Aerospace & Defense Industry Operating Benchmarks

Operational and market capitalization data for 62 aerospace & defense companies

1-Jan-2022

worldlocity

Version

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

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

2022 A&D Industry Report: Key Takeaways

- The A&D industry 3-year CAGR is 0.9% (overall dollars growth). The average company 3-year CAGR is 1.9%.
- The average A&D company has gross margins of 24.1%, invests 13.2% of revenue in selling, general, and administrative expense, 5.3% in research and development, and generates 4.5% operating margin, 9.7% EBITDA margin, 2.2% free cash flow, and -18.9% return on invested capital.
- The A&D company average inventory turns is 8.8. The median is 3.2. 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 A&D company has 33.3% PP&E, and 47.3% in goodwill and intangibles, both as a percentage of revenue. Goodwill and intangibles are a proxy for mergers and acquisitions; based on this measure, A&D is about average across all industries. A&D is typically thought of as asset, material, and labor intensive, but goodwill and intangibles are about equal to physical assets (as measured by PP&E).
- As expected, A&D 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.
- A&D 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).
- A&D companies with higher gross margins invest more in R&D and have 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.
- 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 2.2X average and 7.2X 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 62 publicly-traded A&D companies.

62

REVENUE
Aggregate revenue for companies in the data set is $573 billion for the latest reporting fiscal year as of the date on the cover of this report.

$573B

MARKET CAPITALIZATION
Aggregate market cap for companies in the data set is $936 billion as of date on the cover of this report.

$936B

Notes:
1. Unless otherwise noted, all company financial data are based on trailing twelve months results as of the date on the cover of this report.
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

AAR Corp	General Dynamics Corp	MTU Aero Engines AG	Woodward Inc
Aerojet Rocketdyne Hold	Heico Corp	National Presto Industr	Yangzijiang Shipbuildin
AeroVironment Inc	Heroux-Devtek Inc	Northrop Grumman Corp	
Airbus SE	Hexcel Corp	Raytheon Technologies C	
Astronics Corp	Huntington Ingalls Indu	Rolls-Royce Holdings PL	
Austal Ltd	Jamco Corp	Saab AB	
AviChina Industry & Tec	Kaman Corp	Safran SA	
Avon Protection PLC	Kongsberg Gruppen ASA	SembCorp Marine Ltd	
Axon Enterprise Inc	Kratos Defense & Securi	Senior PLC	
BAE Systems PLC	L3Harris Technologies I	Singapore Technologies	
Boeing Co	Latecoere SA	Smith & Wesson Brands I	
Bombardier Inc	Leonardo SpA	Spirit AeroSystems Hold	
BWX Technologies Inc	Lisi SA	Sturm Ruger & Co Inc	
Cadre Holdings Inc	Lockheed Martin Corp	Textron Inc	
CAE Inc	Magellan Aerospace Corp	Thales	
Ceska Zbrojovka Group S	MDA Ltd	TransDigm Group Inc	
Dassault Aviation SA	Meggitt PLC	Triumph Group Inc	
Ducommun Inc	Mercury Systems Inc	Ultra Electronics Holdi	
Elbit Systems Ltd	Mitsui E&S Holdings Co	Vectrus Inc	
Embraer SA	Moog Inc	VSE Corp	

