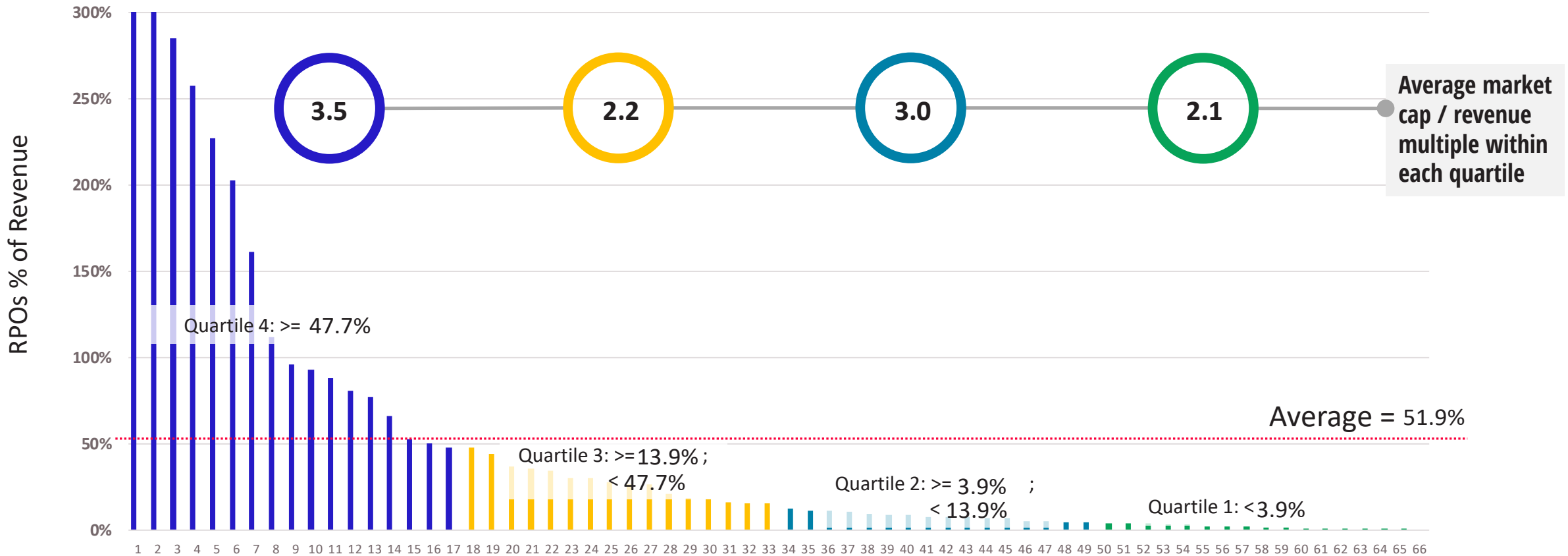
Notes:
1. Chart is truncated for readability.

Operational Analysis
Days in receivables (DIR)

Days in receivables (DIR) is an operational measure of cash collection. It represents the number of days it takes to get paid once a PO is raised. The average is **61.9** days; the median is **58.8** days.

Days in Receivables – Distribution Across 141 Industrial Companies

Average market cap / revenue multiple within each quartile

Average = 61.9

Quartile 4: >= 71.6

Quartile 3: >= 58.8 ; < 71.6

Quartile 2: >= 49.1 ; < 58.8

Quartile 1: < 49.1

2.0   2.7   3.3   2.2

Notes:
1. Chart is truncated for readability.

Days in payables is an operational measure of cash collection. It represents the number of days it takes to get paid once a PO is raised. The average is **54.5** days; the median is **50.7** days.

Days in Payables – Distribution Across 142 Industrial Companies

2.6 **2.7** **2.1** **2.8**

Average market cap / revenue multiple within each quartile

Quartile 4: >= 64.7

Average = 54.5

Quartile 3: >= 50.7 ; < 64.7

Quartile 2: >= 37.2 ; < 50.7

Quartile 1: < 37.2

Notes:
1. Chart is truncated for readability.

Industrial companies carry an average of **96.1** days in inventory on a COGS basis The median is **85.6** days. Paradoxically, companies with higher days in inventory have significantly higher market cap multiples than others. This indicates that modern supply chain management is about much more than managing inventory and is increasingly about contributing to revenue, profit, and ROI.

Days in Inventory – Distribution Across **142** Industrial Companies
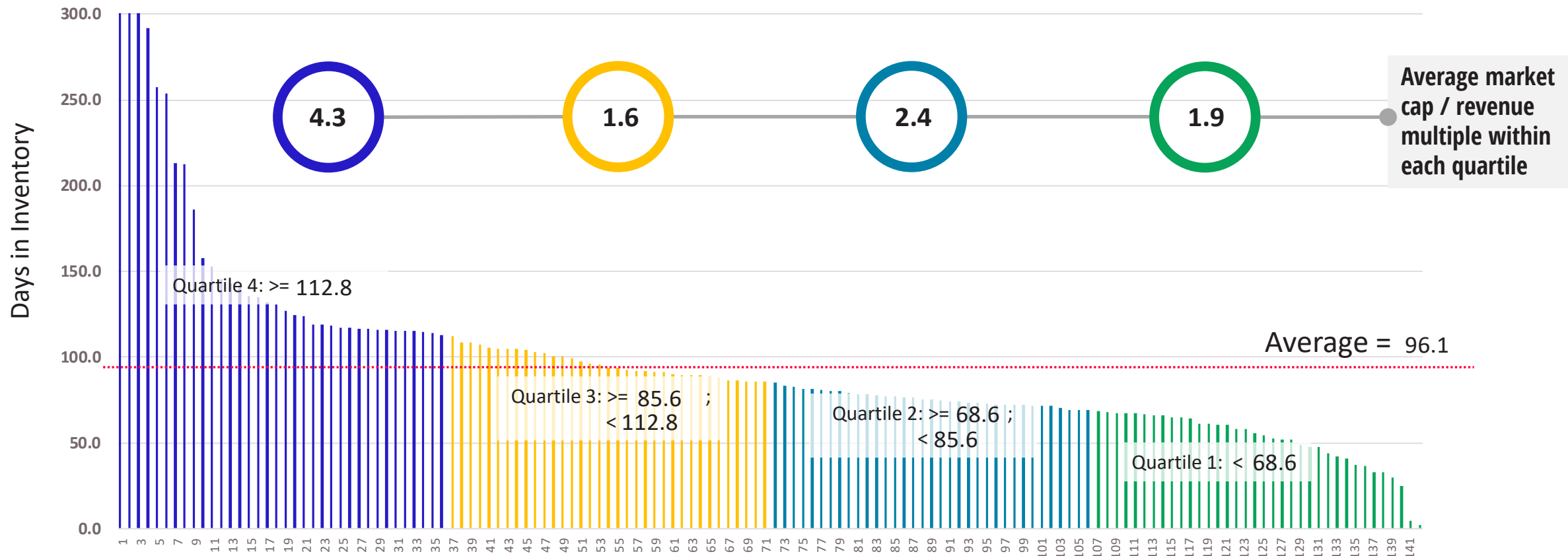
Average market cap / revenue multiple within each quartile

- **4.3**
- **1.6**
- **2.4**
- **1.9**

Quartile 4: >= 112.8

Quartile 3: >= 85.6 ; < 112.8

Quartile 2: >= 68.6 ; < 85.6

Quartile 1: < 68.6

Average = 96.1

Days in Inventory

Notes:
1. Chart is truncated for readability.

Industrial companies operate with an average of **6.5** inventory turns. The median is **4.3**, indicating a few outliers are skewing the average higher. Paradoxically, companies with lower inventory turns have significantly higher market cap multiples. This indicates that modern supply chain management is about much more than managing inventory and is increasingly about contributing to revenue, profit, and ROI.

Inventory Turns – Distribution Across **142** Industrial Companies

Quartile 4: >= 5.3

Quartile 3: >= 4.3 ; < 5.3

Quartile 2: >= 3.2 ; < 4.3

Quartile 1: < 3.2

Average = 6.5

Average market cap / revenue multiple within each quartile

1.9   2.4   1.6   4.3
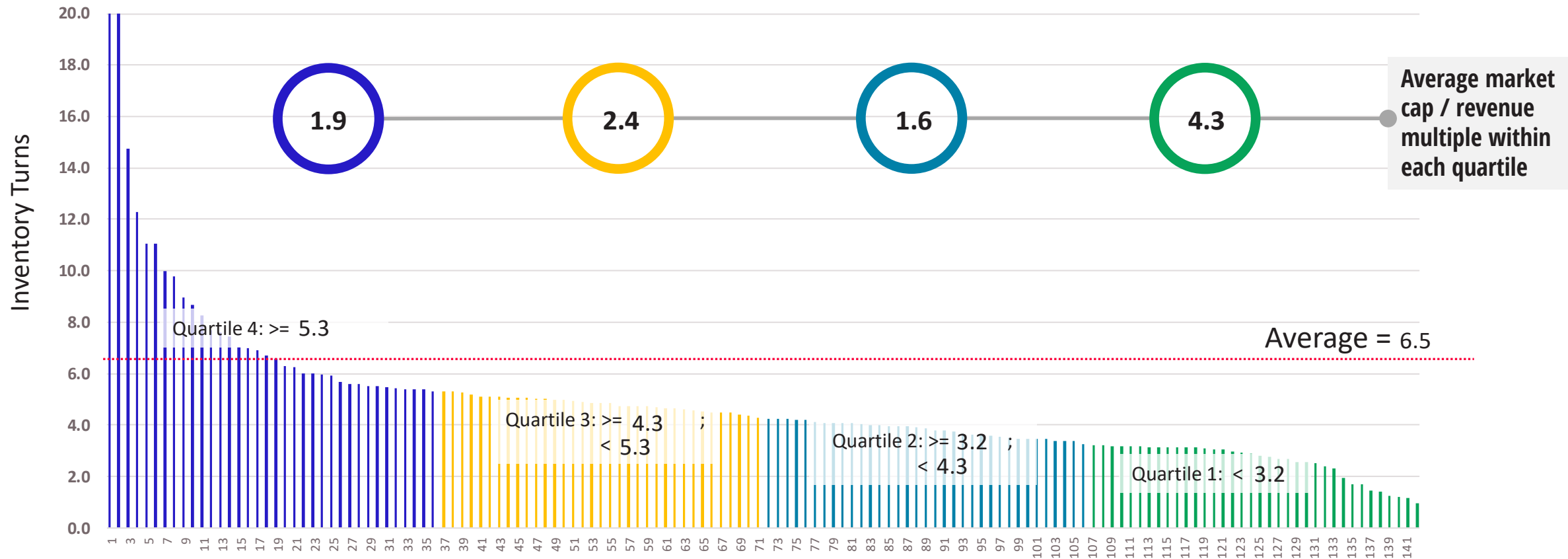
Notes:
1. Chart is truncated for readability.

Operational Analysis
Inventory % of revenue

Industrial companies generally carry a lot of inventory. The average inventory as a percentage of revenue is **17.0%** *. The median is* **15.3%** *.*

Inventory – Distribution Across 142 Industrial Companies

2.7 **2.4** **2.2** **2.9**

Average market cap / revenue multiple within each quartile

Inventory % of Revenue

Quartile 4: >= 19.9%

Average = 17.0%

Quartile 3: >=15.3%; < 19.9%

Quartile 2: >= 12.1% ; < 15.3%

Quartile 1: < 12.1%

Historically, in many businesses, there is tradeoff between gross margin and inventory turns. Higher gross margin products have historically had lower inventory turns, simply because the cost of lost sales exceeds the cost of carrying the inventory. Turn and earn is a view that combines the two. Industrial companies have an average turn and earn of **1.7** . Interestingly, there is little difference in market cap multiples between leaders and laggards.

Turn and Earn – Distribution Across 142 Industrial Companies

3.1   **2.2**   **2.0**   **2.8**

Average market cap / revenue multiple within each quartile

Quartile 4: >= 1.9

Quartile 3: >= 1.4 ; < 1.9

Quartile 2: >= 1.0 ; < 1.4

Quartile 1: < 1.0

Average = 1.7
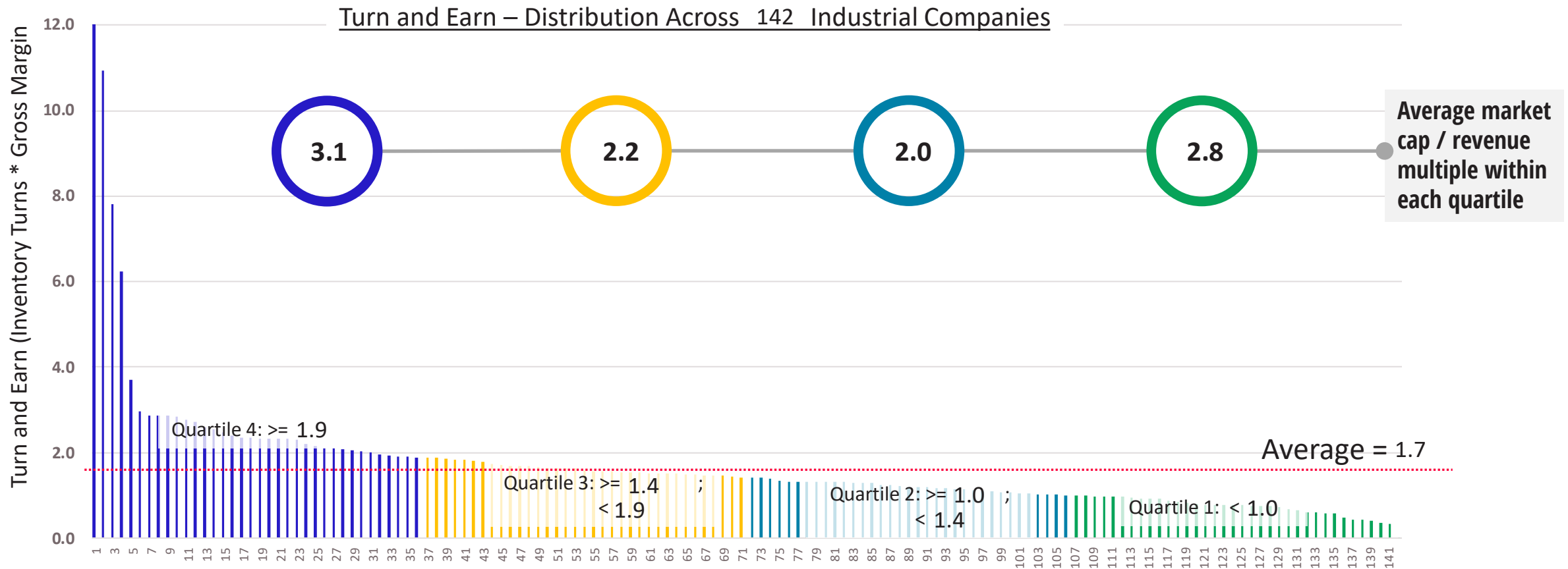
Notes:
1.   Chart is truncated for readability.

Operational Analysis
Inventory turns versus gross margin

Historically, there has been a tradeoff between inventory turns and gross margin, with higher gross margin products typically having lower inventory turns, simply because the cost of lost sales exceeds the costs of carrying the inventory. This chart shows the relationship between inventory turns and gross margin. While there is slight inverse relationship, it is not profound. This indicates that supply chain management has evolved towards multivariate science, versus the historical focus on a single variable or even a combination of variables.

- Inventory Turns Versus Gross Margin – 142 Industrial Companies

Weak Inverse Relationship

Inventory Turns (y-axis): 0.0, 2.0, 4.0, 6.0, 8.0, 10.0, 12.0, 14.0

Gross Margin (x-axis): 10.0%, 20.0%, 30.0%, 40.0%, 50.0%, 60.0%

Notes:
1. Chart is truncated for readability.

