

# Telecommunication Industry Operating Benchmarks

Operational and market capitalization data for 115  
Telecommunication companies

Version 2025.1.1

2-Dec-2025







# Version

VERSION	DATE	NOTES
2021.1.1	04.01.21	Initial version, dated 04.01.21
2021.2.1	06.25.21	Updated financial and market cap data for 06.25.21. Removed companies that merged or were taken private.
2021.3.1	11.30.21	Updated financial and market cap data for 11.30.21. Removed companies that merged or were taken private.
2022.1.1	01.01.22	Updated financial and market cap data for 01.01.22. Added companies and removed those that merged or were taken private.
2022.2.1	05.16.22	Updated financial and market cap data for 05.16.22. Added companies and removed those that merged or were taken private.
2022.2.2	10.07.22	Updated financial and market cap data for 10.07.22. Added companies and removed those that merged or were taken private.
2023.1.1	12.01.23	Updated financial and market cap data for 12.01.23. Added companies and removed those that merged or were taken private.
2025.1.1	12.02.25	Updated financial and market cap data for 12.02.25. 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.

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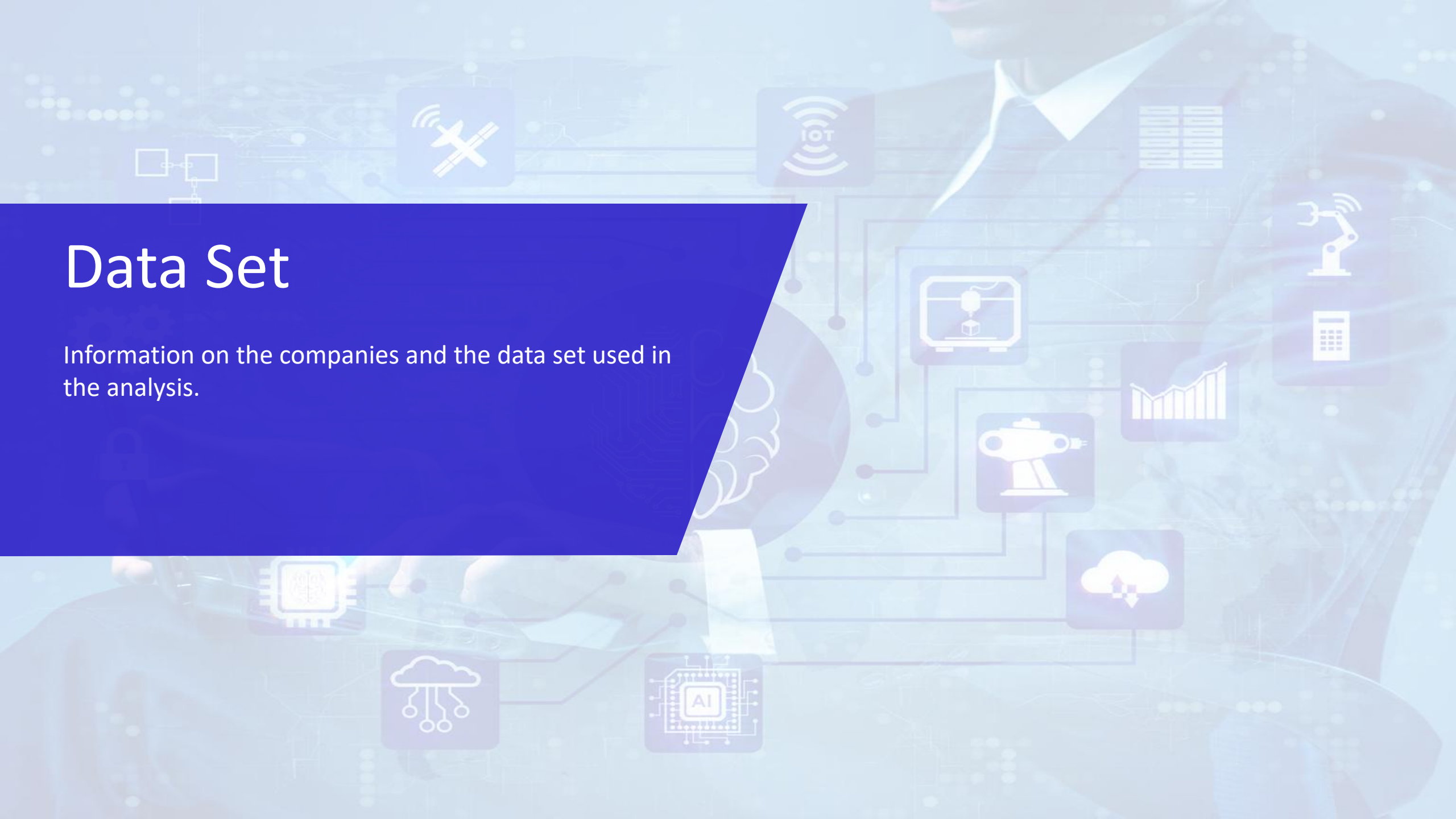
# 2025 Telecommunication Industry Report: Key Takeaways



