

Materials Industry Operating Benchmarks

Operational and market capitalization data for 238
materials companies

1-Jan-2022







Version



VERSION	NOTES
2021-1.1	Initial version, dated 04.01.21
2021-2.1	Updated financial and market cap data for 06.25.21. Removed companies that merged or were taken private.
2021-3.1	Updated financial and market cap data for 11.30.21. Removed companies that merged or were taken private.
2022-1.1	Updated financial and market cap data for 01.01.22. Added companies and removed those that merged or were taken private.

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

Contents

- 5  [DATA SET](#)
- 11  [OVERALL MARKET](#)
- 15  [ANALYSIS SUMMARY](#)
- 22  [APPENDIX](#)

2022 Materials Industry Report: Key Takeaways

- The Materials industry 3-year CAGR is 6.3% (overall dollars growth). The average company 3-year CAGR is 4.8%.
- The average Materials company has gross margins of 33.4% , invests 7.7% of revenue in selling, general, and administrative expense, 1.1% in research and development, and generates 18.9% operating margin, 25.2% EBITDA margin, 10.6% free cash flow, and 12.9% return on invested capital.
- The Materials company average inventory turns is 8.6 . 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 Materials company has 95.9% PP&E, and 12.8% in goodwill, and intangibles, all as a percentage of revenue. Goodwill and intangibles are a proxy for mergers and acquisitions; based on this measure, Materials is among the lowest industries in mergers and acquisitions. While many industries exhibit characteristics of the “intangibles economy,” Materials is still among those that are asset, labor, and material intensive.
- As expected, Materials 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.
- Materials 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).
- Materials companies remain very asset-intensive, with a high percentage of assets relative to revenue, along with significant CAPEX to remain competitive with those assets. That said, materials companies generate significant operating margins and return on investment.
- Historical analysis (using aggregate data and ratios) indicates the operational structure is essentially the same as it was a decade ago. This includes similar gross margins, operating margins, asset intensity, inventory turns, and cash flows. This indicates the industry has a certain physical setpoint and that there are individual winners and losers around that setpoint, but that the overall industry is not operationally performing better than it was a decade ago.
- Individual operational measures are poor statistical predictors of market cap multiple. Quartile analysis was performed to contrast the operational characteristics of market cap multiple leaders with others.
- Market cap multiple leaders have cap multiples that are 2.4X average and 13.2X laggards. Leaders have significantly higher gross margins, invest significantly more in CAPEX, 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 238 publicly-traded Materials companies.



238



REVENUE

Aggregate revenue for companies in the data set is \$2.1 trillion for the latest reporting fiscal year as of the date on the cover of this report.



\$2.1T



MARKET CAPITALIZATION

Aggregate market cap for companies in the data set is \$2.4 trillion as of date on the cover of this report.



\$2.4T

Notes:

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2. All market capitalizations are as of the date on the cover of this report.
3. M=million; B=billion; T=trillion.

