

Electronics Components Midpoint Outlook

Learning from the Past; Looking to the Future

Dale Ford – Chief Analyst
June 24, 2021



Electronic Components Industry Association



Midpoint Outlook

- Top Americas Authorized Distributors
- Cycle Analysis
- Looking Forward ~ 2021
- What About the Electronics & Components Supply Chain?
- Electronics & Components Market Drivers



Top Americas
Authorized
Distributors

~ 2020 ~

Top 50 North America Authorized Distributors - 2020

ECIA / Electronics Sourcing Partnership



Distribution minimizes 2020 losses as it stabilizes supply chain

Amid pandemic turbulence North American distributors see revenues slide for second straight year but contain decline to -5.9% in volatile supply chain environment

The Top 50 North America Authorized Distributors

Rank 2020	Rank 2019	Company	2020 North America (\$ Millions)	Growth 2020/2019 (%)	Share of Top 50 Total Sales (%)	North America Sales Share of Worldwide (%)	Type*	Sales Breakdown by Percent						Total Employees	Sales per Employee (\$ Millions)
								Active	Passive	Electro	Interconnect	Computer Products	Other		
1	1	Arrow Electronics, Inc. (2)	6,183.1	-13.7	28.84	30.2	1	76.0	3.4	2.4	8.3	8.0	2.0	5,055	1.22
2	2	Avnet (Includes Farnell) (2)	4,660.1	-6.2	21.74	26.1	1	76.0	5.1	3.4	11.5	2.5	1.5	3,869	1.20
3	3	Future Electronics (1)	2,000.0	-5.9	9.33	39.2	1	70.0	7.2	5.1	17.7	-	-	2,725	0.73
4	4	Digi-Key	1,700.1	-3.7	7.93	59.2	3	34.0	19.8	11.0	24.1	3.2	7.9	3,760	0.45
5	5	TTI	1,450.0	0.0	6.76	50.1	2	-	48.4	5.5	46.1	-	-	1,906	0.76
6	6	Mouser Electronics	942.6	7.2	4.40	46.4	3	45.0	17.0	11.0	22.0	-	5.0	1,850	0.51
7	7	DAC / Hellind	796.0	-4.4	3.71	82.7	2	-	-	15.9	84.2	-	-	735	1.08
8	8	Allied Electronics/RS Components	634.0	-5.9	2.96	26.5	1	0.7	0.8	33.0	22.1	8.7	34.7	800	0.79
9	9	Sager	313.0	-2.2	1.46	100.0	2	-	-	14.0	22.0	-	64.0	377	0.83
10	10	Master Electronics (1)	285.0	11.3	1.33	83.3	1	73.0	4.0	6.0	9.0	5.0	3.0	425	0.67

Industry growth drivers
– Beyond technology

Supply chain imbalances
and extending lead times

Securing the supply chain
becomes a top priority

Reshaping markets in
the near and long-term

The value of
distribution
highlighted

Shipping, logistics
and freight – oh my!

Transformations in workplaces
and workforce support

Digital technology – Supply
Chain wins and opportunities

Connect. Influence. Optimize.

The Top 50

Rank 2020	Rank 2019	Company	2020 North America (\$ Millions)
1	1	Arrow Electronics, Inc. (2)	6,183.1
2	2	Avnet (Includes Farnell) (2)	4,660.1
3	3	Future Electronics (1)	2,000.0
4	4	Digi-Key	1,700.1
5	5	TTI	1,450.0
6	6	Mouser Electronics	942.6
7	7	DAC / Heilind	796.0
8	8	Allied Electronics/RS Components	634.0
9	9	Sager	313.0
10	10	Master Electronics (1)	285.0
11	11	Bisco Industries, Inc.	218.8
12	14	WPG Americas Inc.	200.0
13	12	Powell Electronics	190.0
14	13	PEI-Genesis (3)	180.0
15	15	Electro Enterprises	146.8

16	19	BJG Electronics, Inc.	123.6
17	18	RFMW	112.0
18	16	Carlton-Bates	100.0
19	17	Hughes Peters	90.0
20	20	Flame Enterprises	77.3
21	21	Steven Engineering	75.1
22	22	Peerless Electronics (1)	71.5
23	23	NEP Electronics (1)	65.8
24	24	Marsh Electronics, Inc.	58.5
25	25	Richardson Electronics (2)	58.2
26	26	Symmetry Electronics	55.0
27	32	Area51 Electronics	46.6
28	28	Edge Electronics (1)	46.2
29	27	SMD, Inc.	38.8
30	31	Falcon Electronics	38.5
31	29	Agility EMS (Gopher Electronics) (1)	36.5
32	30	Fuses Unlimited (1)	34.8
33	34	CDM Electronics (1)	34.0