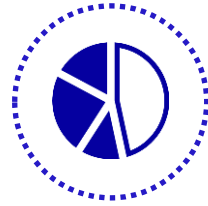
- The Telecommunication industry 3-year CAGR is -0.3%(overall dollars growth). The average company 3-year CAGR is 1.0%.
- The average Telecommunication company has gross margins of 32.1% , invests 16.4% of revenue in selling, general, and administrative expense, 1.6% in research and development, and generates 14.6% operating margin, 35.2% EBITDA margin, 10.0% free cash flow, and 9.3% return on invested capital.
- The Telecommunication company average inventory turns is 72.3 . The median is 38.1 . 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 Telecommunication company has 107.4% PP&E, and 72.9% in goodwill and intangibles, all as a percentage of revenue. Goodwill and intangibles are a proxy for mergers and acquisitions; based on this measure, Telecommunication is among the highest industries in mergers and acquisitions.
- Telecommunication companies are asset intensive, with a high level of investment in PP&E as a percentage of revenue; the best indicator of market cap multiple is return on investment (ROA, ROIC, ROCE, and economic profit).
- Telecommunication 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).
- Telecommunication companies require significant CAPEX to be competitive.
- 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 2.1X average and 7.3X laggards. Leaders have significantly higher 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 115 publicly-traded Telecommunication companies.



**115**



## REVENUE

Aggregate revenue for companies in the data set is \$1.6 trillion for the latest reporting fiscal year as of the date on the cover of this report.



**\$1.6T**



## MARKET CAPITALIZATION

Aggregate market cap for companies in the data set is \$2.2 trillion as of date on the cover of this report.



**\$2.2T**

### 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

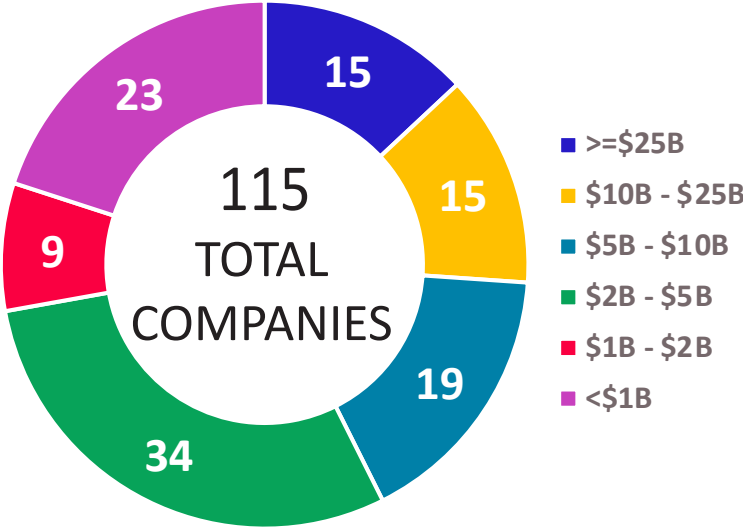
Advanced Info Service P	Comcast Corp.	Liberty Latin America L	Rogers Communications,	Telia Co. AB
Airtel Africa Plc	Deutsche Telekom AG	LINK Mobility Group Hol	Royal KPN NV	Telstra Group Ltd.
America Movil SAB de CV	EchoStar Corp.	Lumen Technologies, Inc	Shenandoah Telecommuni	TELUS Corp.
Array Digital Infrastru	Elisa Oyj	Magyar Telekom Telecomn	Sify Technologies Ltd.	TIM SA (Brazil)
AT&T, Inc.	freenet AG	Maxis Bhd.	Sinch AB	T-Mobile US, Inc.
ATN International, Inc.	Frontier Communications	Millicom International	Singapore Telecommunica	TPG Telecom Ltd.
Axiata Group Bhd.	Gamma Communications P	MTN Group Ltd.	SK Telecom Co., Ltd.	True Corp. Public Co. L
AXTEL SAB de CV	GCI Liberty, Inc.	NetLink NBN Trust	SmarTone Telecommunica	Türk Telekomünikasyon A
B Communications Ltd.	Globe Telecom, Inc.	NOS SGPS SA	SoftBank Corp.	TURKCELL İletişim Hizme
BCE, Inc.	GMO Internet Group, Inc	NTT, Inc.	SoftBank Group Corp.	United Internet AG
Bezeq The Israeli Telec	Gogo, Inc.	Oi SA	Spark New Zealand Ltd.	VEON Ltd.
BT Group Plc	Grupo Televisa SAB	Okinawa Cellular Teleph	StarHub Ltd.	Verizon Communications,
Cable One, Inc.	Helios Towers Plc	Optimum Communications	Sunrise Communications	Vodacom Group Ltd.
Cablevisión Holding SA	Hellenic Telecommunicat	Orange Polska SA	Suny Cellular Communica	Vodafone Group Plc
CelcomDigi Bhd.	HKBN Ltd.	Orange SA	Swisscom AG	WideOpenWest, Inc.
Cellcom Israel Ltd.	HKT Trust & HKT Ltd.	Partner Communications	Tele2 AB	
Charter Communications,	Hutchison Telecommunica	PCCW Ltd.	Telecom Argentina SA	
China Communications Se	IDT Corp.	PLDT, Inc.	Telecom Italia SpA	
China Tower Corp. Ltd.	Internet Initiative Jap	Proximus SA	Telefonica Brasil SA	
Chorus Ltd.	Iridium Communications,	PT Indosat Tbk	Telefónica Deutschland	
Chunghwa Telecom Co., L	KDDI Corp.	PT Sarana Menara Nusant	Telefónica SA	
CITIC Telecom Internati	KORE Group Holdings, In	PT Telkom Indonesia (Pe	Telekom Austria AG	
Cogeco Communications,	KT Corp.	PT Tower Bersama Infrac	Telekom Malaysia Bhd.	
Cogeco, Inc.	Liberty Broadband Corp.	PT XLSMART Telecom Seja	Telenor ASA	
Cogent Communications H	Liberty Global Ltd.	Quebecor, Inc.	Telephone & Data System	