Data Set

Companies included in this report

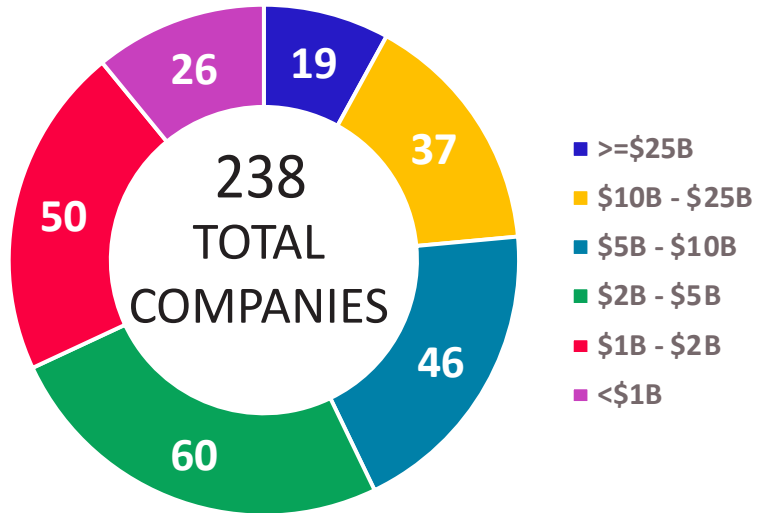


Acerinox SA	BlueScope Steel Ltd	China Steel Corp	First Quantum Minerals	Iamgold Corp	Macmahon Holdings Ltd	Nufarm Ltd	Rio Tinto Ltd	Taiheiyu Cement Corp	Warrior Met Coal Inc
Adbri Ltd	Boise Cascade Co	Clearwater Paper Corp	Fletcher Building Ltd	ICL Group Ltd	Martin Marietta Materia	Nutrien Ltd	Rio Tinto PLC	Tata Steel Ltd	West China Cement Ltd
Advanced Metallurgical	Boliden AB	Cleveland-Cliffs Inc	FMC Corp	Iluka Resources Ltd	Materion Corp	OceanaGold Corp	Salzgitter AG	Teck Resources Ltd	West Fraser Timber Co.L
African Rainbow Mineral	Boral Ltd	Coeur Mining Inc	Fortescue Metals Group	Imerys	MDU Resources Group Inc	Oji Holdings Corp	Sappi Ltd	Ternium Argentina SA	Western Forest Products
Agnico Eagle Mines Ltd	Buenaventura Mining Co	Commercial Metals Co	Franco-Nevada Corp	Impala Platinum Holding	Mechel PAO	Olympic Steel Inc	Schnitzer Steel Industr	Ternium SA	Wheaton Precious Metals
Alamos Gold Inc	Buzzi Unicem SpA	Companhia Siderurgica N	Freeport-McMoRan Inc	Industrias Ch SAB de CV	Mercer International In	Outokumpu Oyj	Schweitzer-Mauduit Inte	The Mosaic Co	Wienerberger AG
Alcoa Corp	Canfor Corp	Compass Minerals Intern	Fresnillo PLC	Industrias Penoles SAB	Mineral Resources Ltd	Oz Minerals Ltd	Severstal PAO	The Navigator Co SA	Yamana Gold Inc
Alcoma Steel Group Inc	Canfor Pulp Products In	Constellium SE	GCC SAB de CV	Interfor Corp	Mining and Metallurgica	Pan American Silver Cor	Sibanye Stillwater Ltd	The Scotts Miracle Gro	Yamato Kogyo Co Ltd
Alpha Metallurgical Res	Capstone Mining Corp	Coronado Global Resourc	Gerdau SA	Jacquet Metals	Mitsubishi Materials Co	Perenti Global Ltd	Sims Ltd	TimkenSteel Corp	Yara International ASA
Aluminum Corporation of	Cascades Inc	Corteva Inc	Glatfelter Corp	James Hardie Industries	MMG Ltd	PhosAgro PJSC	Sinofert Holdings Ltd	Torex Gold Resources In	Yodogawa Steel Works Lt
Angang Steel Co Ltd	Cementos Argos S.A.	CRH PLC	Glencore PLC	JFE Holdings Inc	Mondi PLC	Polymetal International	South32 Ltd	Toyota Tsusho Corp	Zhaojin Mining Industry
Anglo American Platinum	Cemex SAB de CV	CSR Ltd	GMexico Transportes SA	Jiangxi Copper Co Ltd	Neenah Inc	Polyus PJSC	Southern Copper Corp	Turquoise Hill Resource	Zijin Mining Group Co L
Anglo American PLC	Centamin PLC	Doman Building Material	Gold Fields Ltd	K+S AG	New Gold Inc	POSCO	SSAB AB	UFP Industries Inc	Zimplats Holdings Ltd
Anglogold Ashanti Ltd	Centerra Gold Inc	DOWA Holdings Co Ltd	Grasim Industries Ltd	Kaiser Aluminum Corp	Newcrest Mining Ltd	PT Aneka Tambang (Perse	SSR Mining Inc	UltraTech Cement Ltd	
Anhui Conch Cement Co L	Century Aluminum Co	Eagle Materials Inc	Grupo Mexico SAB de CV	KGHM Polska Miedz SA	Newmont Corp	PT Indah Kiat Pulp & Pa	Steel Dynamics Inc	United States Steel Cor	
Antofagasta PLC	CF Industries Holdings	Eldorado Gold Corp	Grupo Simec SAB de CV	Kinross Gold Corp	Nexa Resources SA	PT Indocement Tunggal P	Stelco Holdings Inc	UPM-Kymmene Oyj	
Aperam SA	Champion Iron Ltd	Endeavour Mining PLC	Harmony Gold Mining Co	Kirkland Lake Gold Ltd	Nine Dragons Paper (Hol	PT Krakatau Steel (Pers	Stella-Jones Inc	Usinas Siderurgicas de	
ArcelorMittal SA	China BlueChemical Ltd	Enviva Inc	Hecla Mining Co	Klabing SA	Nippon Light Metal Hold	PT Pabrik Kertas Tjiwi	Stora Enso Oyj	Vale SA	
ArcelorMittal South Afr	China Gold Internationa	Equinox Gold Corp	HeidelbergCement AG	Kloekner & Co SE	Nippon Paper Industries	PT Semen Indonesia (Per	Sumitomo Metal Mining C	Vallourec SA	
Asia Cement (China) Hol	China Hongqiao Group Lt	Eramet SA	Hindalco Industries Ltd	Kobe Steel Ltd	Nippon Steel Corp	PT Solusi Bangun Indone	Sumitomo Osaka Cement C	Verso Corp	
Aurubis AG	China Molybdenum Co Ltd	Eregli Demir Ve Celik F	Hitachi Metals Ltd	Kumba Iron Ore Ltd	Noranda Income Fund	PT Timah Tbk	Summit Materials Inc	Vesuvius PLC	
B2Gold Corp	China National Building	Evolution Mining Ltd	Hochschild Mining PLC	Lee & Man Paper Manufac	Norsk Hydro ASA	PT United Tractors Tbk	SunCoke Energy Inc	Vicat SA	
Barrick Gold Corp	China Oriental Group Co	EVRAZ PLC	Holcim Ltd	LINTEC Corp	Norske Skog ASA	PT Vale Indonesia Tbk	Suzano SA	voestalpine AG	
BHP Group Ltd	China Resources Cement	Ferrexpo PLC	Holmen AB	Lundin Gold Inc	Northern Star Resources	Reliance Steel & Alumini	Svenska Cellulosa AB	Volcan Compania Minera	
Bio Pappel SAB de CV	China Shanshui Cement G	Ferroglobe PLC	Hudbay Minerals Inc	Lundin Mining Corp	Nucor Corp	Resolute Forest Product	Taiga Building Products	Vulcan Materials Co	