Data Set
Company distribution

BY ANNUAL REVENUE

62
TOTAL
COMPANIES

- ■ >=$25B
- ■ $10B - $25B
- ■ $5B - $10B
- ■ $2B - $5B
- ■ $1B - $2B
- ■ <$1B

6
7
7
13
10
19
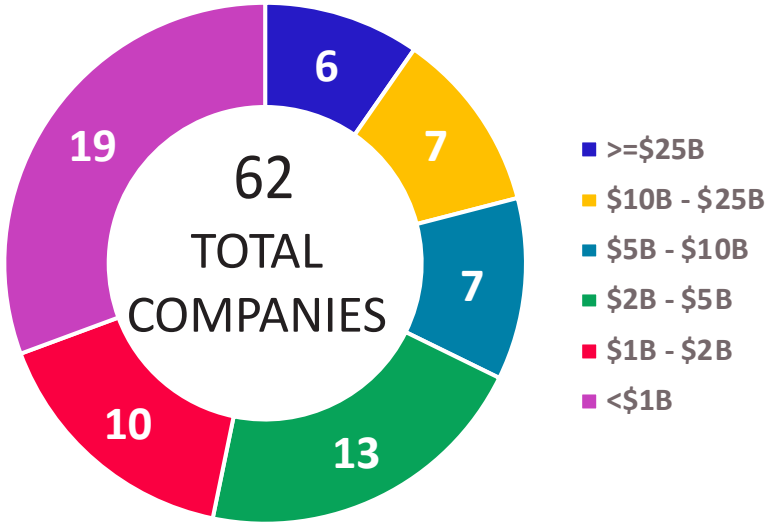
MEDIAN REVENUE = **$2,153M**

GEOGRAPHIC REGION
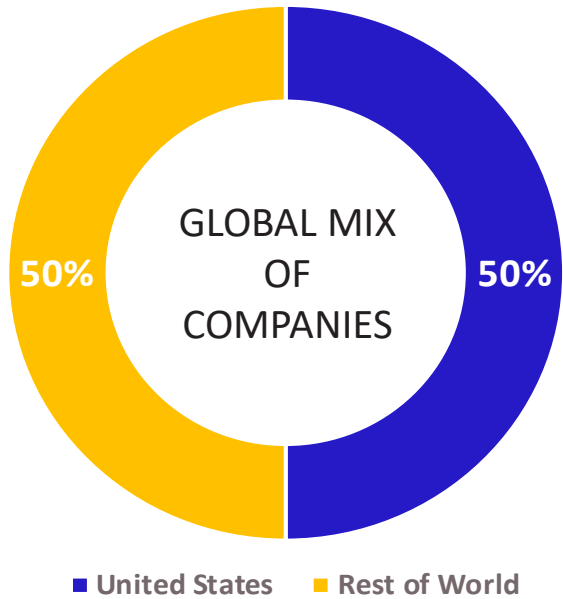
GLOBAL MIX
OF
COMPANIES

50%   50%

■ **United States**   ■ **Rest of World**

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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 historical period from 2010-2020.

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

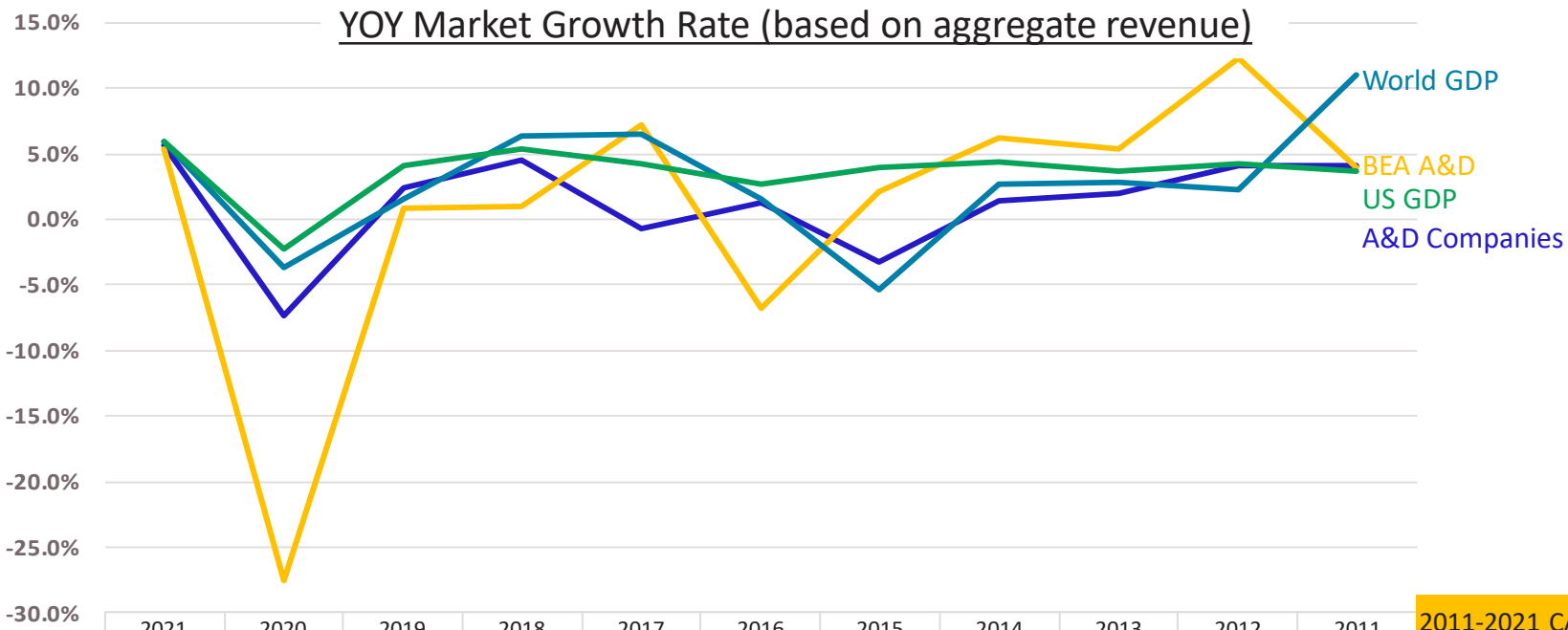| APPROACH	DESCRIPTION	EXAMPLE	GOOD FOR
1. Aggregate averages	Averages are computed by adding up all numbers from all companies. For example, the gross margin for the industry would be the sum of all revenue for all companies minus the sum of all COGS for all companies (divided by the sum of all revenue 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 A&D market. Charts in this section use the "aggregate averages" approach.