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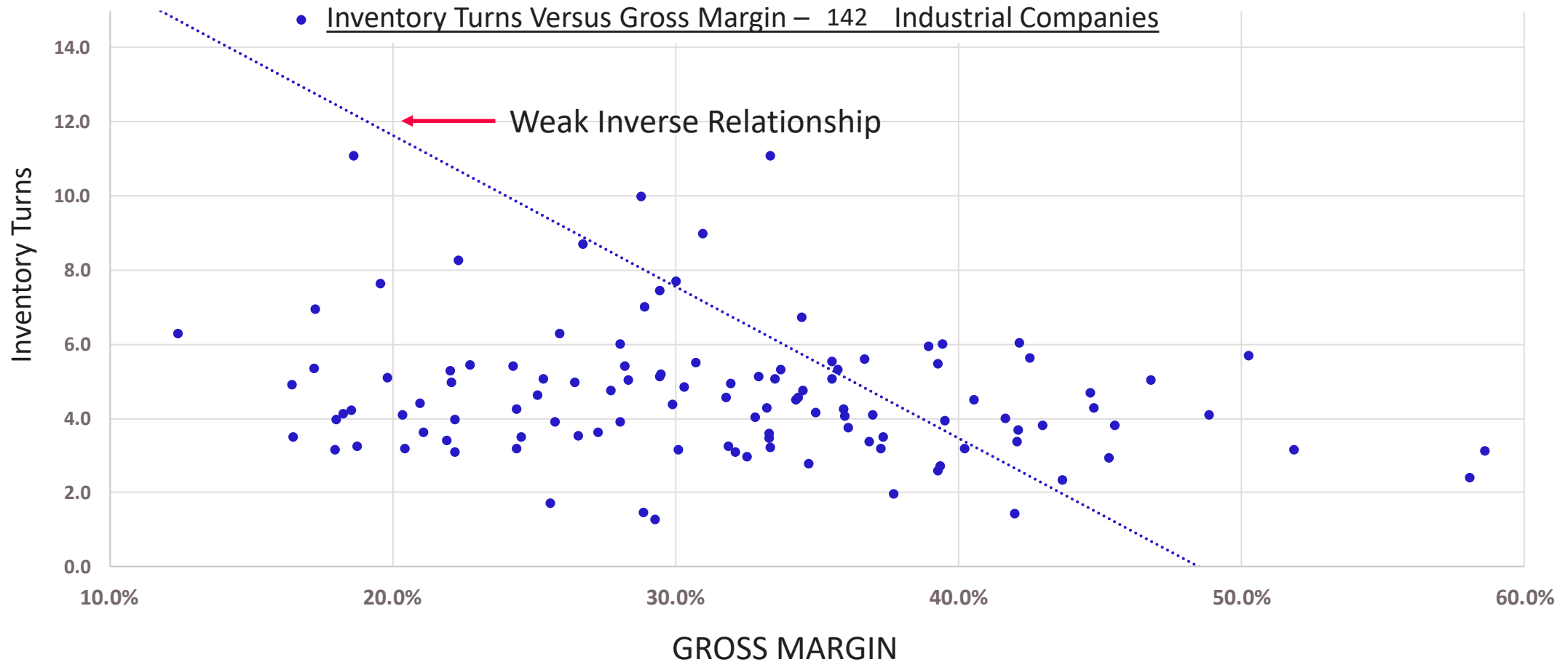
Operational Analysis
Cash-to-cash cycle (days)

The cash-to-cash cycle measures the number of days of cash that is tied up in the supply chain. Industrial companies have an average cash-to-cash cycle of **103.1** days. The median is **91.8** days. Paradoxically, companies with longer cash-to-cash cycles have higher market cap multiples.

Cash-to-Cash (Days) – Distribution Across 142 Industrial Companies

3.2 — **3.1** — **2.3** — **1.5** — **Average market cap / revenue multiple within each quartile**

Quartile 4: >= 127.4

Quartile 3: >= 91.8 ; < 127.4

Quartile 2: >= 66.6 ; < 91.8

Quartile 1: < 66.6

Average = 103.1
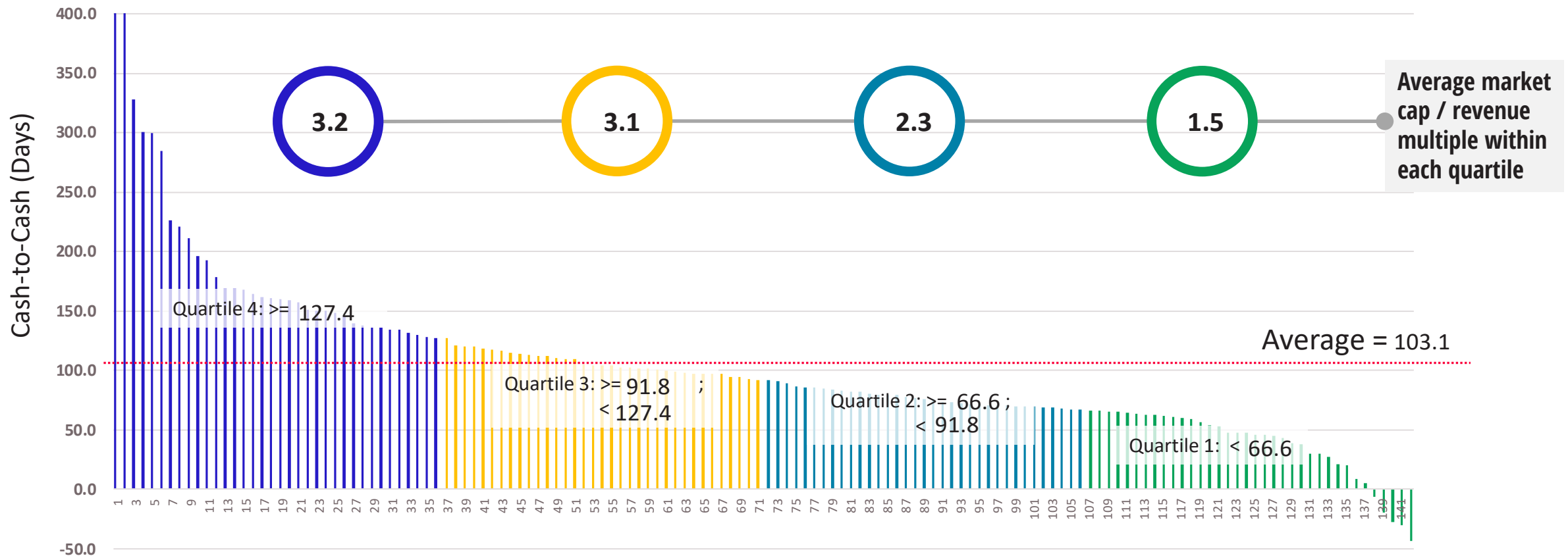
Notes:
1. Chart is truncated for readability.
2. Cash-to-cash (days) = Days in Receivables plus Days in Inventory minus Days in Payables.

Operational Analysis
Revenue per employee

Revenue per employee is the amount of annual revenue that is generated per full-time employee (not including contractors). The average revenue per employee across the industrial company dataset companies is **$261,216**. The median is **$236,823**.
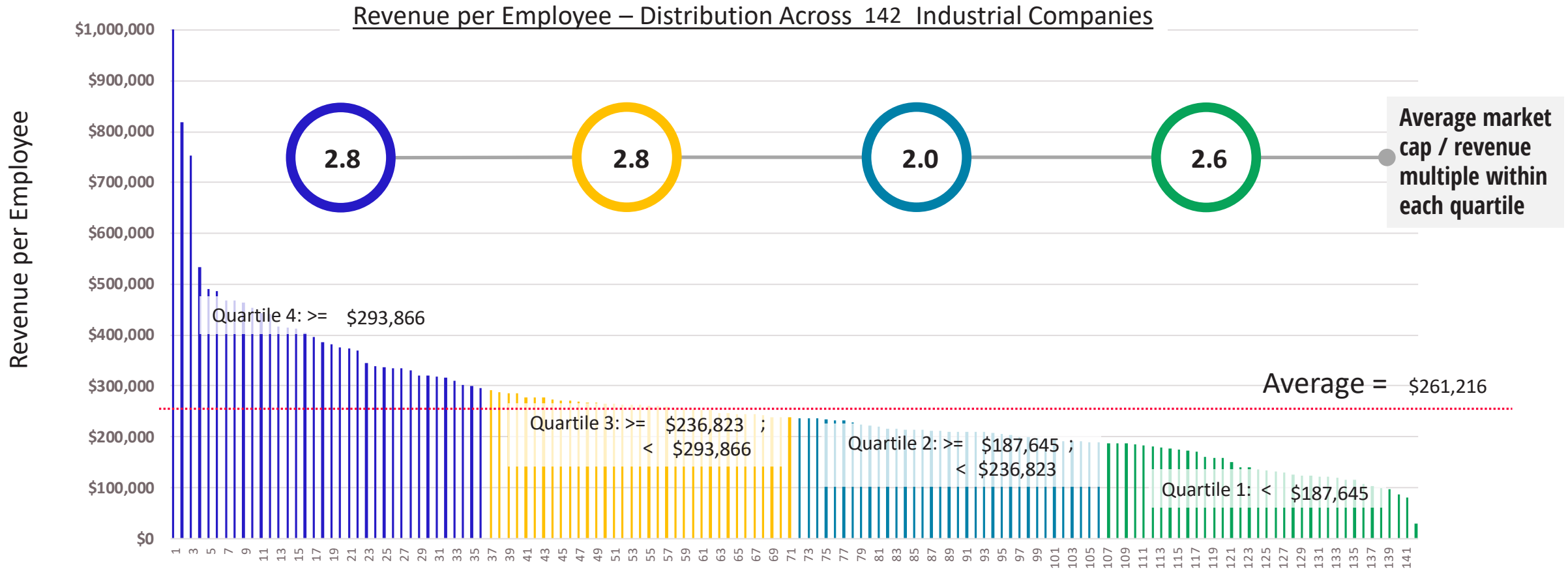
Revenue per Employee – Distribution Across 142 Industrial Companies

Average market cap / revenue multiple within each quartile

| 2.8 | 2.8 | 2.0 | 2.6 |

Quartile 4: >= $293,866

Quartile 3: >= $236,823 ; < $293,866

Quartile 2: >= $187,645 ; < $236,823

Quartile 1: < $187,645

Average = $261,216

Return on Investment

Charts that provide analysis of various forms of return on investment.

ROI Analysis
Return on invested capital (ROIC)

Return on invested capital (ROIC) is a commonly-used measure for industrial companies. The average ROIC for industrial companies is **5.7%**. The median is **7.1%**. As expected, leaders in ROIC are also leaders in market cap multiple.

Return on Invested Capital – Distribution Across 142 Industrial Companies
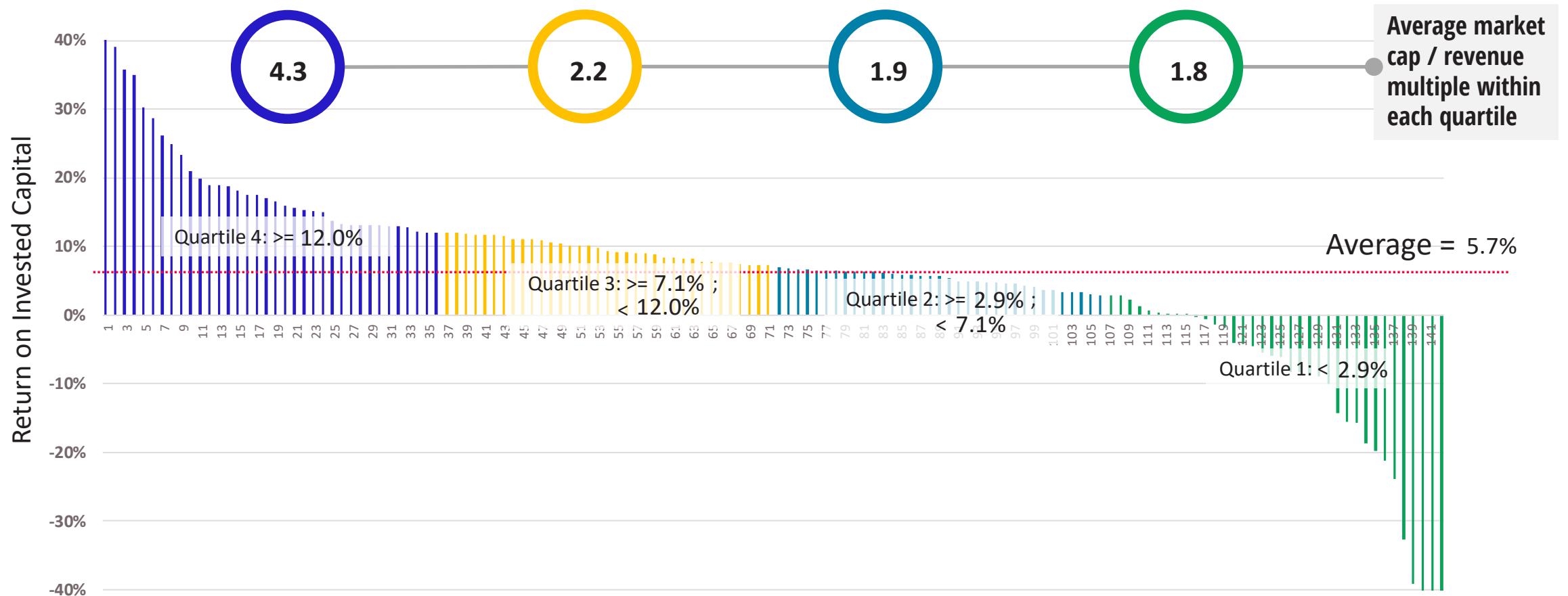
Quartile 4: >= 12.0%

Quartile 3: >= 7.1% ; < 12.0%

Quartile 2: >= 2.9% ; < 7.1%

Quartile 1: < 2.9%

Average market cap / revenue multiple within each quartile

4.3   2.2   1.9   1.8

Average = 5.7%

Return on Invested Capital

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Return on assets (ROA) is a commonly-used measure for industrial companies. The average ROA for industrial companies is **4.3%**. The median is **5.2%**. As expected, leaders in ROA are also leaders in market cap multiple.