Data Set

Company distribution

BY ANNUAL REVENUE

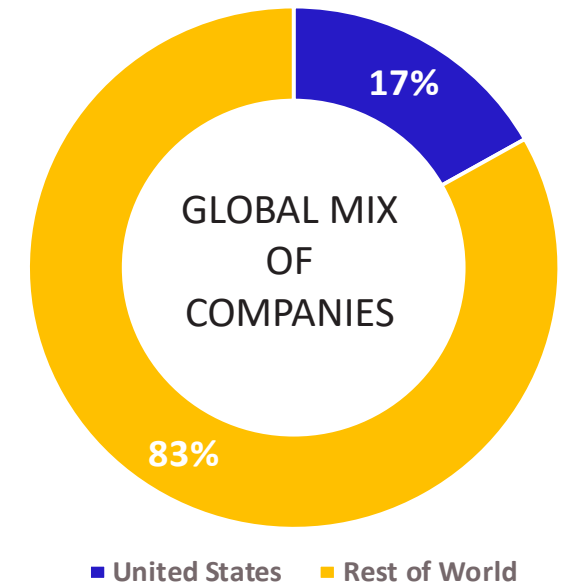


MEDIAN REVENUE = **\$5,331M**

BY SUB-INDUSTRY



GEOGRAPHIC REGION



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Data Set

Index of key variables included in this report

This report provides analysis of the following variables (and derivatives) for trailing twelve months (TTM) results and for the ten-year historical period.

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



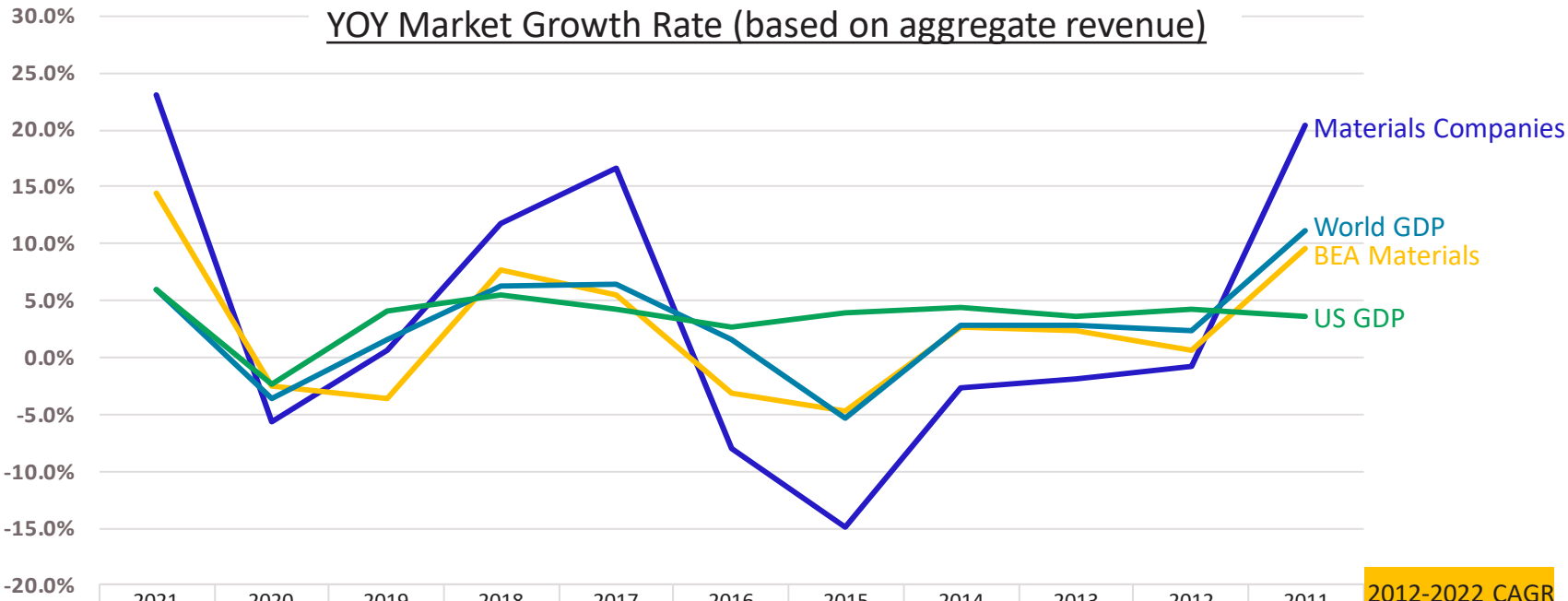
APPROACH	DESCRIPTION	EXAMPLE	GOOD FOR
1. Aggregate averages	Averages are computed by adding up all numbers from all companies. For example, the gross margin for the industry would be the sum of all revenue for all companies minus the sum of all COGS for all companies (divided by the sum of all revenue for all companies).	Average Gross Margin % = $\frac{(\text{sum of all revenues minus sum of all COGS})}{\text{sum of all revenues}}$	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 % = $\frac{(\text{sum of all gross margin \%s})}{(\text{number of companies})}$	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.	<ol style="list-style-type: none">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 Materials market. Charts in this section use the “aggregate averages” approach.