YOY Market Growth Rate (based on aggregate revenue)

World GDP
BEA A&D
US GDP
A&D Companies

	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2011-2021 CAGR
A&D Companies	5.7%	-7.3%	2.4%	4.5%	-0.7%	1.3%	-3.2%	1.5%	2.0%	4.1%	4.1%	**1.3%**
BEA A&D Output	5.4%	-27.6%	0.9%	0.9%	7.2%	-6.8%	2.1%	6.2%	5.3%	12.3%	3.9%	**0.4%**
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

- A&D market CAGR for past decade was 1.3%, which is lower than the global current dollar GDP growth rate (2.8%). It is slightly higher than the BEA A&D output CAGR for the same period (0.4%).
- BEA numbers are for US domestic manufacturing only, so are shown for comparison purposes only.
- 2020 numbers reflect the extent to which A&D has been negatively impacted by the pandemic.
- 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. "A&D 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 A&D 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. A&D output as defined here is based on output of the following sub-industries: Other transportation equipment. 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 A&D market growth rates. Note that GDP growth rates are typically reported in constant dollars pegged to a certain year in order to account for the effect of price inflation. Thus, GDP growth rates commonly reported in media are typically lower than those shown here.
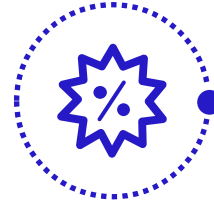
Analysis Summary
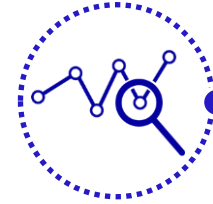## *Operational ratios based on aggregate data, TTM[1]*

3-YEAR CAGR[2]	**0.9%**	
GROSS MARGIN	**19.1%**	
MARKET CAP[3]	**1.6X**	
NET PROFIT	**3.9%**	
R&D	**4.4%**	
SG&A	**8.5%**	
INVENTORY TURNS	**2.4**	
C2C (DAYS)	**131.1**	
PP&E	**23.9%**	
CAPEX	**3.1%**	
FREE CASH FLOW	**3.2%**	
ROIC	**4.6%**	
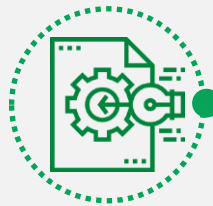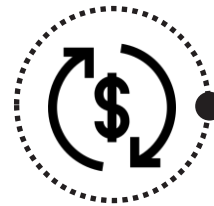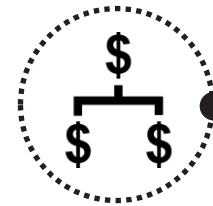
Notes:
1. All revenue and cost numbers are aggregate values for all companies for the trailing twelve months (TTM) as of the date on the cover of this report.
2. Growth rate is based on total dollars growth of the industry over the past four years.
3. Market capitalization ratio is aggregate market capitalization for all companies as of the date on the cover of this report divided by total revenue for all companies on TTM basis.