Return on Assets – Distribution Across 142 Industrial Companies

4.6   **2.0**   **1.9**   **1.8**

Average market cap / revenue multiple within each quartile

Quartile 4: >= 9.2%

Quartile 3: >= 5.2% ; < 9.2%

Average = 4.3%

Quartile 2: >= 1.9% ; < 5.2%

Quartile 1: < 1.9%
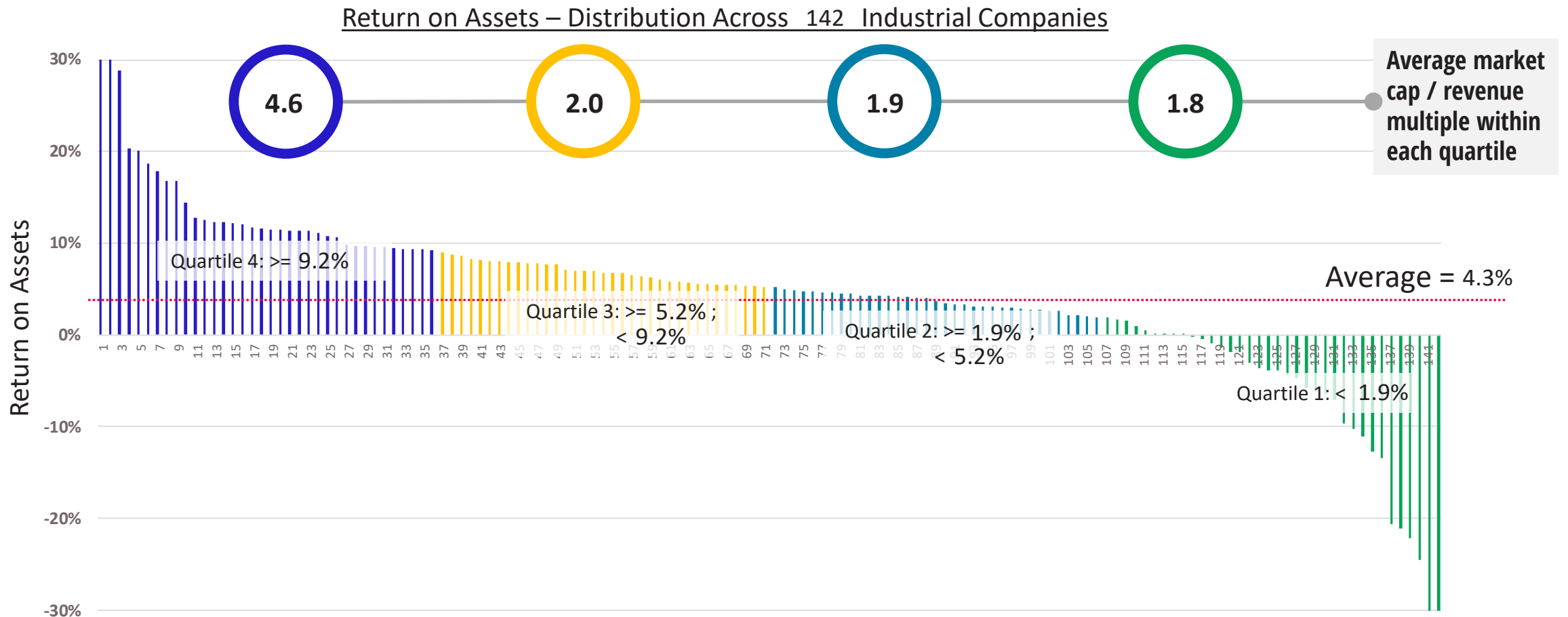
Return on Assets

Notes:
1. Return on assets = Net profit divided by total assets.

ROI Analysis
Return on physical assets (ROPA)

*Return on physical assets (ROPA) is an ROI measure that attempts to isolate the return a company is getting on its supply chain. In this case, physical assets includes property, plant, and equipment (PP&E), and inventories. Gartner has recently changed its top 25 supply chain comparison criteria from ROA to ROPA. The average ROPA for industrial companies is **22.9%**.*

Return on Physical Assets – Distribution Across 142 Industrial Companies

4.7 — **2.4** — **1.4** — **1.7** — **Average market cap / revenue multiple within each quartile**

Quartile 4: >= 40.7%

Quartile 3: >= 20.8%; < 40.7%

Quartile 2: >= 4.7% , < 20.8%

Quartile 1: < 4.7%

Average = 22.9%

Return on Physical Assets
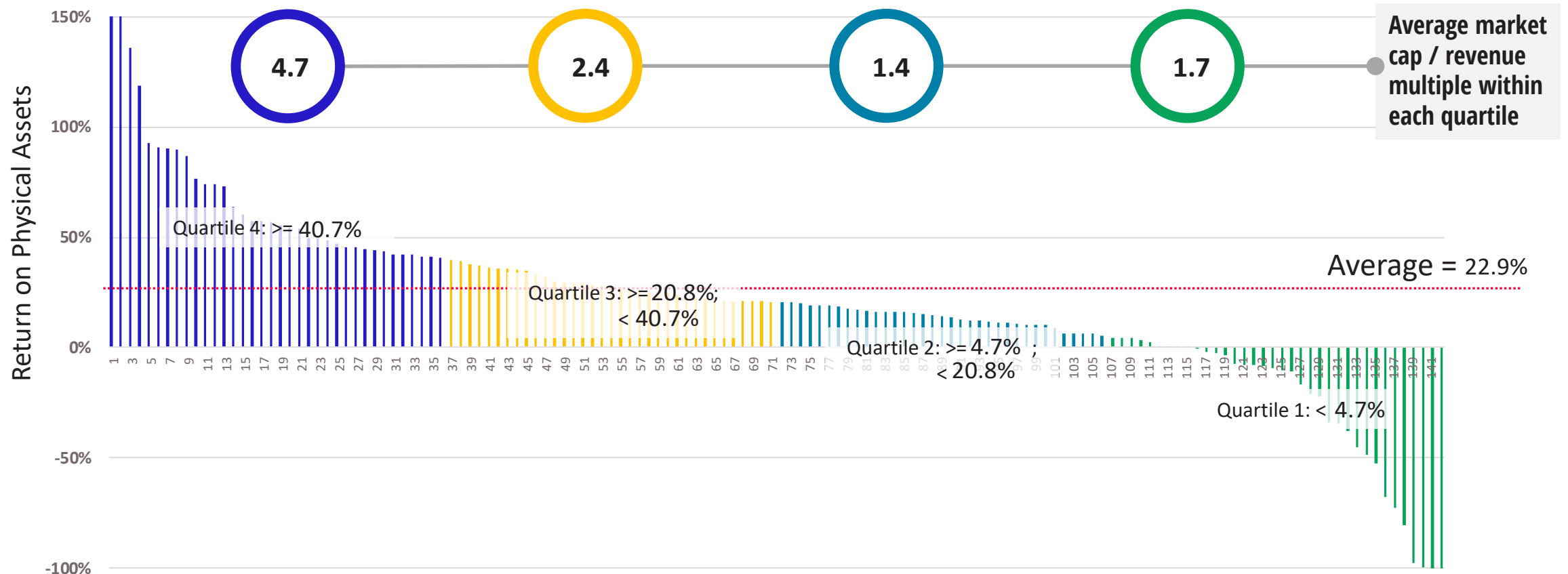
Notes:
1. Return on physical assets (ROPA) = Net profit divided by (PP&E plus inventories). Note: Gartner uses operating profit in their calculations.

Economic profit is an ROI measure that indicates if a company's profit covers the cost of capital. This is also known by the Stern Stewart name economic value add (EVA). The average economic profit for industrial companies as a percentage of revenue is **-1.8%** .
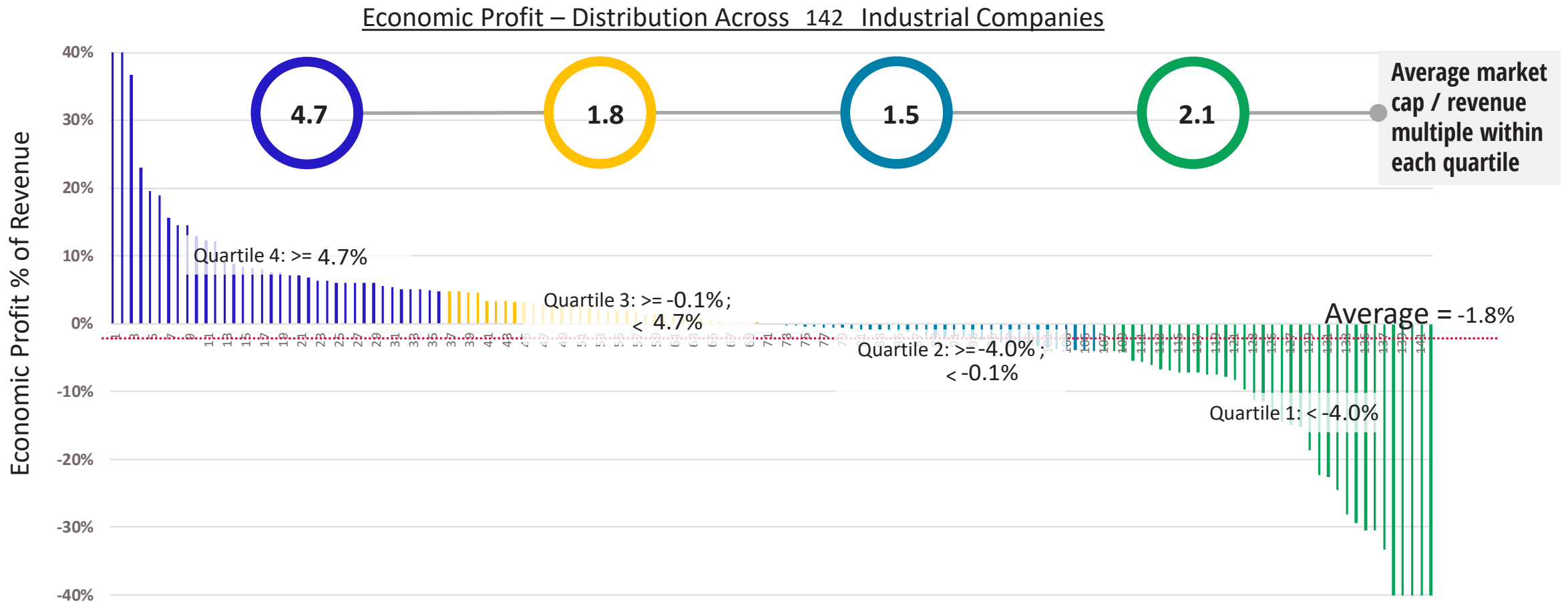
Economic Profit – Distribution Across 142 Industrial Companies

Average market cap / revenue multiple within each quartile

4.7   1.8   1.5   2.1

Quartile 4: >= 4.7%

Quartile 3: >= -0.1% ; < 4.7%

Quartile 2: >= -4.0% ; < -0.1%

Quartile 1: < -4.0%

Average = -1.8%

Economic Profit % of Revenue

Historical Analysis

Charts that provide analysis of key variables across all companies for the ten years from 2010 to 2019. Note: the numbers in this are aggregate averages for the entire industry (not averages of the percentages for all companies).

Historical Analysis
Summary table of all variables, 2010-2019

AVERAGES	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	10YRAVG
Growth Rate (YOY)	1.4%	10.0%	4.4%	-6.3%	-8.1%	0.2%	2.5%	3.3%	16.9%	5.2%	3.0%
Gross Margin	32.0%	29.5%	29.3%	31.4%	31.4%	30.5%	30.7%	30.6%	30.7%	32.9%	30.9%
SG&A % of Revenue	16.3%	16.3%	16.7%	17.0%	16.3%	15.1%	15.0%	12.2%	11.7%	12.1%	14.9%
R&D % of Revenue	4.4%	4.4%	4.6%	4.5%	4.4%	4.1%	4.0%	4.0%	3.8%	3.7%	4.2%
Inventory Turns (COGS/Inv)	4.3	4.5	4.2	4.2	4.4	4.4	4.4	4.2	4.7	4.8	4.4
Days in Inventory	84.0	81.7	87.0	87.5	83.5	82.5	83.0	86.1	78.2	75.6	82.9
Operating Income	9.4%	6.9%	7.5%	8.2%	9.2%	11.2%	11.8%	12.1%	13.2%	11.6%	10.1%
Net Profit	6.2%	3.6%	4.2%	5.2%	3.9%	8.5%	8.7%	8.6%	8.8%	8.0%	6.6%
EBITDA	14.8%	11.5%	12.4%	13.0%	13.2%	15.2%	15.5%	17.5%	19.3%	18.9%	15.1%
Operating Cash Flow	11.6%	9.9%	9.9%	9.7%	12.5%	13.3%	14.1%	12.1%	13.2%	14.7%	12.1%
FCF % of Revenue	7.4%	5.9%	6.0%	6.0%	8.6%	9.0%	9.6%	7.1%	7.9%	10.4%	7.8%
CAPEX % of Revenue	4.1%	4.1%	3.9%	3.7%	3.9%	4.3%	4.4%	5.0%	5.3%	4.4%	4.3%
Stock Compensation	0.4%	0.4%	0.4%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%
Days in Receivables	60.8	60.4	67.9	66.0	63.2	64.9	68.9	74.9	72.7	71.7	67.1
Days in Payables	69.5	68.1	72.7	67.8	56.4	60.0	61.1	59.7	57.9	58.8	63.2
Cash-to-Cash Cycle (Days)	75.4	73.9	82.2	85.6	90.3	87.4	90.8	101.3	93.0	88.4	86.8
Property, Plant, Equipment %	21.4%	22.2%	26.0%	25.2%	24.4%	23.3%	26.1%	28.6%	25.9%	26.2%	24.9%
Cash % of Revenue	19.6%	14.7%	27.8%	27.5%	34.0%	34.0%	38.7%	24.1%	22.2%	32.6%	27.5%
Debt % of Revenue	54.0%	54.7%	62.4%	63.1%	68.5%	70.9%	77.5%	88.5%	92.7%	104.2%	73.6%
Goodwill % of Revenue	38.1%	39.2%	45.1%	43.9%	37.9%	32.1%	32.0%	32.9%	32.9%	32.7%	36.7%
Intangible Assets % of Revenue	16.1%	16.4%	19.0%	17.0%	15.5%	13.3%	12.4%	12.8%	11.5%	10.2%	14.4%
Equity % of Revenue	55.8%	57.2%	66.5%	59.0%	61.0%	65.6%	67.4%	63.7%	58.4%	68.1%	62.3%
ROA	3.6%	2.1%	2.1%	2.7%	2.0%	4.0%	4.1%	3.9%	4.1%	3.3%	3.2%
ROIC	5.6%	3.2%	3.3%	4.3%	3.0%	6.3%	6.0%	5.6%	5.8%	4.6%	4.8%
Return on Physical Assets	16.7%	9.5%	9.9%	12.5%	9.8%	21.9%	20.7%	19.1%	21.6%	19.9%	16.2%
Economic Profit % of Revenue	-1.8%	-4.5%	-5.1%	-3.7%	-5.5%	-1.4%	-1.8%	-2.5%	-2.2%	-4.5%	-3.3%
Market Cap / Revenue	2.0	1.5	2.0	1.7	1.4	1.5	1.7	1.3	1.1	1.4	1.6
Market Cap / EBITDA	13.7	13.0	16.2	13.3	10.6	9.7	10.7	7.6	5.7	7.2	10.8

NOTES & INSIGHTS

- This chart shows aggregate industry values for each year of the decade of the 2010s. Percentages are a percentage of revenue and are derived by adding up all values for all companies and then dividing by the sum of all revenues for all companies. For example, gross margin in 2019 is derived by summing all revenues for that year and subtracting the sum of all COGS and then dividing the result by the sum of all revenues.
- Market cap values for a given year are taken from the last day of the year.
- Some profit measures
- This chart should give a good understanding of the operating dynamics of the industry overall. For example, from this chart you can say that the industry as a whole operates with gross margins in the low 30% range, spends about 16% on SG&A, 4+% on R&D, operates with about 4+ inventory turns, generates about 9% in operating margin and 6% in net margin and 5+% in return on invested capital.