# Data Set

## Company distribution

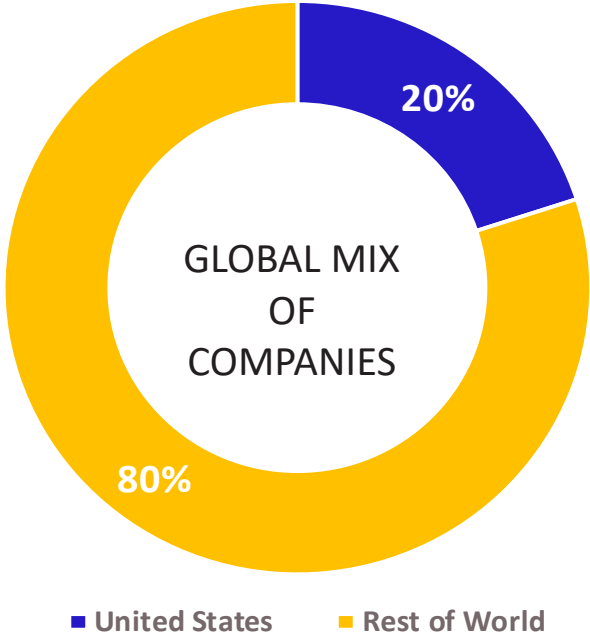


BY ANNUAL REVENUE



MEDIAN REVENUE = **\$3,948M**

GEOGRAPHIC REGION



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

## Index of key metrics included in this report

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

### OPERATIONS

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

### ASSETS

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

### CASH FLOW

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

### ROI

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

### VALUATION

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

### PROFIT

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

#### Notes:

1. For definitions and notes on these metrics and their use in this report, refer to the [Appendix](#).

# Data Set

## Three different analysis approaches in this analysis



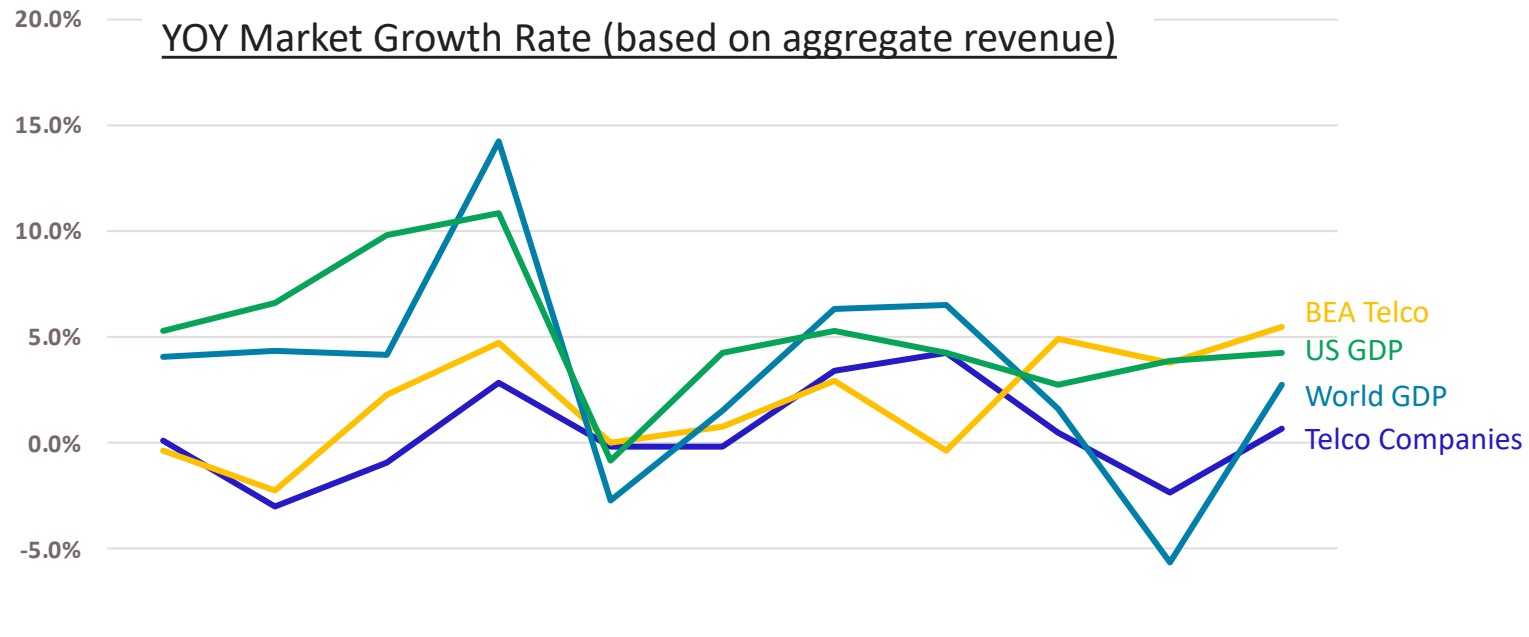
APPROACH	DESCRIPTION	EXAMPLE	GOOD FOR
1. Aggregate averages	Averages are computed by adding up all numbers from all companies. For example, the gross margin for the industry would be the sum of all revenue for all companies minus the sum of all COGS for all companies (divided by the sum of all revenue for all companies).	Average Gross Margin % = $\frac{(\text{sum of all revenues minus sum of all COGS})}{\text{sum of all revenues}}$	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"><li>1) Isolate each quartile of market cap multiples; compare gross margin of leaders to others.</li><li>2) Isolate each quartile of gross margin; display average market cap multiple within each gross margin quartile.</li></ol>	Understanding characteristics of leaders.