Historical key metrics based on aggregate data, 2011-Current

HISTORY

	METRIC	TTM	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	AVG11-21	2010	2000
OPERATIONS	Growth Rate (3YRCAGR)	0.9%	0.9%	-0.4%	1.8%	0.4%	-0.3%	0.3%	1.0%	2.9%	2.0%	4.1%	4.1%	1.5%		
	Gross Margin	19.1%	19.0%	16.9%	20.2%	21.4%	22.1%	21.0%	21.7%	22.4%	21.7%	21.9%	22.0%	20.9%	20.9%	17.9%
	SG&A % of Revenue	8.5%	8.5%	8.9%	8.3%	6.9%	7.3%	7.3%	7.2%	7.4%	7.6%	7.6%	8.0%	7.7%	7.1%	7.6%
	R&D % of Revenue	4.4%	4.4%	4.8%	4.4%	4.1%	3.9%	4.4%	4.1%	4.2%	4.1%	4.4%	4.8%	4.3%	4.9%	5.3%
	Inventory Turns (COGS/Inv)	2.4	2.4	2.4	2.6	2.7	2.6	3.1	2.8	2.9	2.9	3.0	3.3	2.8	3.3	4.6
	Days in Inventory	151.0	151.3	154.7	143.1	136.0	140.4	116.0	129.7	124.2	125.3	121.1	111.4	132.1	109.2	80.1
PROFIT & CASH FLOW	Operating Income	5.6%	5.5%	3.1%	6.9%	9.1%	9.7%	8.2%	9.2%	9.5%	8.4%	8.4%	7.9%	7.8%	8.2%	9.1%
	Net Profit	3.9%	3.8%	-0.4%	4.5%	7.2%	7.7%	4.6%	5.1%	5.5%	5.7%	5.3%	5.0%	4.9%	5.1%	3.5%
	EBITDA	11.1%	11.1%	7.3%	11.3%	12.8%	15.5%	10.4%	11.3%	12.0%	12.3%	12.1%	11.9%	11.6%	11.3%	11.0%
	Operating Cash Flow	6.3%	6.4%	0.5%	8.3%	10.0%	10.9%	9.0%	8.9%	8.6%	8.1%	8.6%	7.7%	7.9%	8.6%	10.2%
	FCF % of Revenue	3.2%	3.3%	-2.9%	4.5%	6.2%	7.0%	5.0%	4.8%	4.4%	3.8%	4.4%	4.2%	4.1%	5.6%	7.3%
	CAPEX % of Revenue	3.1%	3.1%	3.4%	3.8%	3.8%	3.9%	4.0%	4.1%	4.2%	4.4%	4.2%	3.5%	3.8%	3.0%	3.0%
	Stock Compensation	0.7%	0.7%	0.5%	0.5%	0.4%	0.3%	0.3%	0.3%	0.3%	0.4%	0.4%	0.4%	0.4%	0.4%	0.6%
	Days in Receivables	40.9	40.9	42.6	41.5	49.3	46.6	56.2	57.6	53.8	56.0	55.2	56.8	50.6	56.3	49.5
	Days in Payables	60.9	60.9	62.6	71.0	75.2	67.1	64.1	64.4	64.1	70.5	74.7	71.3	67.8	81.8	67.4
	Cash-to-Cash Cycle (Days)	131.1	131.4	134.7	113.6	110.1	119.9	108.1	122.9	113.9	110.8	101.6	96.9	114.9	83.7	62.1
ASSETS	Property, Plant, Equipment %	23.9%	23.9%	25.4%	22.3%	20.4%	20.1%	18.4%	18.4%	17.6%	17.8%	17.0%	16.5%	19.8%	16.6%	18.2%
	Cash % of Revenue	19.9%	20.1%	23.4%	13.8%	15.0%	18.5%	13.8%	13.1%	13.4%	15.8%	15.1%	13.8%	16.0%	16.1%	7.6%
	Debt % of Revenue	47.2%	47.2%	52.2%	38.7%	34.3%	28.2%	25.8%	25.8%	21.5%	20.5%	18.7%	20.8%	30.3%	17.2%	28.0%
	Goodwill and Intangibles % of	54.2%	54.0%	56.8%	46.8%	44.9%	35.5%	34.1%	35.4%	33.7%	34.8%	34.1%	31.6%	40.2%	30.8%	25.9%
ROI	ROA	2.1%	2.1%	-0.2%	2.7%	4.5%	5.1%	3.4%	3.8%	4.2%	4.2%	4.0%	3.9%	3.4%	4.1%	3.2%
	ROIC	4.6%	4.5%	-0.5%	6.8%	11.7%	14.8%	9.9%	10.1%	11.5%	10.6%	11.5%	10.6%	9.2%	11.1%	5.8%
	Return on Physical Assets	9.7%	9.6%	5.1%	13.0%	18.4%	19.4%	18.9%	19.9%	21.5%	18.7%	19.5%	19.7%	16.7%	21.3%	26.2%
	Economic Profit % of Revenue	-1.3%	-1.3%	-3.4%	0.9%	3.1%	2.5%	2.5%	2.6%	2.3%	-0.9%	1.4%	3.9%	1.2%	2.6%	0.5%
CAP	Market Cap / Revenue	1.6	1.6	1.7	1.5	1.8	1.5	1.6	1.2	1.1	1.1	1.2	0.9	1.4	0.8	1.6
	Market Cap / EBITDA	14.7	14.7	23.3	13.0	13.7	9.0	14.3	9.9	8.2	8.2	9.3	6.4	11.8	6.1	13.6