GROSS MARGIN, SG&A, R&D

	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
Gross Margin	32.0%	29.5%	29.3%	31.4%	31.4%	30.5%	30.7%	30.6%	30.7%	32.9%
SG&A % of Revenue	16.3%	16.3%	16.7%	17.0%	16.3%	15.1%	15.0%	12.2%	11.7%	12.1%
R&D % of Revenue	4.4%	4.4%	4.6%	4.5%	4.4%	4.1%	4.0%	4.0%	3.8%	3.7%
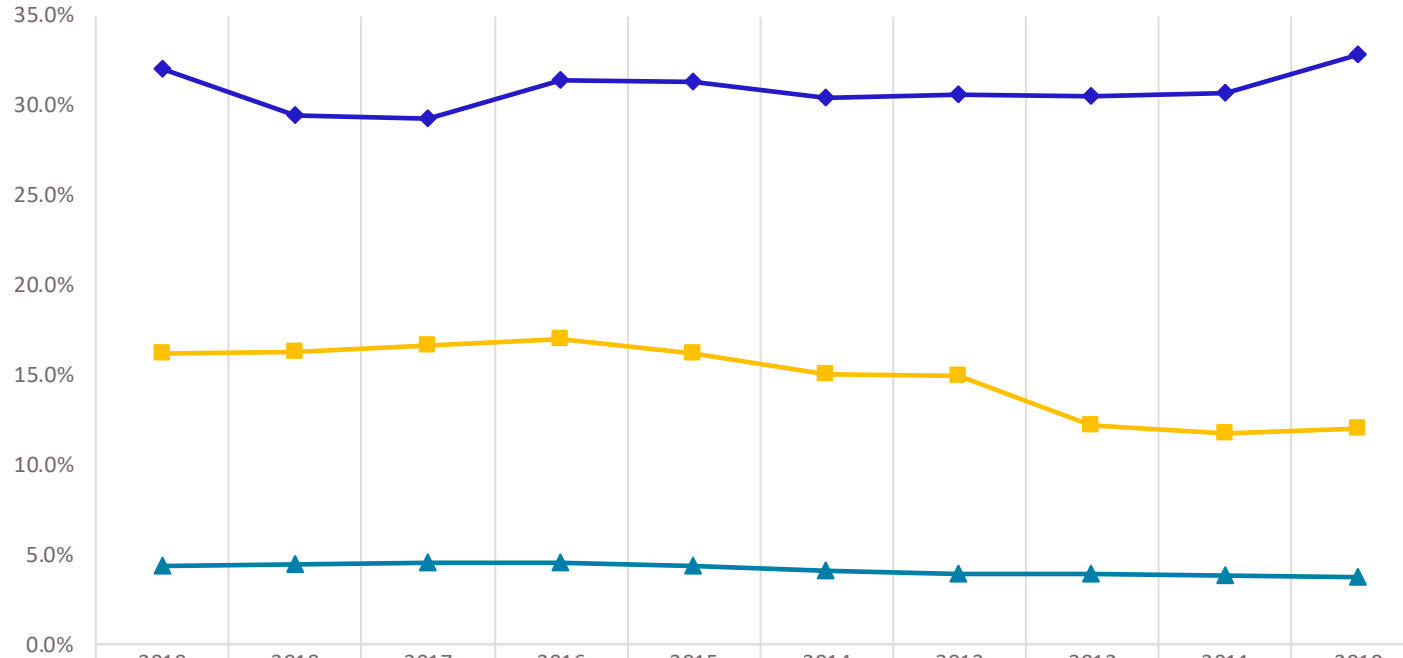
NOTES & INSIGHTS

- Remarkable year-to-year consistency in gross margin for the past decade.
- SG&A was significantly less at the beginning of the decade, which may represent the recession of the great recession.
- R&D was also slightly less at the beginning of the decade, which also may represent the effects of the great recession.

Notes: .
1. Numbers are aggregate for the overall industry (summing values for all companies and dividing by revenue). For example inventory turns is calculated by adding up all COGS for all companies then dividing by the sum of all inventories for all companies.

INVENTORY TURNS (COGS/INVENTORY)

Year	Value
2019	4.3
2018	4.5
2017	4.2
2016	4.2
2015	4.4
2014	4.4
2013	4.4
2012	4.2
2011	4.7
2010	4.8

NOTES & INSIGHTS

- Inventory turns have been remarkably consistent over the course of the past decade, with slightly higher turns at the beginning of the decade, which may be a result of emerging from the great recession.
- This indicates that the lean work that industrial companies did in previous decades has now reached a sort of homeostasis. In fact, this may be true across a large number of operating variables.

Notes: .
1. Numbers are aggregate for the overall industry (summing values for all companies and dividing by revenue). For example inventory turns is calculated by adding up all COGS for all companies then dividing by the sum of all inventories for all companies.

CASH-TO-CASH CYCLE

	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
■ Days in Receivables	60.8	60.4	67.9	66.0	63.2	64.9	68.9	74.9	72.7	71.7
■ Days in Inventory	84.0	81.7	87.0	87.5	83.5	82.5	83.0	86.1	78.2	75.6
■ Days in Payables	-69.5	-68.1	-72.7	-67.8	-56.4	-60.0	-61.1	-59.7	-57.9	-58.8
■ Cash-to-Cash Cycle (Days)	75.4	73.9	82.2	85.6	90.3	87.4	90.8	101.3	93.0	88.4

NOTES & INSIGHTS

- Cash-to-cash cycle measures the amount of cash tied up in a company's supply chain, expressed in days.
- Over the past decade, the overall industry has seen a reduction in receivables (getting paid faster by customers), an increase in payables (taking longer to pay suppliers), and an increase in inventory.
- The overall cycle has been reduced by roughly 15% since the beginning of the decade.
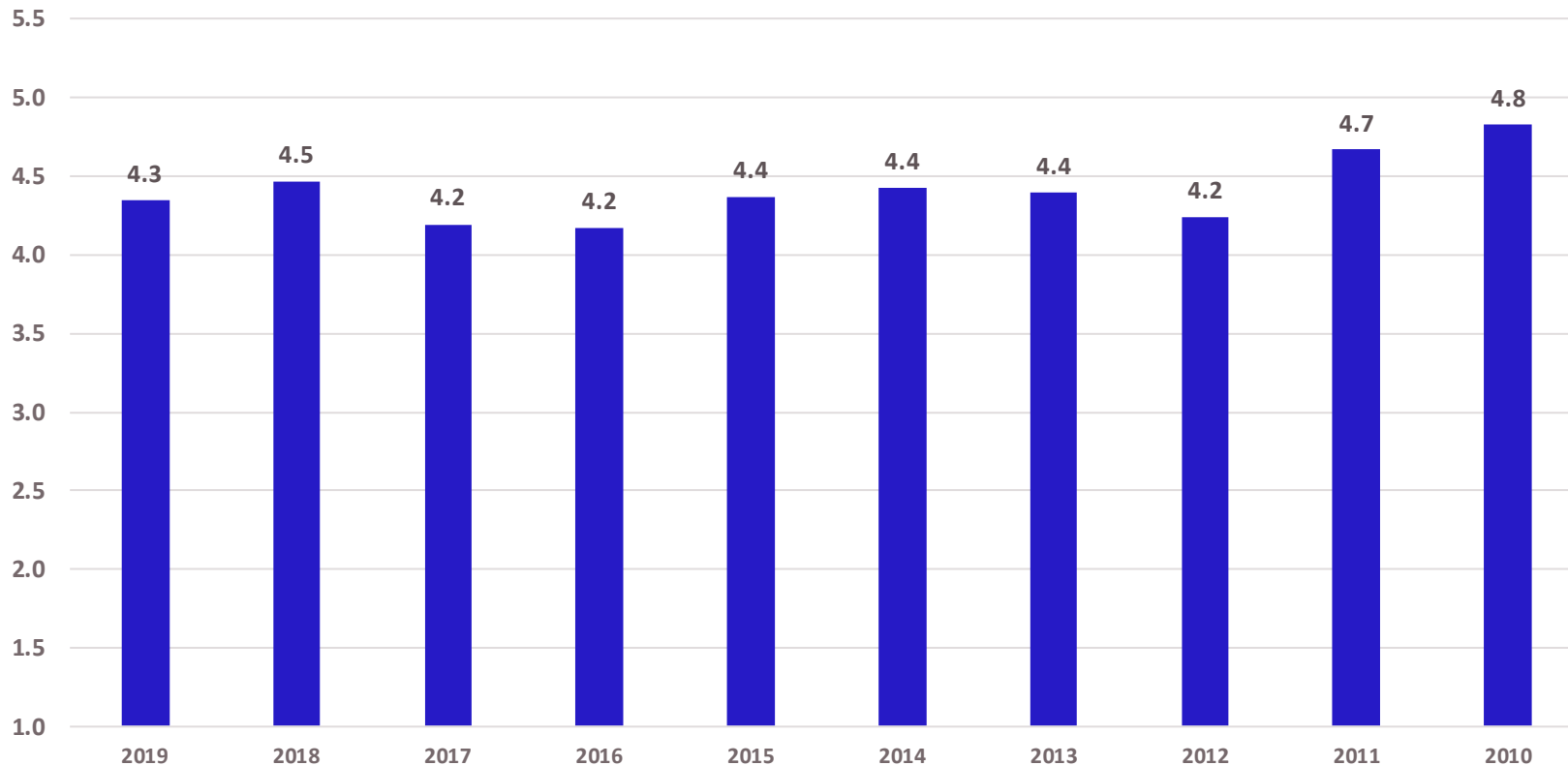
Notes: .
1. Numbers are aggregate for the overall industry (summing values for all companies and dividing by revenue).
2. Cash-to-Cash Cycle (days) = Days in receivables plus days in inventory minus days in payables.

PROFIT AND CASH FLOW

	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
Operating Income	9.4%	6.9%	7.5%	8.2%	9.2%	11.2%	11.8%	12.1%	13.2%	11.6%
Net Profit	6.2%	3.6%	4.2%	5.2%	3.9%	8.5%	8.7%	8.6%	8.8%	8.0%
EBITDA	14.8%	11.5%	12.4%	13.0%	13.2%	15.2%	15.5%	17.5%	19.3%	18.9%
Operating Cash Flow	11.6%	9.9%	9.9%	9.7%	12.5%	13.3%	14.1%	12.1%	13.2%	14.7%
FCF % of Revenue	7.4%	5.9%	6.0%	6.0%	8.6%	9.0%	9.6%	7.1%	7.9%	10.4%
CAPEX % of Revenue	4.1%	4.1%	3.9%	3.7%	3.9%	4.3%	4.4%	5.0%	5.3%	4.4%

NOTES & INSIGHTS

- Profit and cash flow measures are slightly below where they were ten years ago, but relatively steady over the decade.
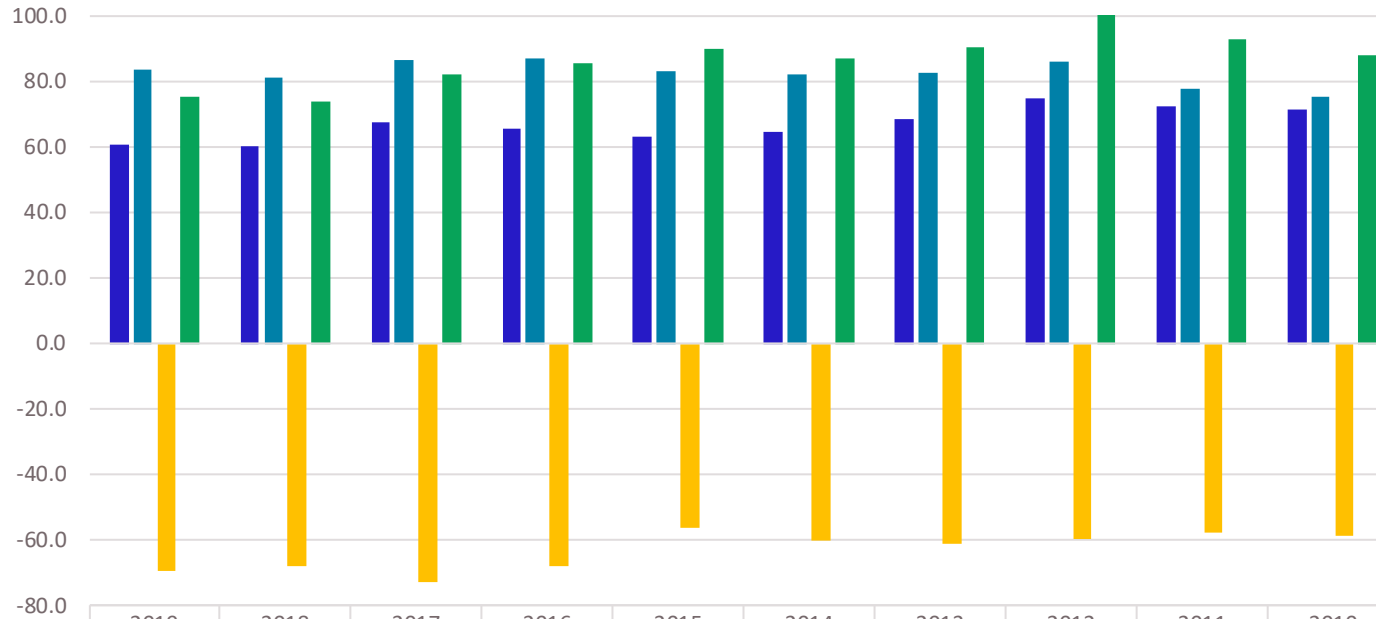- CAPEX for the overall industry has remained relatively steady over the past decade.

Notes: .
1. Numbers are aggregate for the overall industry (summing values for all companies and dividing by revenue).
2. Free cash flow = cash from operations minus CAPEX.

CASH AND DEBT

	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
■ Cash % of Revenue	19.6%	14.7%	27.8%	27.5%	34.0%	34.0%	38.7%	24.1%	22.2%	32.6%
■ Debt % of Revenue	54.0%	54.7%	62.4%	63.1%	68.5%	70.9%	77.5%	88.5%	92.7%	104.2%
■ Net Cash % of Revenue	-34.4%	-39.9%	-34.6%	-35.6%	-34.4%	-36.9%	-38.8%	-64.4%	-70.4%	-71.7%

NOTES & INSIGHTS

- Net cash position for the overall industry has improved significantly over the decade. Cash positions at the beginning of the decade may have been the result of the aftermath of the great recession.
- Cash positions are below where they were ten years ago, and debt has steadily declined as a percentage revenue, with the net position declining.
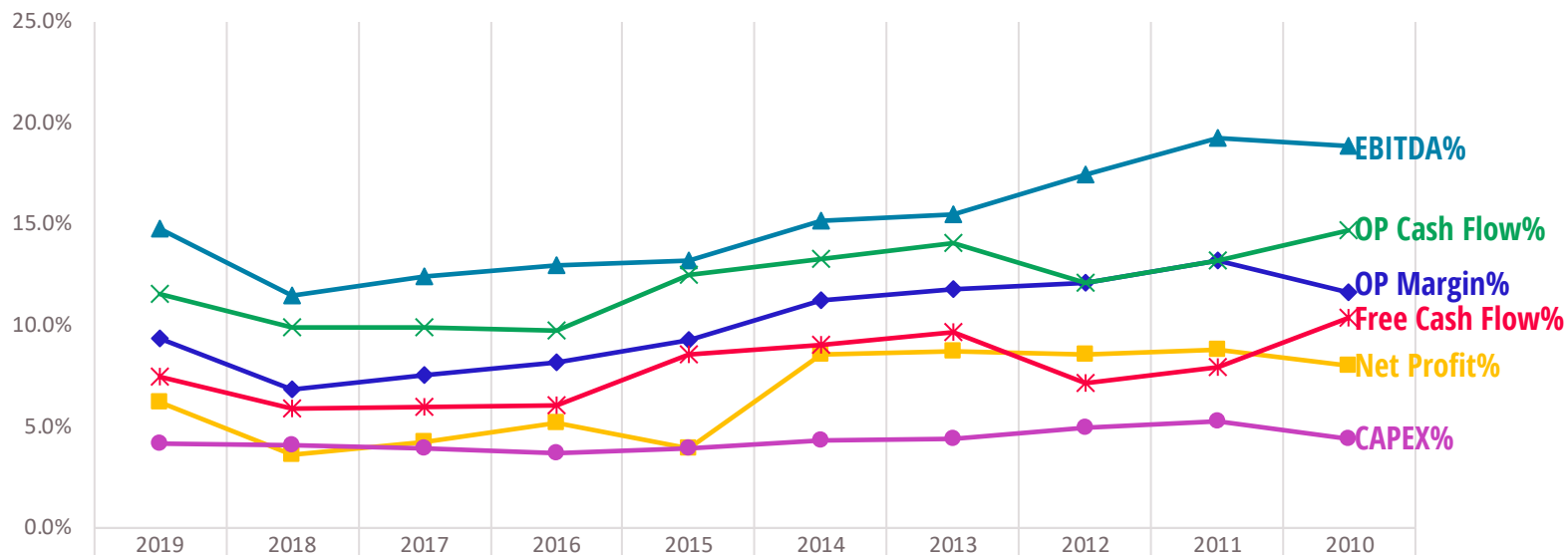- Note: these numbers are as a percentage of revenue and do not necessarily indicate leverage, which would be based on EBITDA or some other profit measure.