# Overall Market

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

# Overall Market

## YOY growth rates, past ten years



	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014	2024-2014 CAGR
Telecommunications Companies	0.1%	-3.0%	-0.9%	2.9%	-0.2%	-0.2%	3.4%	4.3%	0.5%	-2.3%	0.7%	0.5%
BEA Telecommunications Output	-0.3%	-2.2%	2.3%	4.8%	0.0%	0.8%	2.9%	-0.4%	4.9%	3.8%	5.5%	1.6%
World GDP (current \$)	4.0%	4.4%	4.1%	14.2%	-2.7%	1.5%	6.4%	6.5%	1.6%	-5.6%	2.8%	3.7%
US GDP (current \$)	5.3%	6.6%	9.8%	10.9%	-0.9%	4.3%	5.3%	4.3%	2.8%	3.9%	4.3%	4.6%

### NOTES & INSIGHTS

- Telecommunication market CAGR for the past decade was lower than the global current dollar GDP growth rate. It is also lower than BEA Telco growth rate numbers.
- BEA numbers are for US domestic output only and are shown here for comparison purposes only.

#### Notes:

1. "Telecommunication 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 Telecommunication 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=gdpixind>), GDP by Industry. Telecommunication output as defined here is based on output of the following sub-industries: Broadcasting and telecommunications. 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](http://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 Telecommunication 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.

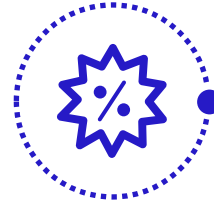
# Analysis Summary

Operational ratios based on aggregate data, TTM<sup>1</sup>



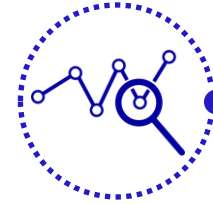
3-YEAR CAGR<sup>2</sup>

0.2%



GROSS MARGIN

35.7%



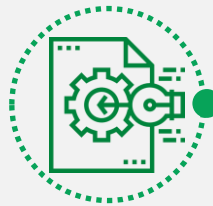
MARKET CAP<sup>3</sup>

1.4X



NET PROFIT

11.0%



R&D

1.5%



SG&A

16.7%



INVENTORY TURNS

28.0



C2C (DAYS)