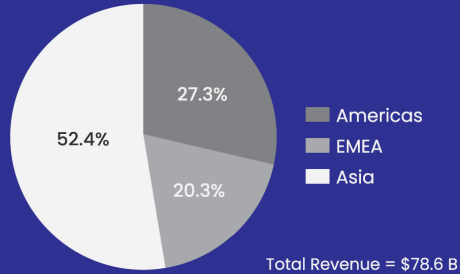
34	35	Brevan Electronics	32.1
35	33	Beyond Components (1)	29.1
36	39	Diverse Electronics	26.3
37	37	Powertech Controls (1)	25.2
38	41	NASCO Aerospace & Electronics	25.0
39	36	PCX (1)	25.0
40	38	Masline Electronics (1)	24.7
41	47	Bluff City Electronics	22.7
42	40	Cumberland Electronics (1)	22.1
43	49	Flip Electronics	21.3
44	44	Microwave Components, LLC	19.5
45	42	Kensington Electronics	19.0
46	43	PUI (Projections Unlimited, Inc.)	18.8
47	45	Benchmark Connector Corporation	18.0
48	48	Sherburn	16.9
49	46	March Electronics (1)	15.8
50	50	East Coast Microwave (1)	14.8
TOTAL TOP 50			21,438

(1) ECIA Estimate for Total North America Sales and Sales Breakdown • (2) ECIA Estimate for Sales Breakdown • (3) ECIA Estimate for Total North America Sales

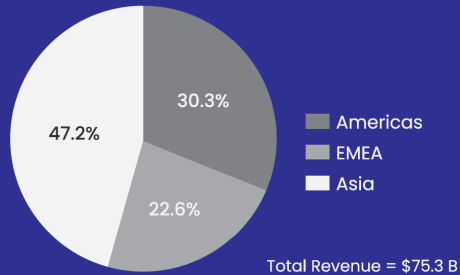
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Distribution Revenue Growth and Geographic Share

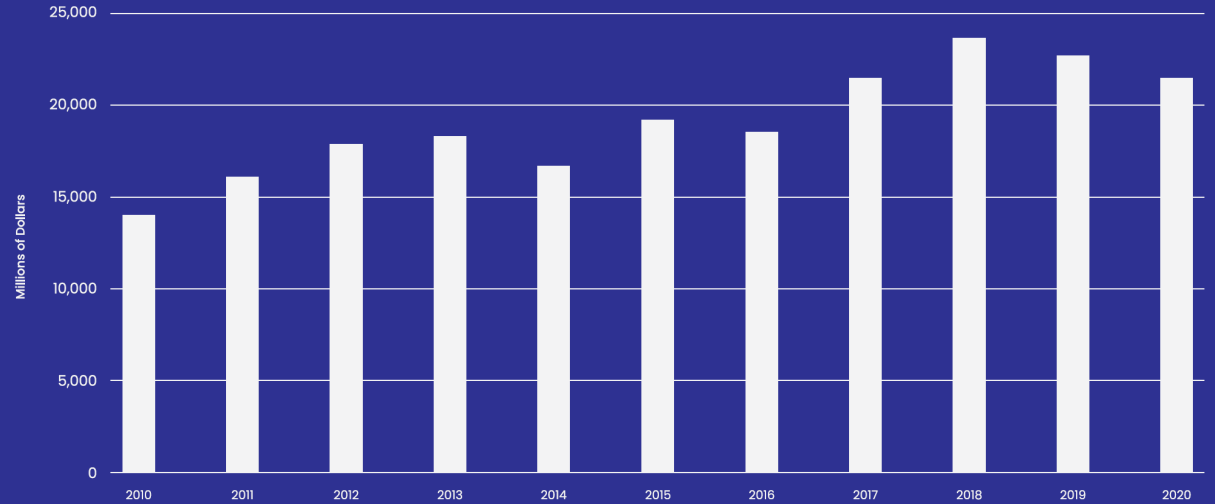
Top 50 Total Revenue Share by Region - 2020