Notes: .
1. Numbers are aggregate for the overall industry (summing values for all companies and dividing by revenue).

ASSETS, % OF REVENUE

	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
Property, Plant, Equipment %	21.4%	22.2%	26.0%	25.2%	24.4%	23.3%	26.1%	28.6%	25.9%	26.2%
Inventory % of Revenue	15.6%	15.8%	16.8%	16.4%	15.7%	15.7%	15.8%	16.4%	14.8%	13.9%
Goodwill % of Revenue	38.1%	39.2%	45.1%	43.9%	37.9%	32.1%	32.0%	32.9%	32.9%	32.7%
Intangibles % of Revenue	19.0%	18.7%	18.8%	17.7%	15.9%	14.4%	14.5%	15.0%	13.1%	13.2%

NOTES & INSIGHTS

- Industrial industry physical assets (PP&E) as a percentage of revenue show a slight downward trend coupled with a corresponding increase in goodwill and intangible assets.
- This is likely part of a long-term trend towards products and processes with higher intangible intellectual property (IP) content along with an increase in mergers and acquisitions.
- Inventory as a percentage of revenue has been fairly steady over the decade.
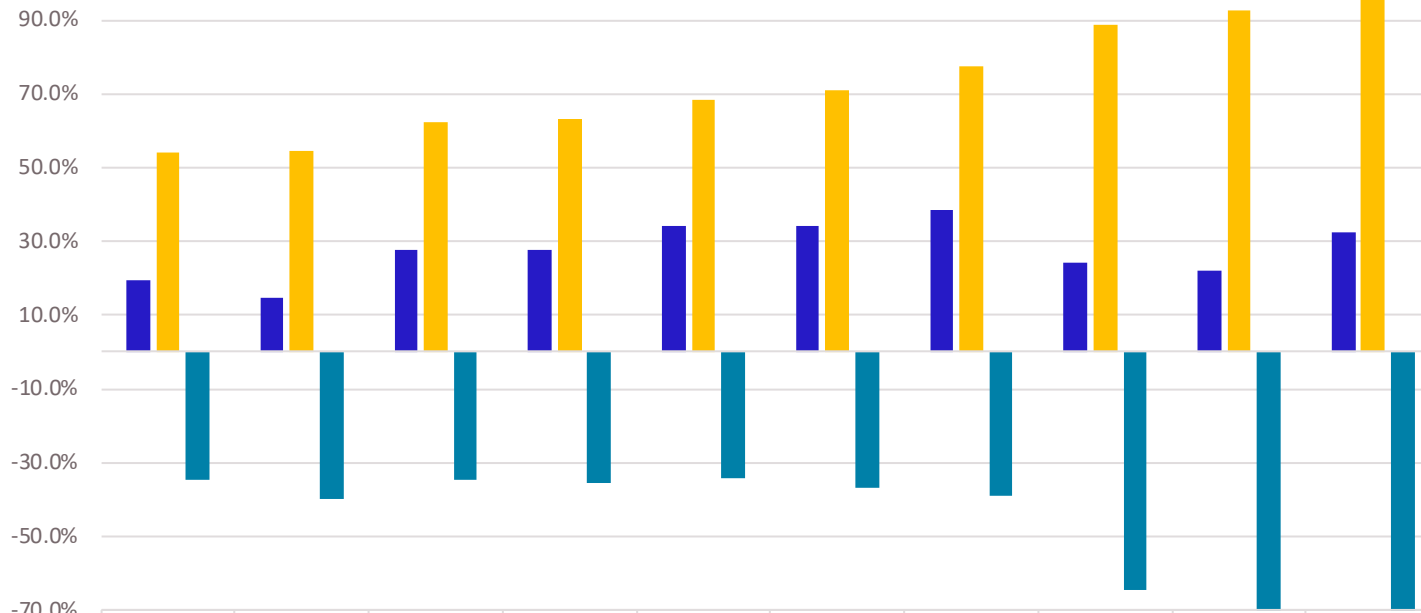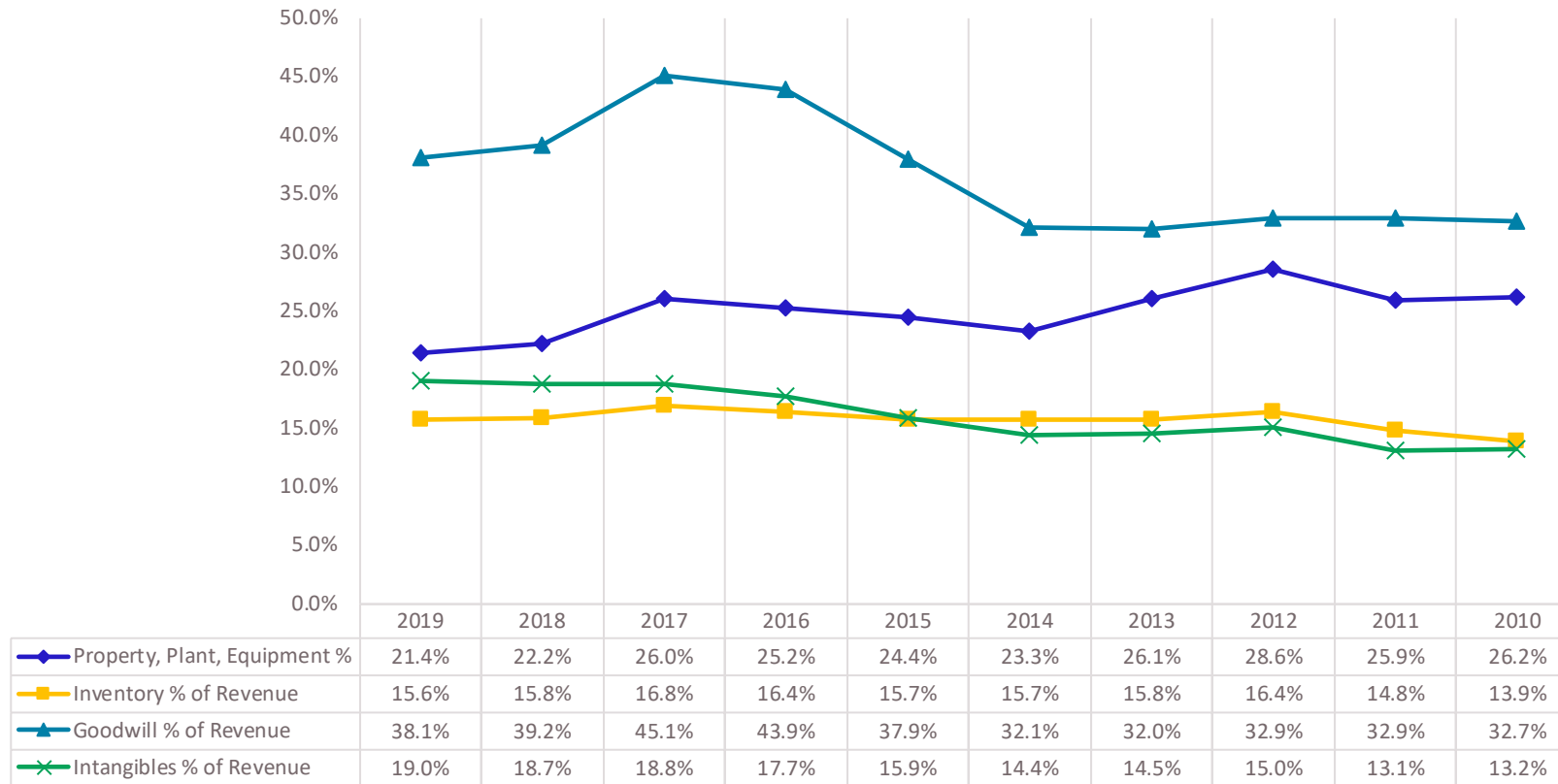
Notes: .
1. Numbers are aggregate for the overall industry (summing values for all companies and dividing by revenue).

RETURN ON INVESTMENT

	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
ROA	3.6%	2.1%	2.1%	2.7%	2.0%	4.0%	4.1%	3.9%	4.1%	3.3%
ROIC	5.6%	3.2%	3.3%	4.3%	3.0%	6.3%	6.0%	5.6%	5.8%	4.6%
Return on PPE	28.9%	16.2%	16.3%	20.6%	16.1%	36.7%	33.3%	30.0%	34.0%	30.5%
Return on Physical Assets	16.7%	9.5%	9.9%	12.5%	9.8%	21.9%	20.7%	19.1%	21.6%	19.9%
Return on Inventory	39.6%	22.8%	25.2%	31.7%	25.0%	54.4%	55.1%	52.4%	59.3%	57.5%
Economic Profit % of Revenue	-1.8%	-4.5%	-5.1%	-3.7%	-5.5%	-1.4%	-1.8%	-2.5%	-2.2%	-4.5%
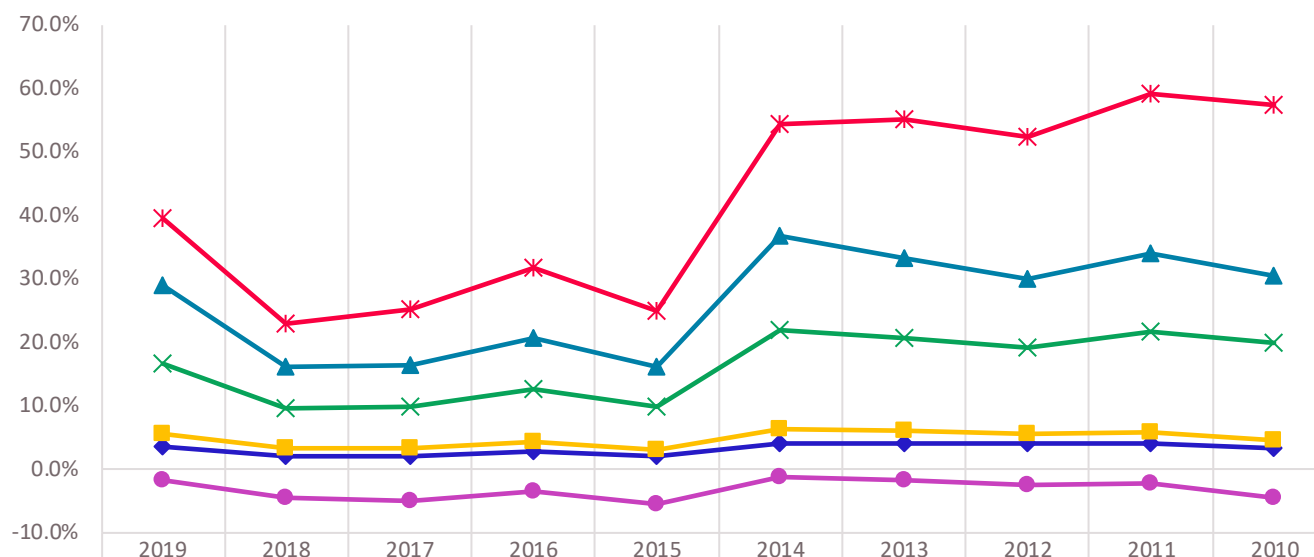
NOTES & INSIGHTS

- ROA and ROIC for the overall industry are in the low single digits for the past decade.
- Economic profit for the overall industry has been consistently negative for the past decade, indicating it is difficult to cover the cost of capital in the industrial market.

Notes: .
1. ROA = net profit divided by total assets; ROIC = net profit divided by (assets minus liabilities). Return on physical assets = net profit divided by (PP&E and inventories); Return on inventory = Net profit divided by inventories; Economic profit % of revenue = (Net profit minus (assets minus liabilities)*WACC) divided by revenue. WACC = weighted average cost of capital for industrial companies, as reported by NYU Stern Business School.

MARKET CAP MULTIPLES
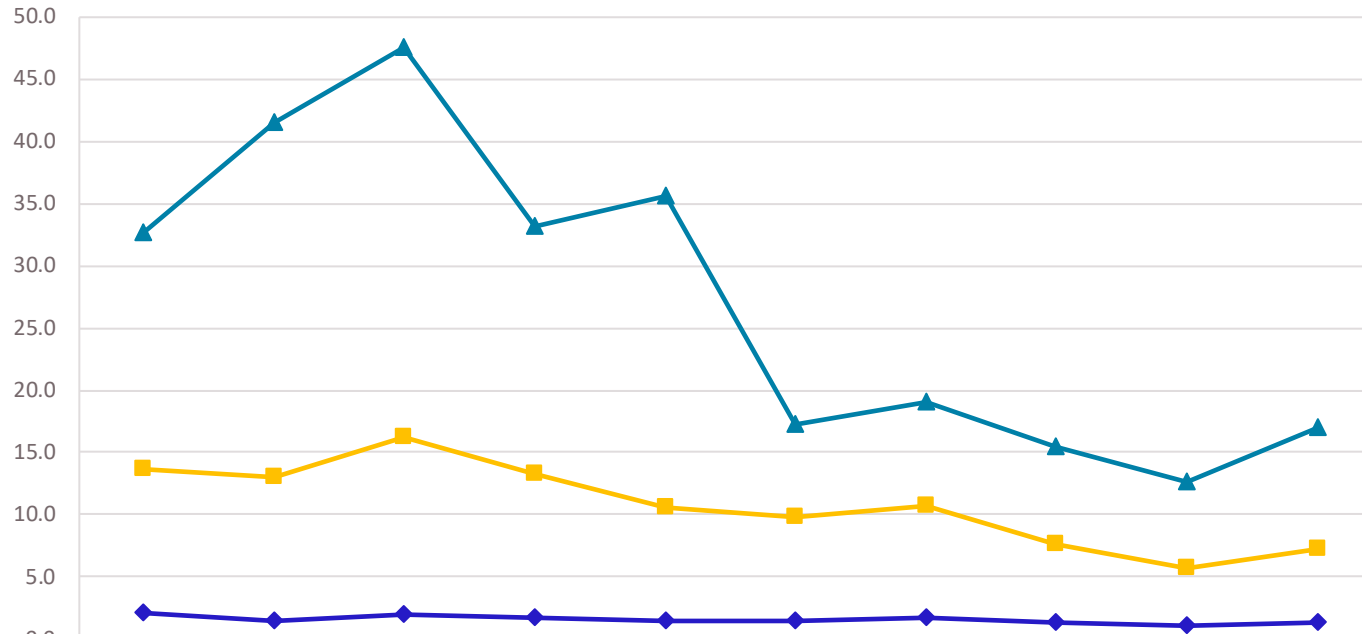
	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
Market Cap / Revenue	2.0	1.5	2.0	1.7	1.4	1.5	1.7	1.3	1.1	1.4
Market Cap / EBITDA	13.7	13.0	16.2	13.3	10.6	9.7	10.7	7.6	5.7	7.2
Market Cap / NOPAT	32.6	41.5	47.5	33.2	35.6	17.3	19.1	15.4	12.6	16.9

NOTES & INSIGHTS

- In general market cap multiples have increased over the course of the decade.
- Market cap as a multiple of EBITDA has roughly doubled since the beginning of the 2010s.
- Market cap as a multiple of net profit has somewhat distorted in the past five years by some outlier conditions and special charges that have affected large companies such as General Electric.