-12.8



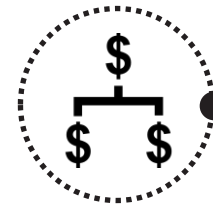
PP&E

87.3%



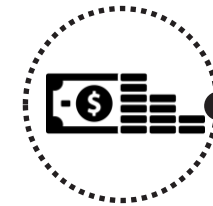
CAPEX

15.7%



FREE CASH FLOW

11.5%



ROIC

7.2%

## Notes:

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

# Overall Market

Historical key metrics based on aggregate data, past ten years



	METRIC	TTM	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014	AVG14-24
OPERATIONS	Growth Rate (3YRCAGR)	0.2%	-0.3%	-0.3%	0.4%	1.5%	1.8%	2.0%	1.5%	0.8%	0.5%	-2.3%	0.7%	0.6%
	Gross Margin	35.7%	36.2%	35.1%	34.8%	33.6%	33.5%	33.8%	33.2%	35.5%	35.7%	35.8%	37.7%	35.0%
	SG&A % of Revenue	16.7%	17.0%	16.8%	16.7%	16.2%	17.0%	16.3%	17.2%	17.7%	18.0%	18.0%	20.9%	17.4%
	R&D % of Revenue	1.5%	1.5%	1.4%	1.3%	1.3%	1.2%	1.2%	1.1%	1.2%	1.1%	1.2%	1.2%	1.3%
	Inventory Turns (COGS/Inv)	28.0	30.3	28.4	28.0	29.1	29.7	24.6	27.3	29.2	29.9	28.0	29.7	28.6
	Days in Inventory	13.0	12.1	12.9	13.1	12.5	12.3	14.8	13.4	12.5	12.2	13.0	12.3	12.8
	Revenue / Employee (\$K)	\$526	\$516	\$503	\$509	\$501	\$470	\$474	\$464	\$454	\$450	\$443	\$452	\$476
PROFIT & CASH FLOW	Operating Income	17.1%	16.9%	16.4%	16.2%	16.0%	15.5%	15.9%	15.3%	15.1%	14.7%	15.0%	14.3%	15.6%
	Net Profit	11.0%	9.2%	7.4%	5.5%	12.9%	6.1%	7.8%	8.9%	11.7%	6.9%	8.0%	8.7%	8.5%
	EBITDA	34.8%	35.5%	34.0%	34.0%	34.4%	34.5%	33.6%	32.1%	31.7%	31.3%	30.8%	29.9%	32.9%
	Operating Cash Flow	27.2%	26.8%	26.6%	26.7%	28.1%	27.9%	25.7%	24.1%	24.5%	23.0%	23.6%	23.9%	25.5%
	FCF % of Revenue	11.5%	11.0%	9.9%	8.7%	7.5%	11.5%	9.8%	8.1%	7.5%	5.7%	5.3%	6.7%	8.3%
	CAPEX % of Revenue	15.7%	15.8%	16.8%	18.0%	20.6%	16.4%	15.8%	16.0%	16.9%	17.3%	18.3%	17.2%	17.2%
	Stock Compensation	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.6%	0.6%	0.5%	0.5%	0.4%	0.4%	0.6%
	Days in Receivables	70.9	65.3	66.3	62.2	61.8	64.1	65.7	63.8	57.5	54.1	49.4	51.2	60.1
	Days in Payables	96.7	68.6	71.6	71.0	68.0	65.2	66.2	65.2	72.7	72.9	69.1	70.6	69.2
	Cash-to-Cash Cycle (Days)	-12.8	8.8	7.5	4.2	6.3	11.2	14.3	12.0	-2.7	-6.5	-6.7	-7.2	3.7
ASSETS	Property, Plant, Equipment %	87.3%	86.8%	90.4%	86.7%	86.2%	89.2%	81.8%	70.9%	73.2%	73.3%	69.3%	68.8%	79.7%
	Cash % of Revenue	15.7%	14.1%	15.1%	14.6%	16.3%	17.3%	13.6%	10.6%	14.3%	12.7%	13.8%	14.5%	14.3%
	Debt % of Revenue	119.9%	117.2%	122.1%	119.9%	121.6%	118.9%	105.1%	94.3%	93.4%	89.4%	84.2%	79.0%	104.1%
	Goodwill and Intangibles % of	97.2%	97.2%	100.5%	98.3%	100.4%	100.8%	85.5%	95.3%	91.7%	90.7%	81.0%	75.5%	92.4%
ROI	ROIC	7.2%	7.3%	6.7%	6.3%	6.2%	6.2%	7.2%	6.6%	7.2%	7.2%	8.4%	8.5%	7.1%
	ROCE	8.0%	7.8%	7.2%	7.3%	7.1%	6.8%	7.7%	8.0%	8.2%	8.1%	8.7%	8.7%	7.8%
	ROA	4.0%	3.4%	2.6%	2.0%	4.6%	2.1%	3.1%	3.7%	5.1%	3.0%	3.8%	4.2%	3.4%
	ROOA	6.7%	6.6%	6.1%	5.8%	5.8%	5.5%	7.2%	5.7%	6.0%	5.8%	6.6%	6.6%	11.5%
	EP	-0.1%	0.6%	-3.1%	3.1%	5.1%	-1.1%	-2.5%	-2.0%	-0.9%	-2.1%	0.2%	0.3%	-0.2%