Overall Market

YOY growth rates, 2011-2021



	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2012-2022 CAGR
Materials Companies	23.1%	-5.6%	0.7%	11.8%	16.7%	-8.0%	-15.0%	-2.7%	-1.8%	-0.9%	20.4%	3.5%
BEA Materials Output	14.5%	-2.5%	-3.6%	7.8%	5.4%	-3.2%	-4.7%	2.7%	2.4%	0.7%	9.6%	1.2%
World GDP (current \$)	5.9%	-3.6%	1.5%	6.3%	6.5%	1.5%	-5.3%	2.8%	2.9%	2.3%	11.1%	2.8%
US GDP (current \$)	6.0%	-2.3%	4.1%	5.4%	4.3%	2.7%	4.0%	4.4%	3.6%	4.2%	3.7%	3.6%

NOTES & INSIGHTS

- Materials market CAGR for the past decade was 3.5%, which is higher than the global current dollar GDP growth rate (2.8%). Materials YOY growth rates are highly variable, consistent with fluctuations in pricing in commodities markets.
- BEA numbers are for US domestic manufacturing only. They are shown here for comparison purposes only.
- 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. "Materials 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 Materials 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=gdpkind>), GDP by Industry. Materials output as defined here is based on output of the following sub-industries: Wood products; Nonmetallic mineral products; Primary metals; Paper products. BEA updates its past numbers periodically, so past reports may not reflect the same past BEA numbers.
3. World GDP and US GDP numbers are sourced from The World Bank (data.worldbank.org)
4. World GDP and US GDP growth rates are based on *current* dollars. This means they have not been adjusted for inflation. *Current* numbers are used to ensure apples-to-apples comparisons with Materials market growth rates. Note that GDP growth rates are typically reported in constant dollars pegged to a certain year in order to account for the effect of price inflation. Thus, GDP growth rates commonly reported in media are typically lower than those shown here.

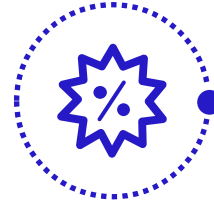
Analysis Summary

Operational ratios based on aggregate data, TTM¹



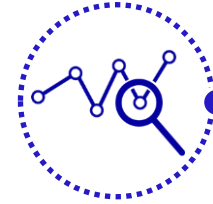
3-YEAR CAGR²

6.6%



GROSS MARGIN

30.7%



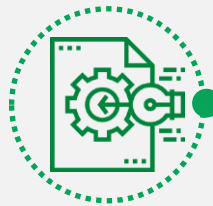
MARKET CAP³

1.1X



NET PROFIT

11.4%



R&D

0.7%



SG&A

6.2%



INVENTORY TURNS

4.3



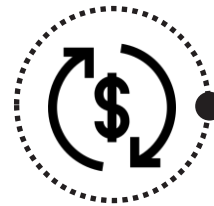
C2C (DAYS)