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).
- TTM and 2020 industry results have been negatively impacted by commercial airline demand due to the pandemic.
- 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   62   companies investigated. This shows that the average A&D company operates with a gross margin of   24.1% , spends   13.2% of revenue on SG&A,   5.3% on R&D, and has inventory turns of   8.8 , operating income of   4.5% , net income of   1.9%, free cash flow of   2.2% , and return on invested capital of   -18.9% .

	REVENUE (TTM)		OPERATIONS				PROFIT AND CASH			
	Annual Revenue ($M)	3-Year CAGR	Gross Margin	SG&A	R&D	Inventory Turns	Operating Income	Net Income	Free Cash Flow	ROIC
Average	$9,237	1.9%	24.1%	13.2%	5.3%	8.8	4.5%	1.9%	2.2%	-18.9%
Median	$2,153	2.8%	21.6%	10.9%	4.2%	3.2	6.8%	4.8%	4.7%	5.3%

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

Analysis Summary
Average values by revenue quartile, TTM[1]

Market cap multiples and gross margins for smaller companies are larger than larger companies. The same is true for operating income, cash flow, and ROIC.

All numbers are averages within each quartile

	#	REVENUE (TTM)		MKT CAP	OPERATIONS				PROFIT AND CASH			
		Revenue($M)	3-Year CAGR	Mkt Cap/ Revenue	Gross Margin	SG&A	R&D	Inventory Turns	Operating Income	Net Income	Free Cash Flow	ROIC
Quartile 4	16	$30,237	2.9%	1.4	20.1%	9.1%	5.0%	10.2	5.0%	6.8%	1.9%	-87.5%
Quartile 3	15	$3,981	2.4%	2.1	24.5%	9.3%	3.5%	13.6	5.4%	1.2%	2.4%	3.3%
Quartile 2	15	$1,409	1.1%	2.7	25.8%	16.1%	7.5%	5.3	4.0%	1.3%	2.4%	8.0%
Quartile 1	16	$502	1.3%	1.7	26.2%	16.6%	7.0%	5.9	3.6%	-1.6%	2.2%	-0.5%

REVENUE QUARTILES ($M)