## HISTORY

	2013	2000
	39.2%	26.0%
	18.9%	15.3%
	1.3%	2.0%
	32.0	25.1
	11.4	14.5
	\$461	\$233
	17.4%	13.3%
	8.4%	9.5%
	33.7%	35.3%
	25.6%	26.6%
	8.5%	-14.0%
	17.1%	40.6%
	0.4%	
	49.2	69.6
	68.3	69.8
	-7.7	14.3
	68.5%	111.2%
	17.2%	19.7%
	75.3%	98.0%
	70.1%	67.0%
	10.4%	11.2%
	10.6%	5.9%
	4.1%	3.2%
	8.4%	5.0%
	2.8%	2.7%

## 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 115 companies investigated. This shows that the average Telecommunication company operates with a gross margin of **32.1%**, spends **16.4%** of revenue on SG&A, **1.6%** on R&D, and has inventory turns of **72.3**, operating income of **14.6%**, net income of **9.5%**, free cash flow of **10.0%**, and return on invested capital of **9.3%**.

	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	\$13,733	1.0%	32.1%	16.4%	1.6%	72.3	14.6%	9.5%	10.0%	9.3%
Median	\$3,948	0.1%	31.9%	12.8%	0.9%	38.1	15.7%	8.4%	11.2%	7.3%

### 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<sup>1</sup>

Market cap multiples are consistent across the revenue quartiles. Gross margins and profit are lower for the smallest companies but consistent in the top three quartiles.

All numbers are averages within each quartile

	#	REVENUE (TTM)		MKT CAP Mkt Cap/ Revenue	OPERATIONS				PROFIT AND CASH			ROIC
		Revenue(\$M)	3-Year CAGR		Gross Margin	SG&A	R&D	Inventory Turns	Operating Income	Net Income	Free Cash Flow	
Quartile 4	29	\$44,740	2.0%	1.4	30.0%	13.3%	1.9%	37.4	14.1%	8.3%	9.8%	6.2%
Quartile 3	29	\$6,272	-1.4%	1.9	36.2%	18.7%	0.7%	59.4	17.7%	3.0%	12.4%	9.7%
Quartile 2	28	\$2,773	0.9%	1.5	30.5%	13.7%	0.5%	132.1	16.0%	8.0%	13.1%	8.4%
Quartile 1	29	\$769	2.5%	1.9	31.6%	19.6%	2.5%	60.2	10.5%	18.6%	4.9%	12.9%

### REVENUE QUANTILES (\$M)

Quartile 4 >= \$10,271

Quartile 3 >= \$3,948 , < \$10,271

Quartile 2 >= \$1,648 , < \$3,948

Quartile 1 < \$1,648

### Notes:

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

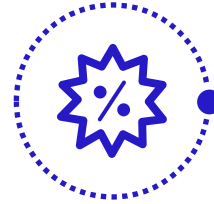
# Analysis Summary

Average numbers for the entire data set, TTM<sup>1</sup>



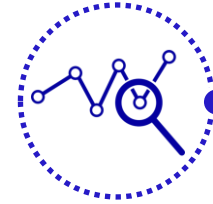
3-YEAR CAGR

1.0%



GROSS MARGIN

32.1%



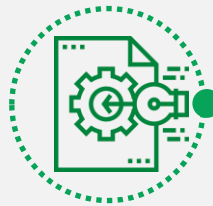
MARKET CAP

1.7X



NET PROFIT

9.5%



R&D

1.6%



SG&A

16.4%



INVENTORY TURNS

72.3



C2C (DAYS)

-12.3



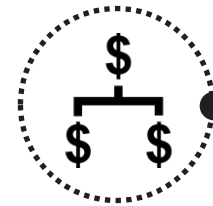
PP&E

107.4%



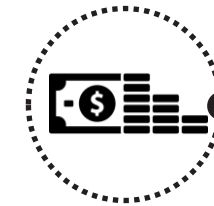
CAPEX

17.2%



FREE CASH FLOW

10.0%



ROIC

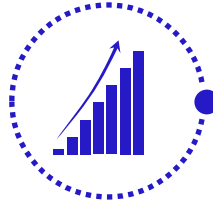
9.3%

## 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.

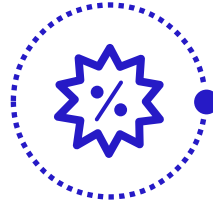
# Analysis Summary

Average numbers for the top-quartile market cap<sup>1</sup> multiple leaders



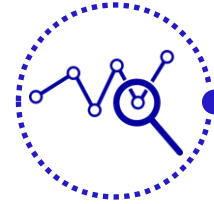
3-YEAR CAGR<sup>2</sup>

**-0.3%**



GROSS MARGIN

**38.1%**



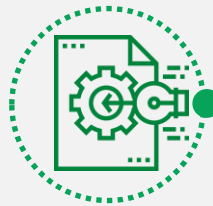
MARKET CAP

**3.6X**



NET PROFIT

**20.5%**



R&D

**1.7%**



SG&A

**13.8%**



INVENTORY TURNS

**85.9**



C2C (DAYS)