59.4



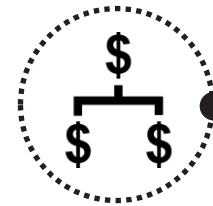
PP&E

68.7%



CAPEX

7.0%



FREE CASH FLOW

9.1%



ROIC

11.3%

Notes:

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

Overall Market

Historical key metrics based on aggregate data, 2011-Current



	METRIC	TTM	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	AVG11-21
OPERATIONS	Growth Rate (3YRCAGR)	6.3%	5.9%	5.0%	5.0%	0.7%	-3.1%	-6.7%	-5.0%	3.0%	-1.8%	-0.9%	20.4%	2.1%
	Gross Margin	30.7%	30.4%	26.1%	24.0%	24.8%	24.5%	23.0%	19.5%	22.5%	22.6%	23.2%	28.0%	24.4%
	SG&A % of Revenue	6.2%	6.3%	7.0%	6.9%	7.0%	7.2%	7.9%	7.5%	6.9%	7.0%	6.9%	6.7%	7.0%
	R&D % of Revenue	0.7%	0.7%	0.8%	0.8%	0.8%	0.8%	1.0%	0.7%	0.7%	0.7%	0.7%	0.8%	0.7%
	Inventory Turns (COGS/Inv)	4.3	4.4	4.5	4.9	4.8	4.8	4.8	5.4	5.2	5.2	5.1	4.9	4.9
	Days in Inventory	85.0	83.7	81.3	74.6	76.7	76.5	76.2	67.9	70.5	70.7	72.0	74.1	74.9
PROFIT & CASH FLOW	Operating Income	18.7%	18.3%	12.7%	11.6%	12.5%	11.6%	8.7%	6.0%	10.0%	9.5%	10.2%	15.9%	11.5%
	Net Profit	11.4%	10.8%	5.2%	5.4%	7.4%	7.7%	3.2%	-2.8%	2.5%	0.5%	3.7%	8.9%	4.8%
	EBITDA	22.2%	22.6%	17.6%	16.8%	18.4%	18.5%	15.7%	7.7%	13.8%	10.8%	13.3%	19.9%	15.9%
	Operating Cash Flow	16.1%	16.4%	15.8%	13.8%	12.6%	13.1%	12.7%	12.6%	12.2%	11.7%	11.7%	13.5%	13.3%
	FCF % of Revenue	9.1%	9.3%	7.9%	6.2%	5.6%	6.5%	5.1%	3.4%	2.8%	0.1%	0.0%	3.9%	4.6%
	CAPEX % of Revenue	7.0%	7.2%	7.9%	7.6%	7.0%	6.6%	7.6%	9.2%	9.4%	11.7%	11.7%	9.5%	8.7%
	Stock Compensation	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.5%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%
	Days in Receivables	37.0	37.5	36.8	35.6	38.6	39.5	41.8	36.3	35.5	36.5	36.5	37.5	37.5
	Days in Payables	62.6	62.8	60.2	56.4	59.3	58.5	59.7	49.5	48.3	47.4	47.5	52.3	54.7
	Cash-to-Cash Cycle (Days)	59.4	58.5	58.0	53.8	56.0	57.4	58.3	54.7	57.8	59.8	61.1	59.3	57.7
ASSETS	Property, Plant, Equipment %	68.7%	70.3%	80.1%	74.1%	70.1%	80.1%	89.9%	82.9%	77.4%	78.3%	73.1%	65.1%	76.5%
	Cash % of Revenue	15.8%	16.4%	17.6%	12.8%	12.6%	13.2%	13.1%	11.2%	10.0%	10.1%	10.5%	11.6%	12.6%
	Debt % of Revenue	35.8%	37.0%	43.8%	39.6%	38.4%	43.1%	51.4%	49.6%	44.4%	44.0%	39.5%	33.1%	42.2%
	Goodwill and Intangibles % of Revenue	12.4%	12.6%	14.4%	13.6%	13.2%	12.8%	14.3%	13.0%	11.4%	11.4%	11.6%	12.1%	12.8%
ROI	ROA	7.9%	7.3%	3.2%	3.6%	5.0%	4.9%	1.9%	-1.8%	1.7%	0.3%	2.6%	6.6%	3.2%
	ROIC	11.3%	10.5%	4.5%	5.1%	7.0%	7.0%	2.6%	-2.4%	2.4%	0.5%	3.6%	9.3%	4.5%
	Return on Physical Assets	22.0%	21.2%	13.1%	13.0%	14.6%	12.2%	8.2%	6.1%	10.8%	10.2%	11.6%	20.0%	12.8%
	Economic Profit % of Revenue	8.5%	8.0%	2.3%	6.9%	4.0%	2.3%	-1.0%	-1.6%	2.4%	-0.1%	3.6%	5.8%	2.9%
CAP	Market Cap / Revenue	1.1	1.2	1.4	1.3	1.0	0.9	1.4	1.1	0.6	0.8	1.1	1.2	1.1
	Market Cap / EBITDA	5.1	5.1	7.7	6.9	5.0	4.6	6.4	9.7	3.2	5.5	5.4	4.3	5.8