Quartile 4 >= $6,607
Quartile 3 >= $2,153, < $6,607
Quartile 2 >= $823, < $2,153
Quartile 1 < $823

Notes:
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3. All percentage numbers are a percentage of revenue. Average is the average of all the percentages for each of the companies.
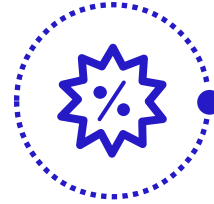
Analysis Summary
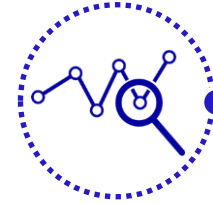## *Average numbers for the entire data set, TTM[1]*
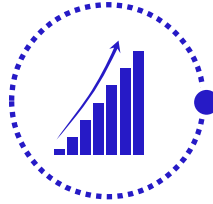
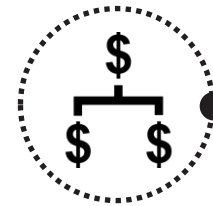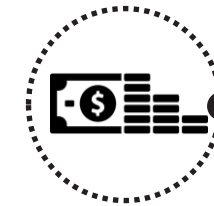|		
3-YEAR CAGR 1.9%	**GROSS MARGIN** 24.1%	**MARKET CAP** 2.0X	**NET PROFIT** 1.9%
R&D 5.3%	**SG&A** 13.2%	**INVENTORY TURNS** 8.8	**C2C (DAYS)** 175.0
PP&E 33.3%	**CAPEX** 3.9%	**FREE CASH FLOW** 2.2%	**ROIC** -18.9%
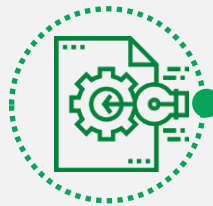
Notes:
1. All revenue and cost numbers are based on trailing twelve months (TTM) results as of the date on the cover of this report for all companies in the data set.
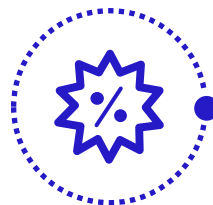2. All ratios shown here are averages of the ratios of each company.

Analysis Summary
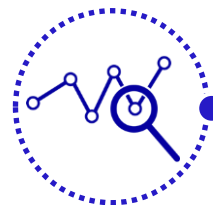## *Average numbers for the top-quartile market cap[1] multiple leaders*
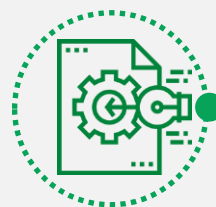
3-YEAR CAGR[2]
8.1%

GROSS MARGIN
32.7%

MARKET CAP
4.2X

NET PROFIT
4.3%

R&D
9.9%

SG&A
17.6%

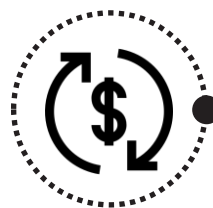**INVENTORY TURNS**
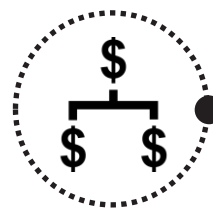# 6.7