**-20.8**



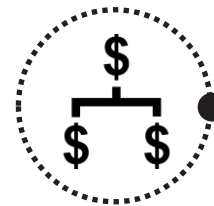
PP&E

**154.5%**



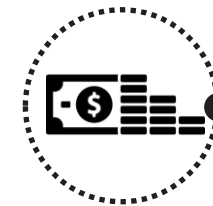
CAPEX

**18.4%**



FREE CASH FLOW

**16.9%**



ROIC

**9.8%**

## 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=115 METRIC	INDUSTRY BENCHMARKS			MARKET CAP MULTIPLE		
		Q4 AVG	MEDIAN	Q1 AVG	Q4 AVG	Q1 AVG	
OPERATIONS	3-Year CAGR	12.8%	0.1%	-8.2%	1.4	1.5	
	Gross Margin	52.4%	31.9%	13.0%	2.0	1.2	← This is one of the few industries in which gross margin is not a clear determinant of market cap multiple.
	SG&A	34.7%	12.8%	3.8%	1.5	1.3	
	R&D	4.3%	15.7%	0.1%	1.3	1.5	
PROFIT	Operating Margin	27.6%	15.7%	-0.6%	2.4	1.0	
	EBITDA Margin	52.4%	36.5%	16.2%	2.5	1.1	← All forms of profitability have a strong correlation with market performance.
	Net Profit Margin	35.7%	8.4%	-14.9%	2.8	1.3	
CASH	Free Cash Flow	22.0%	11.2%	-5.1%	2.2	0.9	
	CAPEX % of Revenue	29.9%	15.7%	6.6%	2.4	1.5	
	PP&E (net) % of Revenue	223.5%	86.6%	31.0%	2.3	1.3	
ROI	ROIC % of Revenue	21.1%	7.3%	1.4%	2.0	2.1	
	ROCE % of Revenue	18.5%	8.8%	0.5%	2.1	1.3	← All forms of ROI are strong indicators of market performance.
	ROA % of Revenue	10.9%	3.6%	-4.5%	2.1	1.3	
	EP % of Revenue	9.1%	0.1%	-17.5%	2.0	2.0	
	ROOA % of Revenue	43.7%	8.1%	-1.0%	2.0	1.8	
	ROPA % of Revenue	80.2%	17.6%	-3.2%	1.7	1.7	
CZC	Inventory Turns	196.3	38.1	16.8	1.6	1.8	
	Payables (days)	28.7	9.6	3.7	1.8	1.6	
	Receivables (days)	179.9	56.4	22.9	1.9	1.9	
	Cash-to-Cash (days)	111.5	-7.1	-96.3	1.8	1.6	← 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.