HISTORY

	2010	2000
Growth Rate (3YRCAGR)		
Gross Margin	26.7%	27.2%
SG&A % of Revenue	7.2%	9.8%
R&D % of Revenue	0.7%	0.9%
Inventory Turns (COGS/Inv)	4.8	4.2
Days in Inventory	76.8	87.2
Operating Income	15.2%	12.2%
Net Profit	9.5%	5.9%
EBITDA	21.5%	20.4%
Operating Cash Flow	13.7%	15.1%
FCF % of Revenue	5.3%	7.2%
CAPEX % of Revenue	8.5%	7.9%
Stock Compensation	0.4%	
Days in Receivables	41.8	58.4
Days in Payables	53.9	77.1
Cash-to-Cash Cycle (Days)	64.7	68.5
Property, Plant, Equipment %	70.1%	83.4%
Cash % of Revenue	13.1%	11.2%
Debt % of Revenue	36.7%	54.6%
Goodwill and Intangibles % of Revenue	16.2%	8.6%
ROA	6.3%	3.7%
ROIC	8.9%	5.4%
Return on Physical Assets	17.7%	12.5%
Economic Profit % of Revenue	1.9%	4.4%
Market Cap / Revenue	1.3	7.2
Market Cap / EBITDA	4.1	27.0

NOTES & INSIGHTS

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

Analysis Summary

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

Analysis Summary

Average and median for different variables, TTM



The table below contains the average and median values for the 239 companies investigated. This shows that the average Materials company operates with a gross margin of **33.4%**, spends **7.7%** of revenue on SG&A, **1.1%** on R&D, and has inventory turns of **8.6**, operating income of **18.9%**, net income of **12.9%**, free cash flow of **10.6%**, and return on invested capital of **12.9%**.

	REVENUE (TTM)		OPERATIONS				PROFIT AND CASH			ROIC
	Annual Revenue (\$M)	3-Year CAGR	Gross Margin	SG&A	R&D	Inventory Turns	Operating Income	Net Income	Free Cash Flow	
Average	\$8,976	4.8%	33.4%	7.7%	1.1%	8.6	18.9%	12.9%	10.6%	12.9%
Median	\$3,742	1.9%	29.8%	5.4%	0.7%	4.3	14.8%	9.3%	8.5%	8.6%

Notes:

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

Analysis Summary

Average values by revenue quartile, TTM¹

Performance across the revenue quartiles is remarkably consistent. Gross margin, inventory turns, operating income and return on invested capital are similar across the revenue bands.

All numbers are averages within each quartile

	#	REVENUE (TTM)		MKT CAP	OPERATIONS				PROFIT AND CASH			ROIC
		Revenue(\$M)	3-Year CAGR	Mkt Cap/ Revenue	Gross Margin	SG&A	R&D	Inventory Turns	Operating Income	Net Income	Free Cash Flow	
Quartile 4	59	\$26,383	5.7%	1.3	32.0%	6.4%	0.9%	4.7	19.2%	11.8%	10.6%	13.0%
Quartile 3	60	\$6,196	4.6%	1.5	34.6%	8.0%	1.2%	4.5	19.7%	12.4%	10.1%	15.8%
Quartile 2	59	\$2,419	4.8%	1.6	34.2%	8.0%	1.0%	5.5	19.7%	13.9%	10.4%	14.4%
Quartile 1	60	\$1,086	4.0%	2.1	32.7%	8.3%	1.2%	19.8	16.9%	13.5%	11.2%	8.4%

REVENUE QUARTILES (\$M)

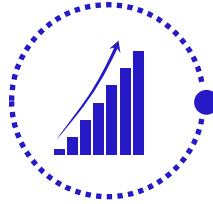
Quartile 4 >= \$9,760
 Quartile 3 >= \$3,803 , < \$9,760
 Quartile 2 >= \$1,642 , < \$3,803
 Quartile 1 < \$1,642

Notes:

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

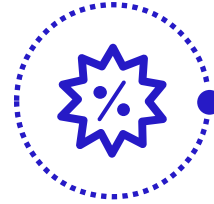
Analysis Summary

Average numbers for the entire data set, TTM¹



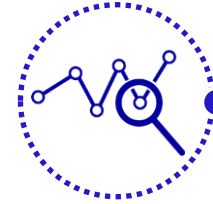
3-YEAR CAGR

4.8%



GROSS MARGIN

33.4%



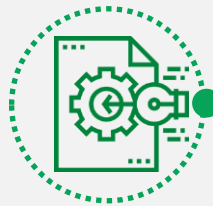
MARKET CAP

1.6X



NET PROFIT

12.9%



R&D

1.1%



SG&A

7.7%



INVENTORY TURNS

8.6



C2C (DAYS)