Notes:

1. PP&E% is property, plant, and equipment (on the balance sheet) as a percentage of revenue. The averages for each year are averages of all the percentages for all the companies in the given year.

Market Cap Analysis

Charts that provide analysis of market capitalization and market capitalization to revenue ratios for all companies for their most recent fiscal year.

Average market capitalization for all companies in the data set is **$12,091,057,724**. Median capitalization is **$2,908,166,677**.

Market Capitalization – Distribution Across 142 Industrial Companies

4.8 — **3.0** — **1.7** — **0.8**

Average market cap / revenue multiple within each quartile

Quartile 4: >= $9,069,827,332

Quartile 3: >= $9,069,827,332 ; < $2,908,166,677

Quartile 2: >= $916,441,742 ; < $2,908,166,677

Quartile 1: < $916,441,742

Average = $12,091,057,724

Market Capitalization (y-axis)
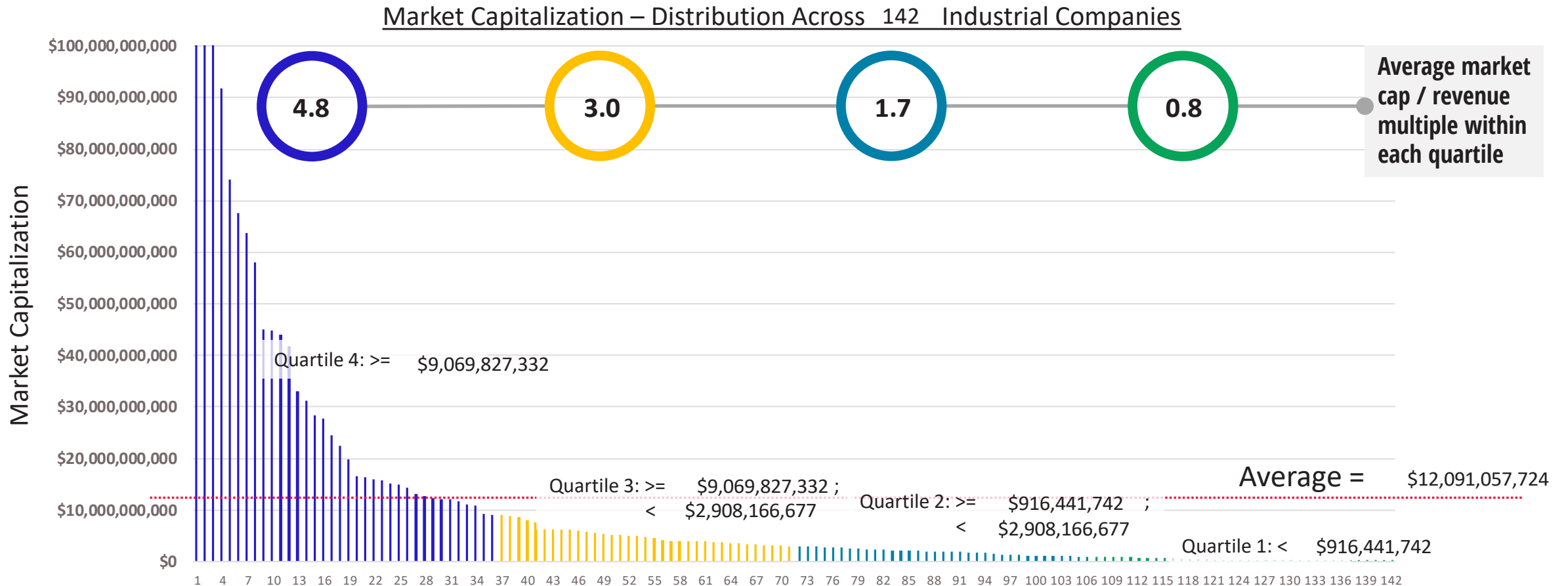
<u>Notes:</u>
1. Market capitalization for each company is as of the date on the cover of this report.

Market Capitalization
Market cap / revenue multiple

The average market cap / revenue multiple for the industrial data set is **2.5** . The median is **1.6** .

Market Cap / Revenue Multiple – Distribution Across 142 Industrial Companies

6.3   **2.1**   **1.3**   **0.5**

Average market cap / revenue multiple within each quartile

Quartile 4: >= 2.9

Quartile 3: >= 1.6 ;
< 2.9

Quartile 2: >= 0.9 ;
< 1.6

Quartile 1: < 0.9

Average = 2.5

Y-axis: Market Cap / Revenue Multiple (0.0 to 20.0)

Market Capitalization
Market cap / EBITDA distribution

The average market cap to EBITDA ratio across the data set is **12.0** *. Median market cap to EBITDA is* **11.2** *.*

Market Cap /EBITDA – Distribution Across **142** Industrial Companies

| 5.0 | 2.4 | 1.4 | 1.4 |

Average market cap / revenue multiple within each quartile

Quartile 4: >= 18.2

Quartile 3: >=11.2 ; < 18.2

Quartile 2: >= 7.3 ; < 11.2

Quartile 1: < 7.3

Average = 12.0

Market Cap / EBITDA

Notes:
1. Market capitalization for each company is as of the date on the cover of this report.
2. EBITDA is earnings before income tax, depreciation, and amortization for the most recent fiscal year (MRY) as of the date on the cover of this report.

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Market Capitalization
Market cap / net profit distribution

The average market cap to net profit ratio across the data set is **72.6** . The average is skewed by outliers, so it is better to look at the median. Median market cap to net profit is **20.6** .

Market Cap / Net Profit – Distribution Across **142** Industrial Companies
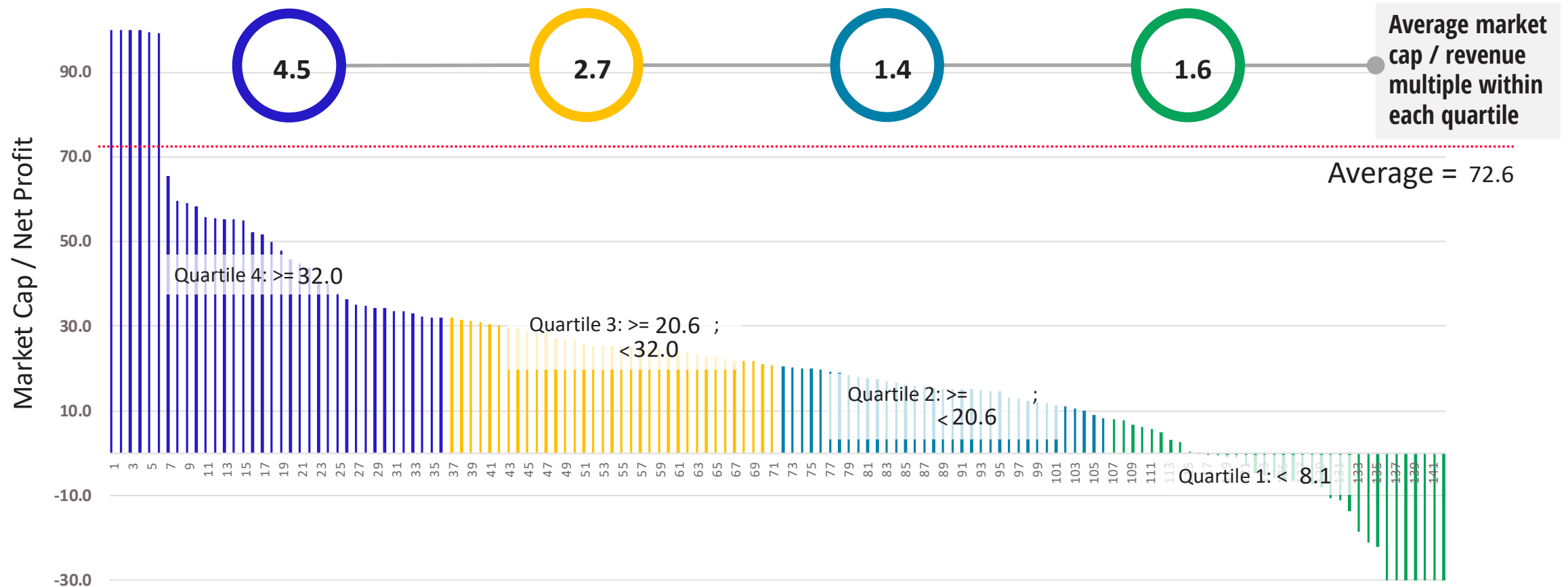
Average market cap / revenue multiple within each quartile

4.5 **2.7** **1.4** **1.6**

Average = 72.6

Quartile 4: >= 32.0

Quartile 3: >= 20.6 ; < 32.0

Quartile 2: >= ; < 20.6
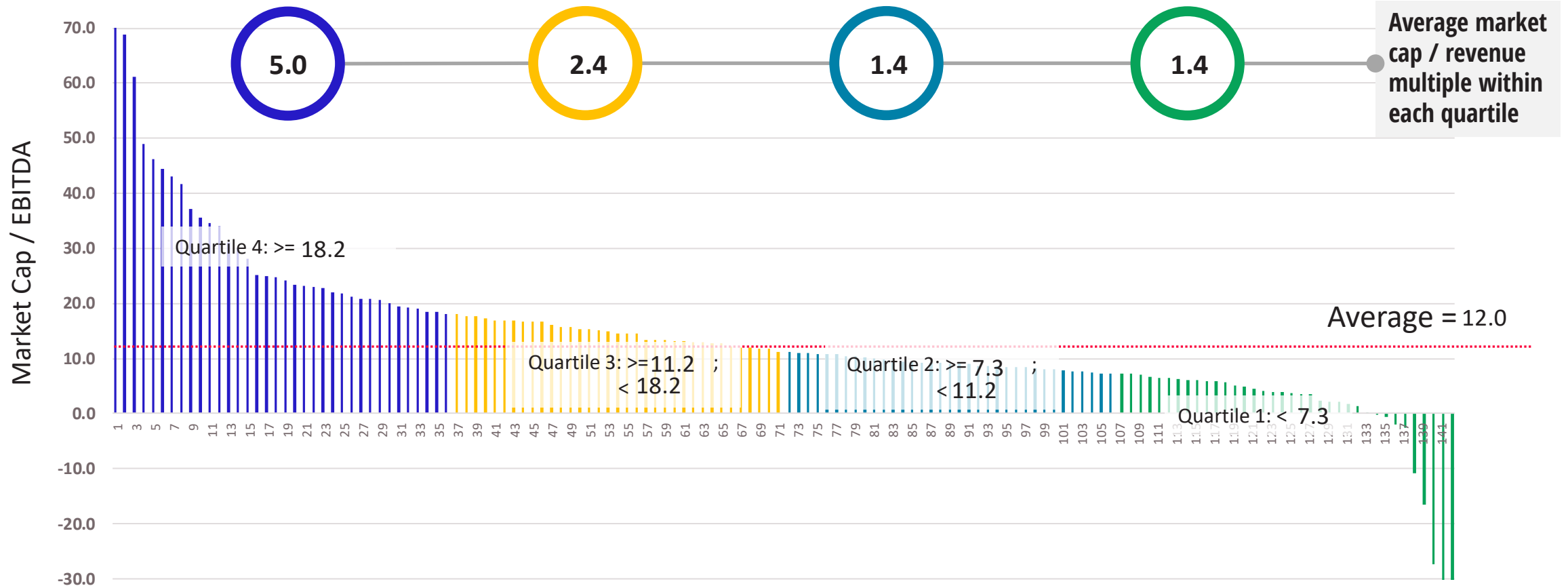
Quartile 1: < 8.1

Market Cap / Net Profit

Notes:
1. Market capitalization for each company is as of the date on the cover of this report.
2. Net income is for the most recent fiscal year (MRY) for each company as of the date on the cover of this report.

Supply Chain Considerations

Structural and operational considerations for industrial supply chains.
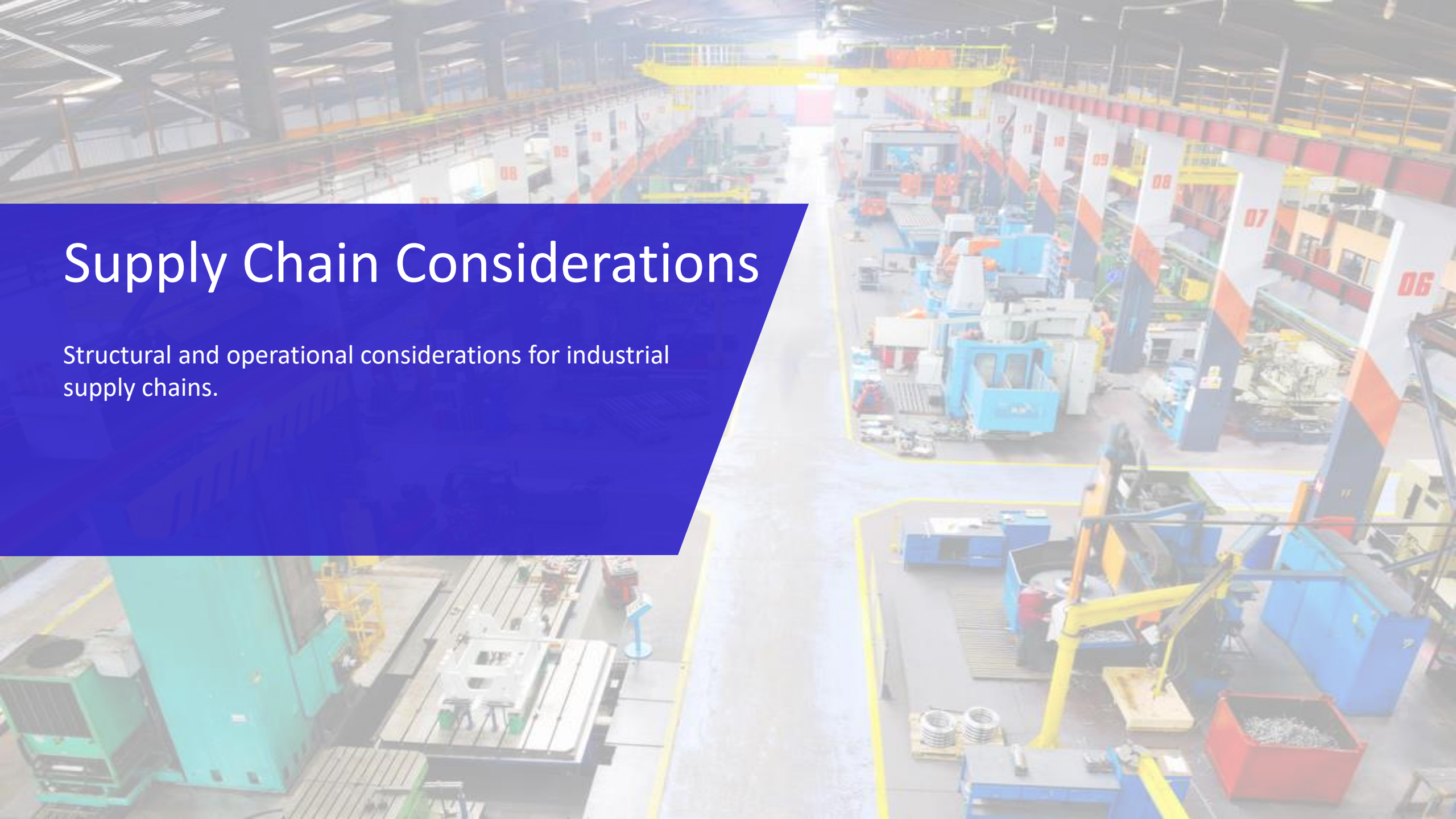
Supply Chain Considerations
Structure