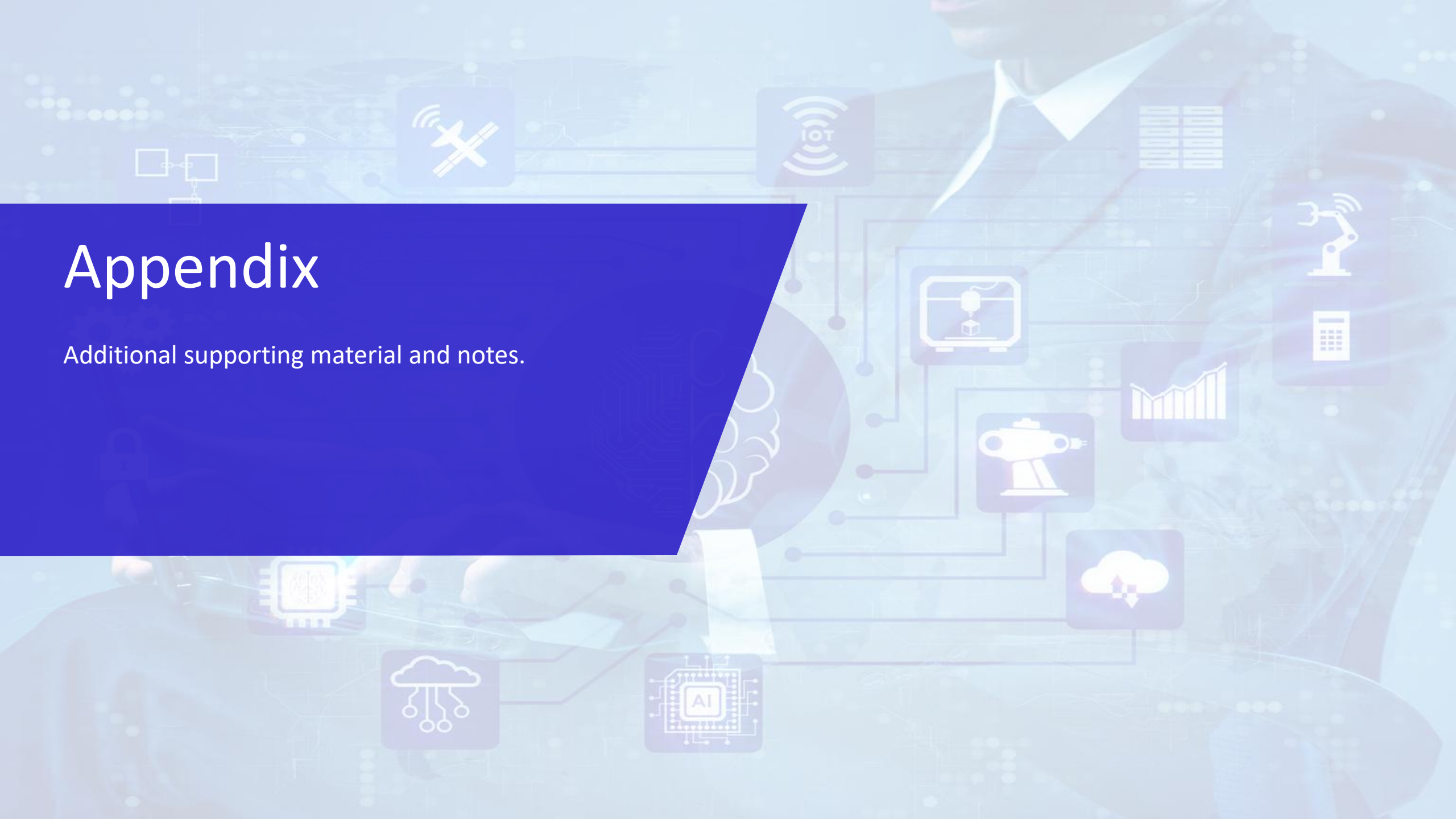
		<i>n=115</i>	QUARTILE (AVGS WITHIN EACH MKT CAP QUARTILE)				DIFFERENCE	
		DATA SET						
		AVG	TOP (Q4)	Q3	Q2	BOTTOM (Q1)	TOP-BOTTOM	
		METRIC						
		Market Cap Multiple	1.7	3.6	1.6	1.0	0.5	7.3X
OPERATIONS		1-Year Growth	1.0%	-0.3%	5.2%	1.3%	-2.4%	2.2 pps
		Gross Margin	32.1%	38.1%	34.4%	28.8%	26.3%	11.9 pps
		SG&A	16.4%	13.8%	18.3%	15.1%	17.4%	-3.6 pps
		R&D	1.6%	1.7%	0.3%	2.9%	1.7%	-0.1 pps
PROFIT		Operating Profit	14.6%	23.4%	15.3%	12.8%	6.7%	16.8 pps
		Net Profit	9.5%	20.5%	5.6%	6.1%	5.6%	14.9 pps
		EBITDA	35.2%	45.0%	36.8%	32.2%	26.7%	18.3 pps
CASH		Inventory Turns	72.3	85.9	79.8	71.3	50.9	35.0 Turns
		C2C Cycle (days)	-12.3	-20.8	-17.7	7.5	-15.2	-5.6 Days
		Net Cash	-99.7%	-129.6%	-83.2%	-82.0%	-103.9%	-25.7 pps
		CAPEX	17.2%	18.4%	19.8%	15.6%	15.1%	3.3 pps
		Free Cash Flow	10.0%	16.9%	8.0%	9.5%	5.6%	11.3 pps
ROI		ROA	3.5%	6.1%	2.8%	3.5%	1.4%	4.7 pps
		ROIC	9.3%	9.8%	8.1%	13.8%	5.4%	4.3 pps
		EP	-2.1%	-1.2%	-1.5%	-1.8%	-4.2%	3.0 pps
		ROOA	14.9%	36.5%	9.8%	9.6%	3.2%	33.3 pps
		ROPA	28.9%	22.0%	23.1%	61.4%	9.2%	12.9 pps

### NOTES & INSIGHTS

- Leaders have market cap multiples that are 2.1X average, and 7.3X laggards.
- The one clear determinant of leaders is return on investment; top quartile market cap multiple leaders excel in all forms of ROI (ROA, ROIC, ROCE and EP). This makes sense given Telecommunication is a capital-intensive industry requiring high levels of CAPEX.
- Inventory is not a significant factor for most Telecommunication companies. These companies are largely service providers and must deploy significant physical assets in order to competitive deliver such service.
- All financial numbers are for the trailing twelve months as of the date on the cover of this report. All market cap numbers are as of the date on the cover of this report.

# Appendix

Additional supporting material and notes.



# Notes and Definitions (1 of 4)



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

# Notes and Definitions (2 of 4)



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

# Notes and Definitions (3 of 4)



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

# Notes and Definitions (4 of 4)



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



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