79.5



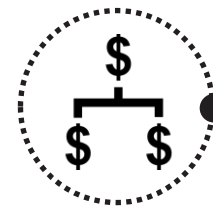
PP&E

95.9%



CAPEX

10.0%



FREE CASH FLOW

10.6%



ROIC

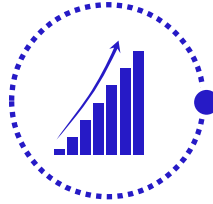
12.9%

Notes:

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

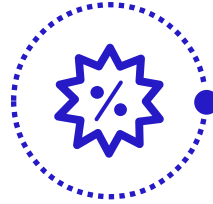
Analysis Summary

Average numbers for the top-quartile market cap¹ multiple leaders



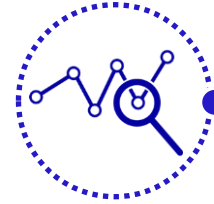
3-YEAR CAGR²

9.7%



GROSS MARGIN

44.4%



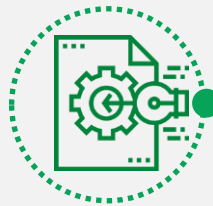
MARKET CAP

3.9X



NET PROFIT

23.7%



R&D

1.9%



SG&A

6.7%



INVENTORY TURNS

19.4



C2C (DAYS)

105.8



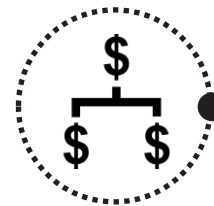
PP&E

163.4%



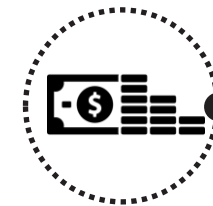
CAPEX

15.5%



FREE CASH FLOW

20.3%



ROIC

15.6%

Notes:

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

Analysis Summary

Key metric benchmarks and relationship to market cap multiple

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

	n=239 METRIC	INDUSTRY BENCHMARKS			MARKET CAP MULTIPLE		
		Q4 AVG	MEDIAN	Q1 AVG	Q4 AVG	Q1 AVG	
OPERATIONS	3-Year CAGR	23.2%	1.9%	-8.3%	2.3	1.0	
	Gross Margin	58.5%	29.8%	13.6%	2.6	0.8	← Gross margin is important to market performance, indicating product superiority and pricing power are paramount.
	SG&A	17.7%	5.4%	1.6%	1.4	2.3	
	R&D	2.7%	14.8%	0.1%	1.7	2.3	
PROFIT	Operating Margin	40.9%	14.8%	2.9%	2.8	0.6	← All forms of profitability have the highest correlation with market performance.
	EBITDA Margin	50.9%	21.9%	5.0%	2.9	0.8	
	Net Profit Margin	34.0%	9.3%	-2.9%	2.6	1.1	
CASH	Free Cash Flow	27.3%	8.5%	-2.8%	2.5	1.1	
	CAPEX % of Revenue	23.2%	6.8%	2.1%	2.9	0.8	
	PP&E (net) % of Revenue	217.9%	69.6%	25.1%	3.1	0.9	
ROI	ROIC % of Revenue	36.7%	8.6%	-3.8%	1.4	1.1	← All forms of ROI are strong indicators of market performance, at about the same level as profitability.
	ROA % of Revenue	23.9%	6.3%	-2.2%	1.5	1.1	
	ROPA % of Revenue	50.3%	15.2%	3.4%	1.4	1.1	
	Economic Profit % of Revenue	26.0%	4.8%	-5.4%	2.3	1.1	
C2C	Inventory Turns	23.3	4.3	2.4	1.9	1.6	← Inventory turns and cash-to-cash (days) correlate little or negatively with market performance
	Payables (days)	256.0	84.4	41.7	1.6	1.9	
	Receivables (days)	189.6	39.1	15.7	1.5	2.3	
	Cash-to-Cash (days)	82.6	67.4	11.4	1.5	1.9	

Notes:

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

Analysis Summary

Market cap multiple quartile comparison

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

VARIABLE	DATA SET	QUARTILE (AVGS WITHIN EACH CAP QUARTILE)				DIFFERENCE
	AVG	TOP (Q4)	Q3	Q2	BOTTOM (Q1)	TOP-BOTTOM
Market Cap Multiple	1.6	3.9	1.4	0.7	0.3	13.2X
1-Year Growth	4.8%	9.7%	7.3%	1.6%	0.4%	9.4 pps
Gross Margin	33.4%	44.4%	37.8%	26.9%	24.4%	20.0 pps
SG&A	7.7%	6.7%	7.6%	7.8%	8.7%	-2.0 pps
R&D	1.1%	1.9%	0.7%	0.9%	0.6%	1.3 pps
Operating Profit	18.9%	29.4%	23.1%	14.7%	8.3%	21.1 pps
Net Profit	12.9%	23.7%	13.9%	9.0%	4.9%	18.9 pps
Inventory Turns	8.6	19.4	4.8	5.0	5.1	14.3 Turns
C2C Cycle (days)	79.5	105.8	65.8	76.3	69.8	36.0 Days
Net Cash	-21.4%	-24.5%	-16.3%	-20.5%	-24.1%	-0.3 pps
CAPEX	10.0%	15.5%	13.2%	6.4%	4.8%	10.7 pps
Free Cash Flow	10.6%	20.3%	8.6%	8.5%	4.6%	15.7 pps
ROIC	12.9%	15.6%	16.2%	10.5%	9.4%	6.3 pps
Return on Physical Assets	21.6%	22.3%	25.5%	22.2%	16.4%	5.9 pps
Economic Profit	8.0%	11.2%	11.9%	6.1%	2.8%	8.4 pps

NOTES & INSIGHTS

- Leaders have market cap multiples that are 2.4X average, and 13.2X laggards.
- Leaders have significantly higher gross margins, asset bases, and capital expenditures.
- Leaders excel in all forms of profitability, cash flow, and return on investment.
- Paradoxically, cap leaders do not lead in inventory turns. Cap laggards are more likely to lead in inventory turns than cap leaders. This is likely because cap leaders are managing their supply chains as profit centers and cap laggards are solely focused on cost.
- All financial numbers are for the trailing twelve months as of the date on the cover of this report. All market cap numbers are as of the date on the cover of this report.

Appendix

Additional supporting material and notes.

Notes and Definitions

1. Primary data sources for the analysis are YCharts and Calcbench.
2. Companies included in this analysis are filtered based on available financial, operational, and market cap data. Some significant companies such as Samsung and LG have been excluded because of lack of market capitalization data from the primary data sources.
3. Free cash flow = operating cash flow minus CAPEX.
4. ROA = return on assets = net income divided by total assets.
5. ROIC = return on invested capital = net income divided by (total debt plus equity).
 1. Note: the formal definition of ROIC uses NOPAT in the numerator. Furthermore, some companies may employ their own specific definition. The results here will be close to the formal definition, but generally slightly less.
6. ROCE = return on capital employed = EBIT divided by capital employed. Capital employed = total assets minus total current liabilities.
7. ROPA = return on physical assets = operating profit divided by (PP&E (net) plus inventory).
8. Economic profit = net operating profit after taxes (NOPAT) minus weighted average cost of capital (WACC) times capital invested. Capital invested = Equity plus the non-current portion of debt. WACC is industry-specific, as publicly reported by Aswath Damodaran, NYU Stern Business School.
9. Inventory turns = COGS (end of period) divided by inventory (end of period).
10. C2C = cash-to-cash in days = days in receivables plus days in inventory minus days in payables.
11. 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.
12. Historical data is for fiscal years 2010-2020 for all companies. The number of companies grows for each year in the historical analysis, as more companies became public across the decade.
13. In the case of companies formed from mergers, the oldest company is used to designate the resultant company founding year.
14. 3-Year CAGR is based on the past four years of annual financial data.
15. 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.
16. EBITDA is calculated as operating income plus depreciation and amortization.
17. Adjusted EBITDA = EBITDA minus stock compensation
18. Cash = cash, cash equivalents, and marketable securities.
19. 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.
20. CAPEX = gross CAPEX, in other words it does not net out the sale of assets.
21. Enterprise value (EV) = market cap plus total debt minus cash.
22. 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.
23. Individual company YOY numbers may be distorted due to mergers and acquisitions. No attempt has been made to normalize for mergers, acquisitions, and divestitures.

Notes and Definitions

24. Aggregate inventory turns is calculated as follows: sum of all COGS for all companies in an industry divided by sum of all inventories for all companies in an industry. In a certain small number of cases, companies do not have an inventory entry on their balance sheets. In this case, to maintain consistency across calculations, inventory is assumed to be zero for those companies. This is most prevalent in service-oriented industries such as transportation and wholesale distribution, where certain companies own zero inventory. This may have the effect of slightly overstating aggregate inventory turns versus if the calculation were only done for those companies that carry inventory. (Note: in goods-producing industries, companies without COGS or without inventories have been filtered out of the analysis).



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