Because industrial companies serve a diversity of industries, they have a mix of front-end and back-end supply chain relationships. Historically, a lot of supply chain focus has been on backend efficiency, but the focus has shifted in the past decade towards front-end customer needs.
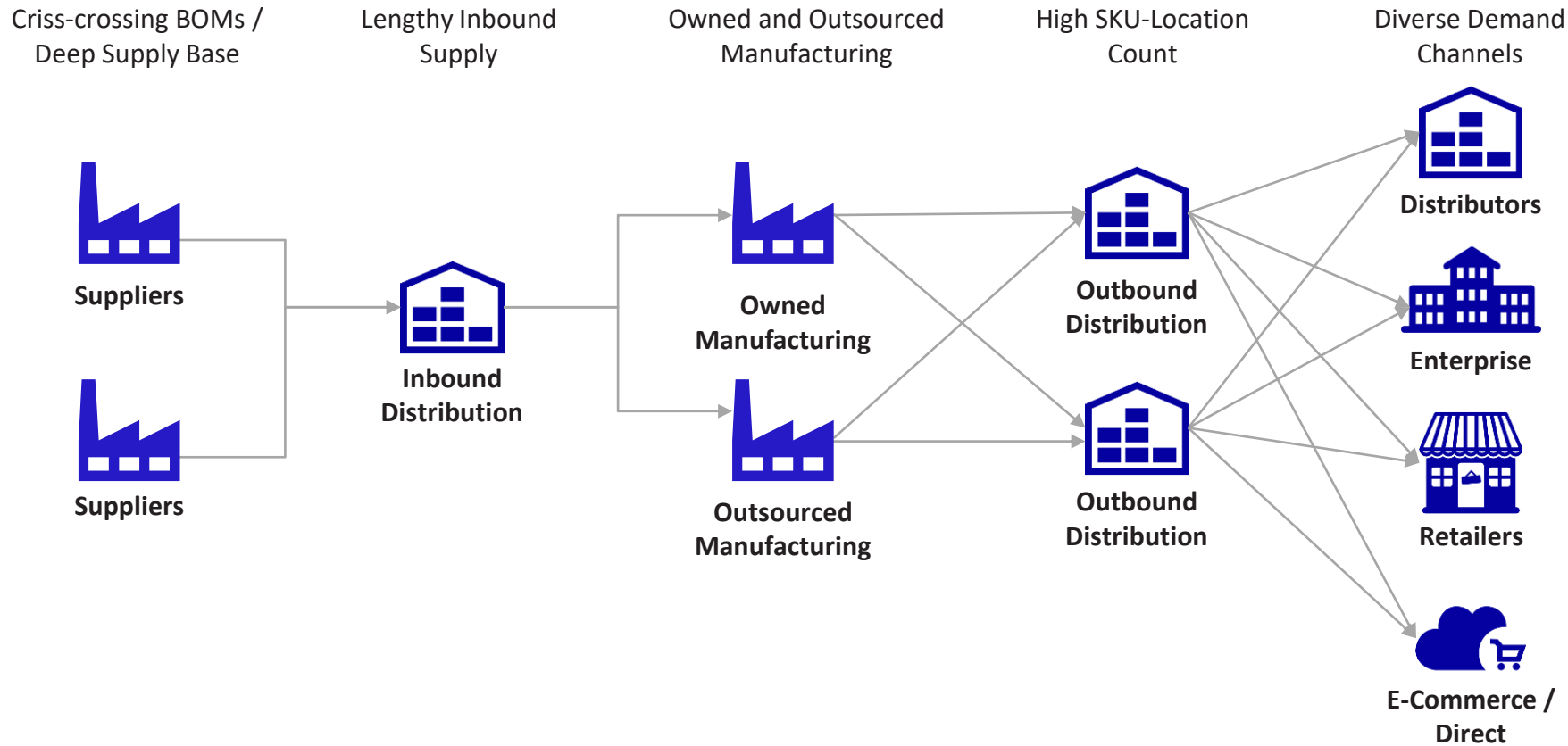
INDUSTRIAL = Distribution complexities of consumer product + product complexities of engineered product

Supply Chain Considerations
Summary of characteristics and key challenges

Supply Chain Characteristics → **Key Challenges** → **Manifestation** + **Pandemic Overlay** + **Digital Transformation Overlay**

Supply Chain Characteristics	Key Challenges	Manifestation	Pandemic Overlay	Digital Transformation Overlay
1. Diverse demand channels	1. Demand and supply volatility	1. Stockouts / lost sales / SLA non-compliance	1. Some demand that has stayed consistent	1. Digital onslaught continues
2. High SKU-location count	2. Sell anywhere, make anywhere, source anywhere	2. Mismatched inventory / excesses and shortages	2. Some demand that has fallen off a cliff and stayed there (aerospace)	2. Products that are increasingly digital
3. Owned and outsourced manufacturing	3. Increasing customer expectations - precision	3. Throughput and asset utilization underperformance	3. Some demand that may have increased (household tools)	3. Customer interactions that need to be increasingly digital
4. Lengthy supply chain	4. New product introduction and engineering change orders	4. New product underperformance	4. Some demand that fell dramatically and has recovered (construction products)	4. Processes that are increasing digital
5. Deep crisscrossing BOMs		5. Premium freight / unplanned overtime	5. Trying to decipher what is coming next	5. Now is not the time to delay; indeed now is the time to accelerate
6. M&A				

Agility and adaptability are critical to surviving and thriving

WORLD UNCERTAINTY INDEX (1990-2020)
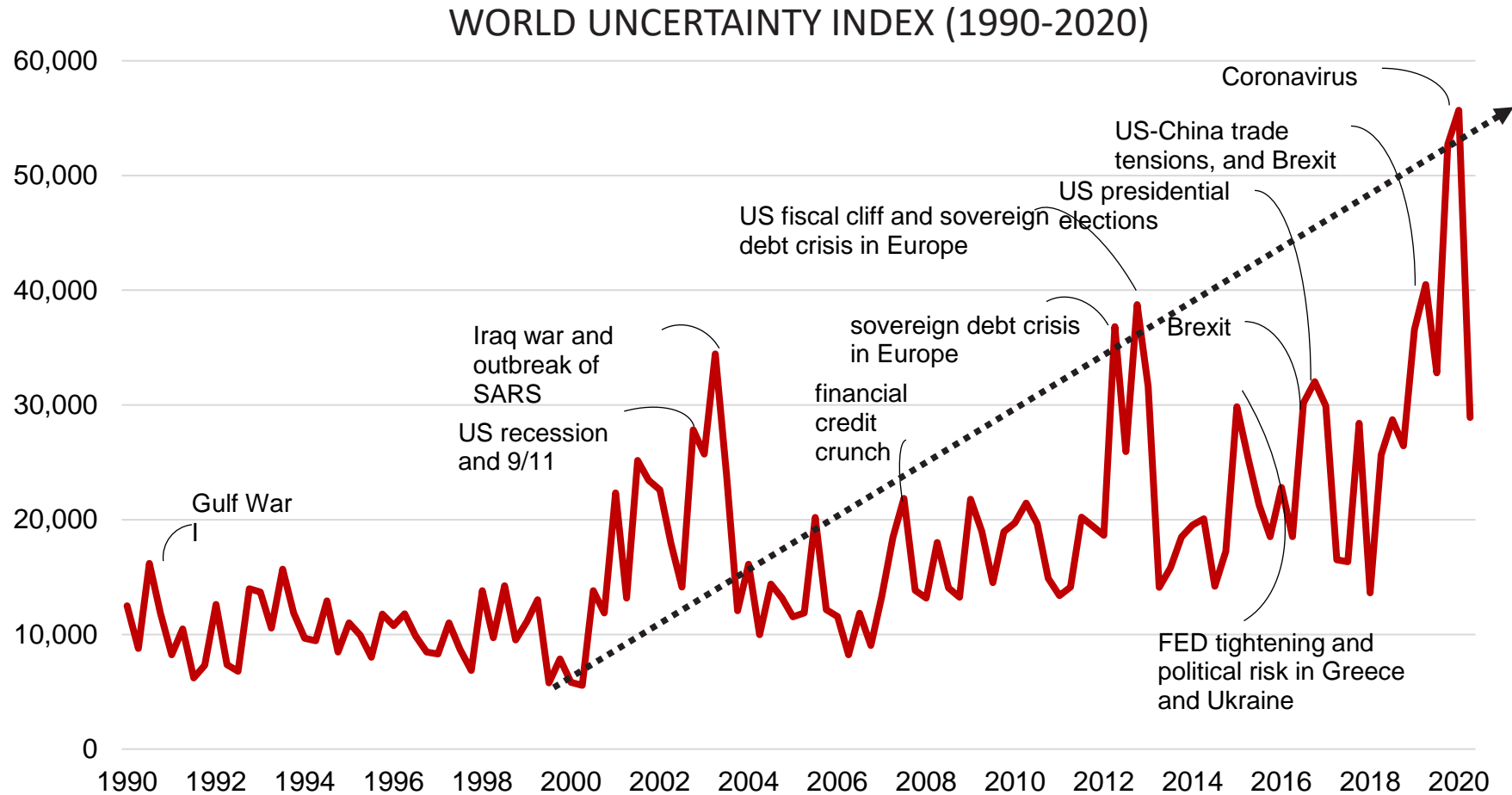
Source: Ahir, H, N Bloom, and D Furceri (2018), "World Uncertainty Index", Stanford mimeo.

INCOME STATEMENT

Revenue
- Cost of Goods Sold

Gross Profit
- Operating Costs

Operating Profit

1. Customer service excellence
2. Pricing optimization
3. Cost optimization

BALANCE SHEET

Assets
Receivables
Inventories
Property, Plant, and Equipment (PP&E)

Liabilities
Payables

4. Asset optimization

CASH FLOW STATEMENT

Operating Activities
Net Profit
Change in Receivables
Change in Inventories
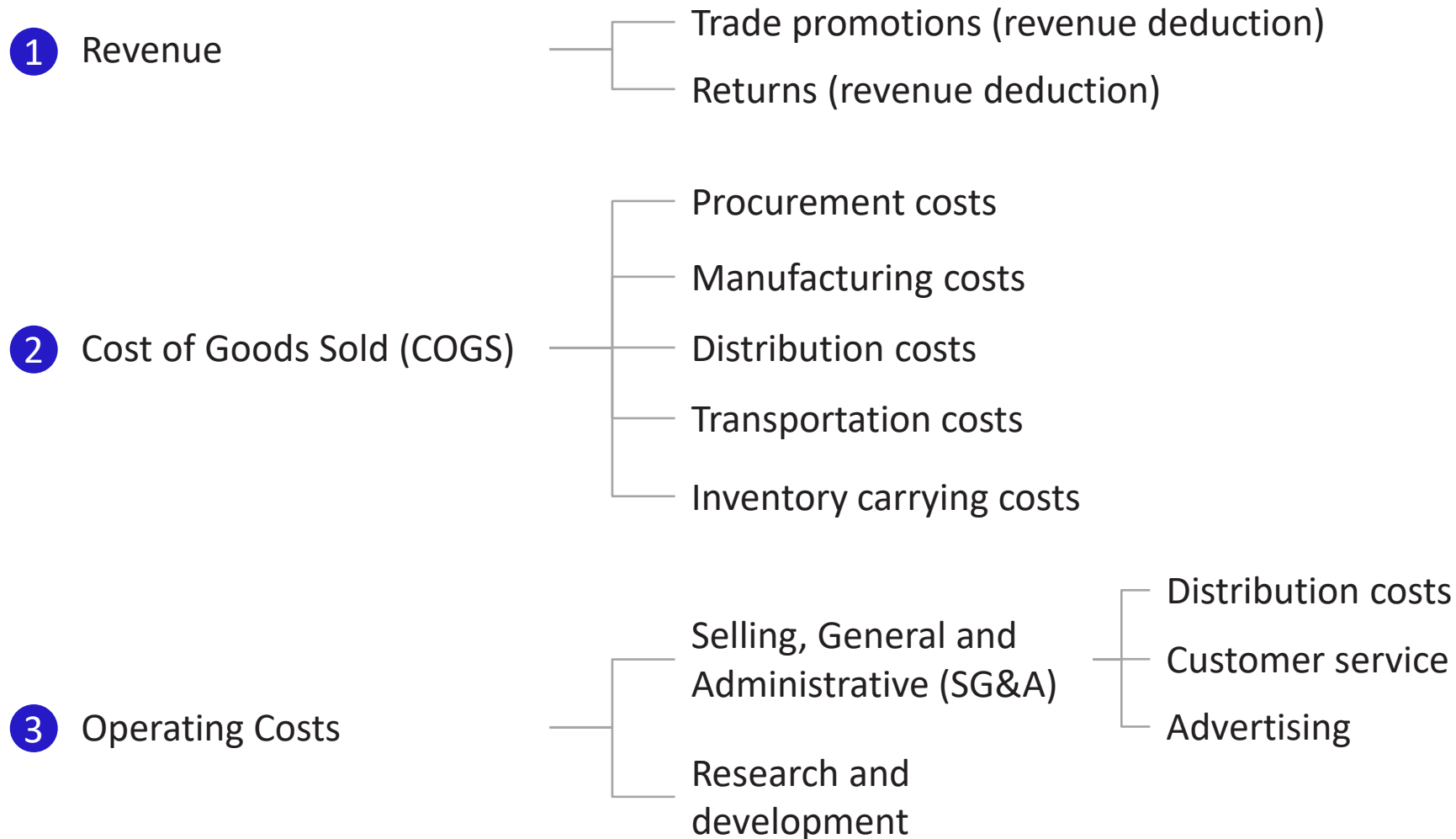Change in Payables

Cash from Operations
Investing Activities
Capital Expenditures

5. Cash-to-cash optimization
6. Capital expenditure optimization

Supply Chain Considerations
SCM financial linkages

1 Revenue
- Trade promotions (revenue deduction)
- Returns (revenue deduction)

2 Cost of Goods Sold (COGS)
- Procurement costs
- Manufacturing costs
- Distribution costs
- Transportation costs
- Inventory carrying costs

3 Operating Costs
- Selling, General and Administrative (SG&A)
  - Distribution costs
  - Customer service
  - Advertising
- Research and development

Supply Chain Considerations
SCM as a complex decision science

Revenue
(Customer Service)

Profit
(Cost Management)

ROI
(Asset Utilization)