C2C (DAYS)
171.8

PP&E
34.7%

CAPEX
5.4%

FREE CASH FLOW
8.1%

ROIC
3.7%

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

Analysis Summary
Key metric benchmarks and relationship to market cap multiple

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

	n=62 METRIC	INDUSTRY BENCHMARKS			MARKET CAP MULTIPLE	
		Q4 AVG	MEDIAN	Q1 AVG	Q4 AVG	Q1 AVG
OPERATIONS	3-Year CAGR	16.5%	2.8%	-12.8%	2.8	1.2
	Gross Margin	47.0%	21.6%	4.9%	3.3	0.9
	SG&A	25.9%	10.9%	5.0%	3.4	1.1
	R&D	11.0%	6.8%	1.4%	3.6	1.7
PROFIT	Operating Margin	17.5%	6.8%	-12.3%	2.8	2.0
	EBITDA Margin	22.9%	11.6%	-6.4%	2.9	1.8
	Net Profit Margin	16.2%	4.8%	-16.7%	2.7	2.0
CASH	Free Cash Flow	16.1%	4.7%	-17.4%	2.8	1.1
	CAPEX % of Revenue	7.8%	3.1%	1.4%	2.5	2.0
	PP&E (net) % of Revenue	71.5%	23.3%	11.5%	1.4	2.9
ROI	ROIC % of Revenue	28.4%	5.3%	-116.9%	1.9	2.0
	ROA % of Revenue	14.6%	3.3%	-8.2%	1.9	2.1
	ROPA % of Revenue	67.2%	13.2%	-17.6%	2.7	2.1
	Economic Profit % of Revenue	12.6%	0.9%	-19.7%	2.7	2.3
C2C	Inventory Turns	27.0	3.2	1.6	1.4	1.8
	Payables (days)	248.4	115.8	32.7	1.8	1.4
	Receivables (days)	127.6	90.8	44.8	2.1	2.3
	Cash-to-Cash (days)	194.5	153.8	75.6	1.6	1.4

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

← All forms of profitability have the highest correlation with market performance.

← All forms of ROI are strong indicators of market performance, at about the same level as profitability.

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

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

Analysis Summary
Market cap multiple quartile comparison

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

VARIABLE	DATA SET AVG	QUARTILE (AVGS WITHIN EACH CAP QUARTILE)				DIFFERENCE TOP-BOTTOM
		TOP (Q4)	Q3	Q2	BOTTOM (Q1)	
Market Cap Multiple	2.0	4.2	1.8	1.1	0.6	7.2X
1-Year Growth	1.9%	8.1%	1.7%	0.9%	-2.9%	10.9 pps
Gross Margin	24.1%	32.7%	27.4%	24.5%	12.1%	20.6 pps
SG&A	13.2%	17.6%	14.2%	11.9%	9.0%	8.6 pps
R&D	5.3%	9.9%	2.6%	4.3%	3.9%	6.0 pps
Operating Profit	4.5%	7.5%	7.8%	5.7%	-2.7%	10.2 pps
Net Profit	1.9%	4.3%	4.3%	3.0%	-3.6%	7.9 pps
Inventory Turns	8.8	6.7	15.8	4.3	8.6	-1.8 Turns
C2C Cycle (days)	175.0	171.8	189.2	157.5	181.4	-9.6 Days
Net Cash	-26.7%	-41.1%	-10.9%	-17.3%	-35.8%	-5.3 pps
CAPEX	3.9%	5.4%	3.1%	3.3%	3.7%	1.7 pps
Free Cash Flow	2.2%	8.1%	5.3%	4.3%	-8.9%	17.1 pps
ROIC	-18.9%	3.7%	8.0%	11.3%	-100.0%	103.7 pps
Return on Physical Assets	18.9%	18.9%	33.5%	22.3%	0.9%	18.0 pps
Economic Profit	-1.5%	2.0%	1.6%	-1.5%	-8.5%	10.5 pps

NOTES & INSIGHTS

- Leaders have market cap multiples that are 2.2X average, and 7.2X laggards.
- Leaders have significantly higher gross margins and investments in R&D. This is perhaps a chicken-and-egg question: does the higher investment in R&D result in a higher gross margin product, or does the higher gross margin product allow for a higher investment in R&D? It is likely a symbiotic and self-reinforcing relationship.
- Leaders excel in all forms of profitability, cash flow, and return on investment.
- Paradoxically, cap leaders do not lead in inventory turns. Cap laggards are more likely to lead in inventory turns than cap leaders. This is likely because cap leaders are managing their supply chains as profit centers and cap laggards are solely focused on cost.
- All financial numbers are for the trailing twelve months as of the date on the cover of this report. All market cap numbers are as of the date on the cover of this report.

Appendix

Additional supporting material and notes.

Notes and Definitions

1. 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 in certain industries 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. TTM = trailing twelve months results. TTM results are pegged to the most recent quarterly results for each company as of the date on the cover of the report.
12. Historical data is captured for the previous eleven fiscal years for all companies. The number of companies grows for each year in the historical analysis, as more companies became public across the decade.
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.

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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