Market cap and SCM leadership sweet spot
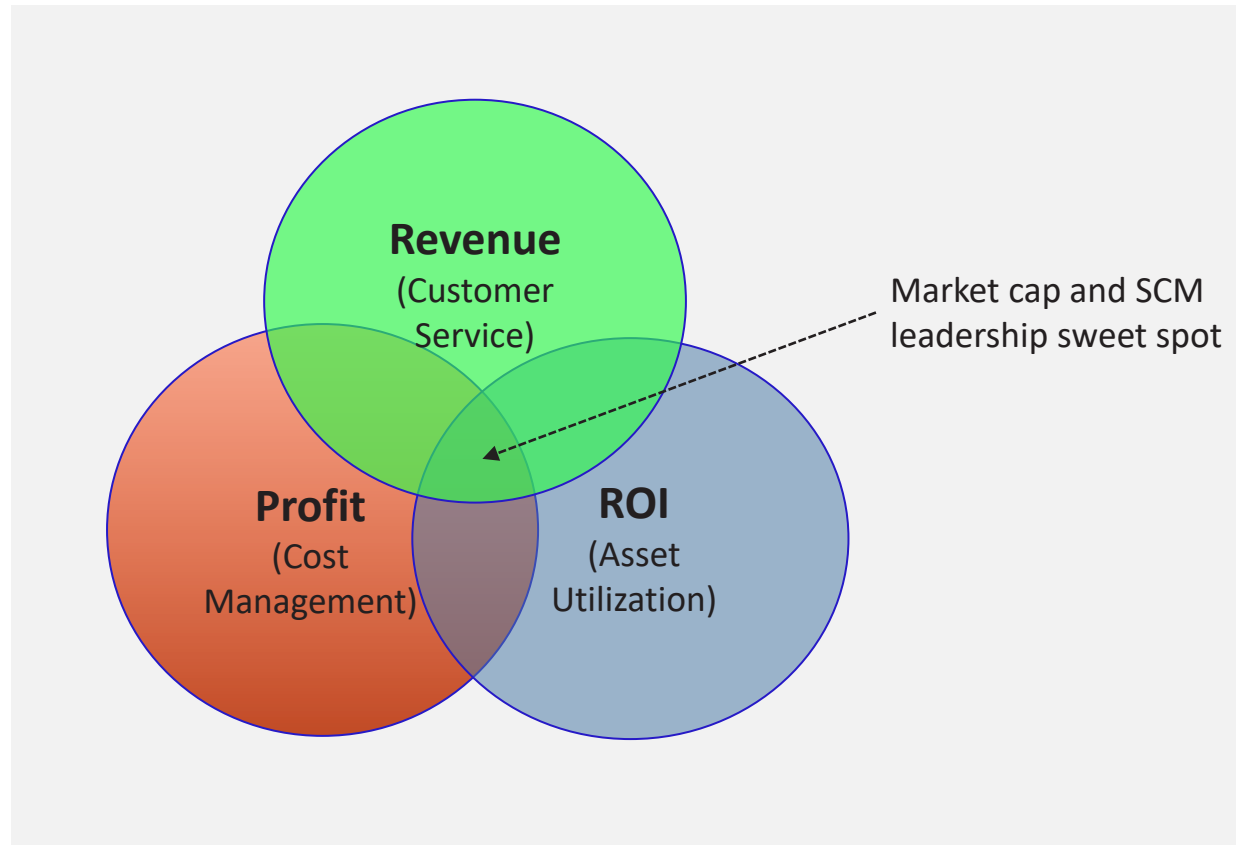
SCM has evolved from a strictly cost management function to a complex decision science. Companies that operate their supply chains more like profit centers are also leaders in market capitalization. Leading supply chain organizations are also starting to dynamically manage margins while considering many variables across customer, asset, and cost dimensions.

Supply Chain Considerations
What is the goal?

Own your customers at a **profit** with a reasonable **return on investment**.

OWN

- **Know your customer preferences**
- **Merge CRM and SCM**
- **Incorporate customer preference into all decisions**
- **Evolve to supply chains of one**

PROFIT

- **Understand cost-to-serve**
- **Employ supply chain segmentation**
- **Synchronize to the customer**
- **Shape demand and fulfillment**

ROI

- **Understand capital deployment**
- **Leverage capital across channels and customers**
- **Understand the "do-nothing" scenario**
- **Execute long-term ROI plan**

VALUE OF DIGITAL - COST OF DIGITAL >= RISK-BASED ROI THRESHOLD

OR

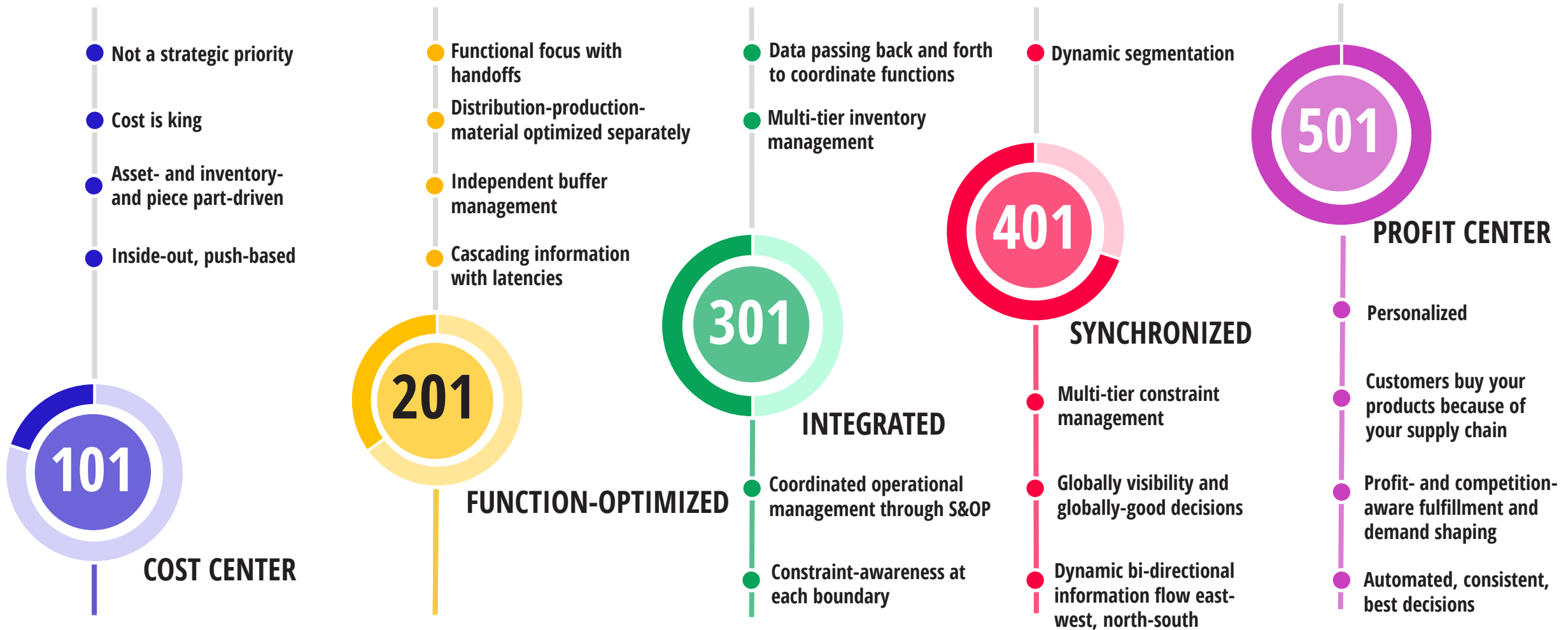**COST OF NOT DOING DIGITAL = GOING OUT OF BUSINESS**

The first error is to assume that the base case of not investing in the innovation—the do-nothing scenario against which cash flows from the innovation are compared—is that the present health of the company will persist indefinitely into the future if the investment is not made.[1]

Projected cash stream from investing in an innovation (A)

DCF and NPV methodologies implicitly make this comparison (B)

More likely cash stream resulting from doing nothing (C)

Companies should be making this comparison

Assumed cash stream resulting from doing nothing
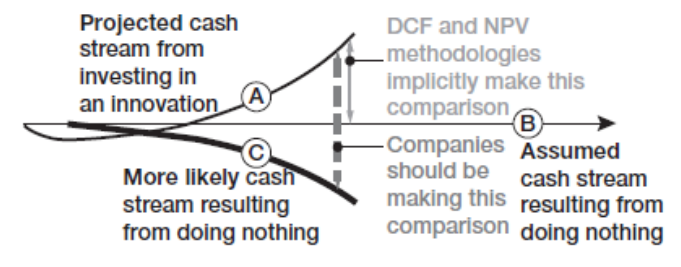
Source: Christensen, Kaufman, Shih, Harvard Business Review, January, 2008

Supply Chain Considerations
Market cap leaders view their supply chains as profit centers

101 — COST CENTER
- Not a strategic priority
- Cost is king
- Asset- and inventory- and piece part-driven
- Inside-out, push-based

201 — FUNCTION-OPTIMIZED
- Functional focus with handoffs
- Distribution-production-material optimized separately
- Independent buffer management
- Cascading information with latencies

301 — INTEGRATED
- Data passing back and forth to coordinate functions
- Multi-tier inventory management
- Coordinated operational management through S&OP
- Constraint-awareness at each boundary

401 — SYNCHRONIZED
- Dynamic segmentation
- Multi-tier constraint management
- Globally visibility and globally-good decisions
- Dynamic bi-directional information flow east-west, north-south

501 — PROFIT CENTER
- Personalized
- Customers buy your products because of your supply chain
- Profit- and competition-aware fulfillment and demand shaping
- Automated, consistent, best decisions

Appendix

Additional supporting material and notes.
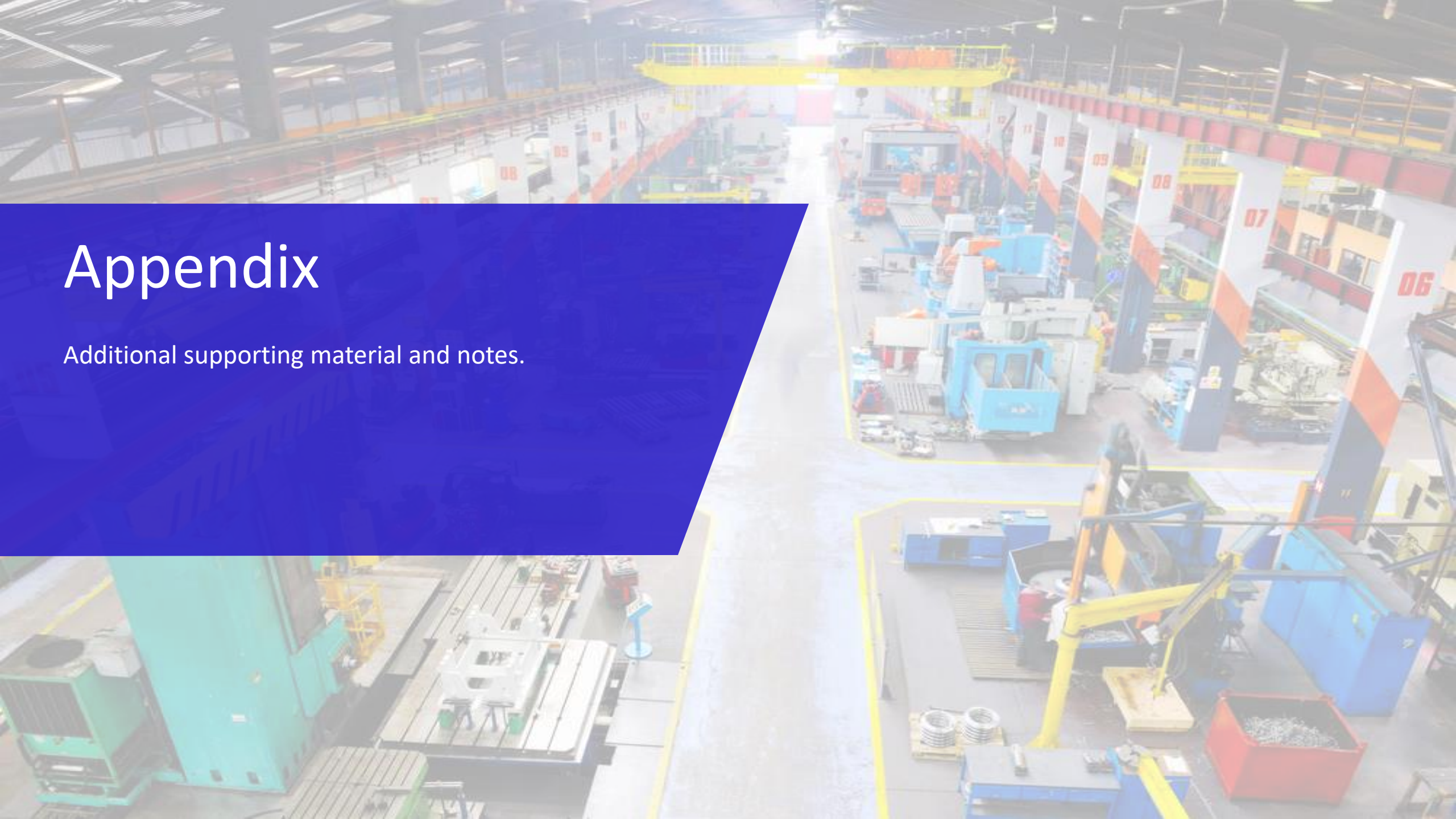
World and US GDP 2000-2018[1]

The following chart provides global and US GDP information for comparison with industrial market growth rates. GDP information is provided in current US$ and constant 2010 US$. This report uses current US$ to ensure apples-to-apples comparisons.

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
World GDP (current US$)	$60,395,540,053,792	$66,113,119,131,563	$73,448,341,079,239	$75,145,997,061,964	$77,302,022,602,630	$79,450,807,677,430	$75,198,758,494,969	$76,335,795,445,381	$81,229,182,706,393	$86,357,073,448,746	$87,697,518,999,809
US GDP (current US$)	$14,448,933,025,000	$14,992,052,727,000	$15,542,581,104,000	$16,197,007,349,000	$16,784,849,190,000	$17,521,746,534,000	$18,219,297,584,000	$18,707,188,235,000	$19,485,393,853,000	$20,529,049,174,602	$21,374,418,877,707
World GDP (constant 2010 US$)	$63,387,062,251,316	$66,113,119,131,563	$68,189,253,910,521	$69,905,552,100,880	$71,767,092,198,790	$73,810,630,933,121	$75,935,751,526,686	$77,904,136,579,049	$80,445,347,186,267	$82,892,746,568,475	$84,944,405,498,039
US GDP (constant 2010 US$)	$14,617,299,295,858	$14,992,052,727,000	$15,224,554,803,721	$15,567,038,144,850	$15,853,795,607,833	$16,242,526,401,218	$16,710,459,044,262	$16,972,347,893,377	$17,348,626,599,471	$17,856,476,888,950	$18,273,171,614,484
World GDP Growth (current US	-5.2%	9.5%	11.1%	2.3%	2.9%	2.8%	-5.4%	1.5%	6.4%	6.3%	1.6%
US GDP Growth (current US $)	-1.8%	3.8%	3.7%	4.2%	3.6%	4.4%	4.0%	2.7%	4.2%	5.4%	4.1%
World GDP Growth (constant 2	-1.7%	4.3%	3.1%	2.5%	2.7%	2.8%	2.9%	2.6%	3.3%	3.0%	2.5%
US GDP Growth (constant 2010	-2.5%	2.6%	1.6%	2.2%	1.8%	2.5%	2.9%	1.6%	2.2%	2.9%	2.3%

Notes:
1. Source is The World Bank (databank.worldbank.org)

1. Unless otherwise noted, all data are based on the most recent fiscal year (MRY) for each company, as reported in the SEC EDGAR database as of the date on the cover of this report.
2. Historical data is for fiscal years 2010-2019 for all companies. The number of companies grows for each year in the historical analysis, as more companies became public across the decade.
3. In the case of companies formed from mergers, the oldest company is used to designate the resultant company founding year.
4. Growth rate in the operational analysis is based on the most recent fiscal year (MRY) compared to the previous fiscal year for each company.
5. 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 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.
6. EBITDA is calculated as operating income plus depreciation and amortization.
7. Cash = cash, cash equivalents, and marketable securities.
8. Total debt includes 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.
9. CAPEX = gross CAPEX, in other words it does not net out the sale of assets.
10. Enterprise value (EV) = market cap plus total debt minus cash.
11. Most companies allocate depreciation and amortization costs to individual cost buckets, including cost of revenue, SG&A, and R&D. 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.
12. Individual company YOY numbers may be distorted due to mergers and acquisitions. For example, sales efficiency can be distorted significantly up or down because of a significant acquisition or divestiture. No attempt has been made to normalize for mergers, acquisitions, and divestitures.