Top 50 Total Revenue Share by Region - 2019

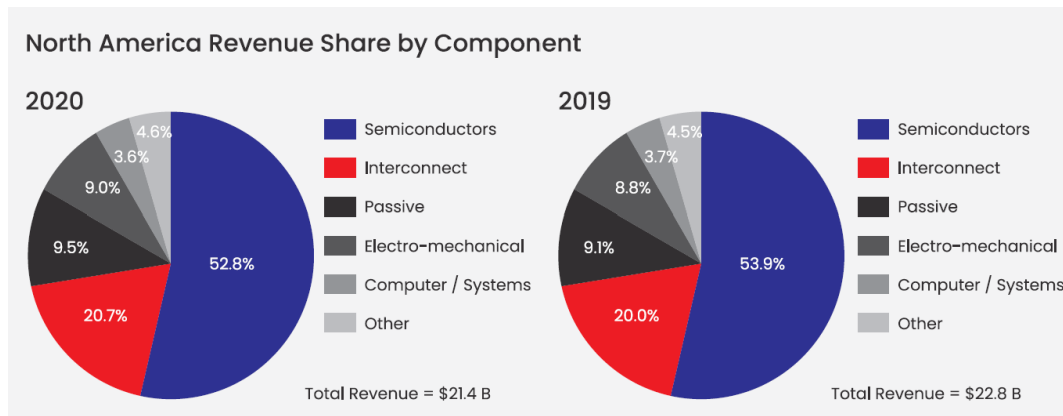
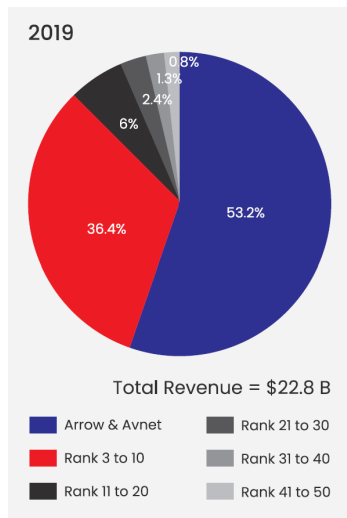
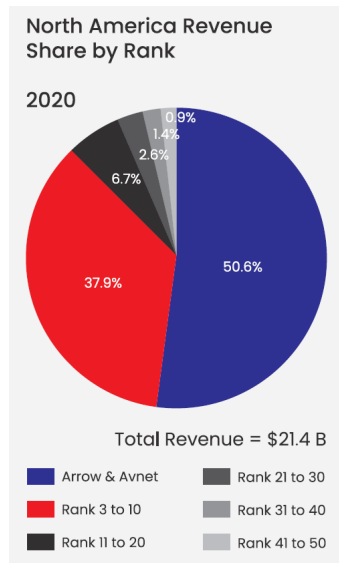


Total Revenue of Top 50 Authorized North America Distributors



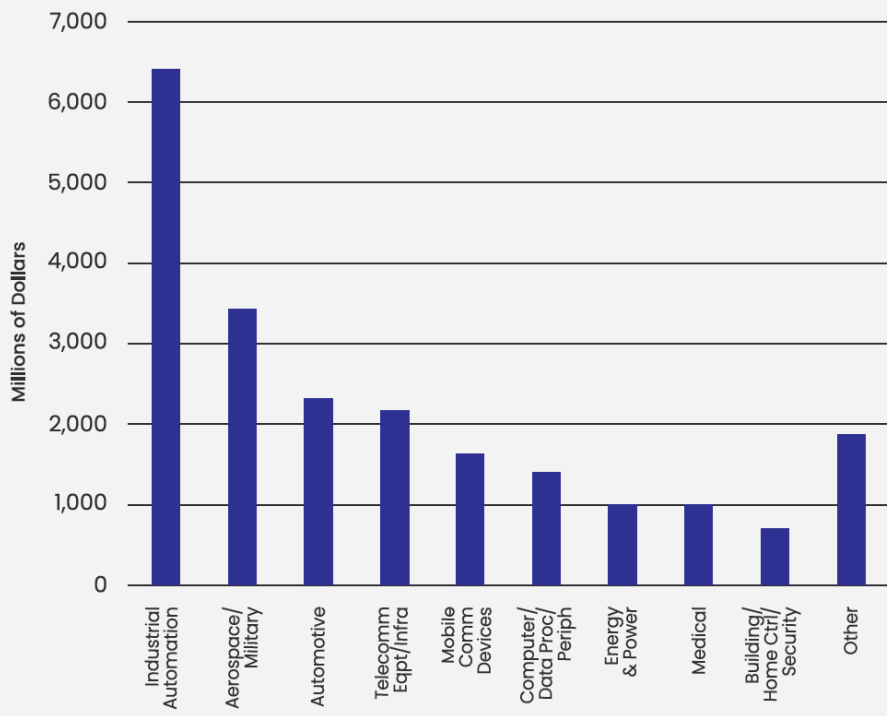
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Revenue Share by Component and Rank

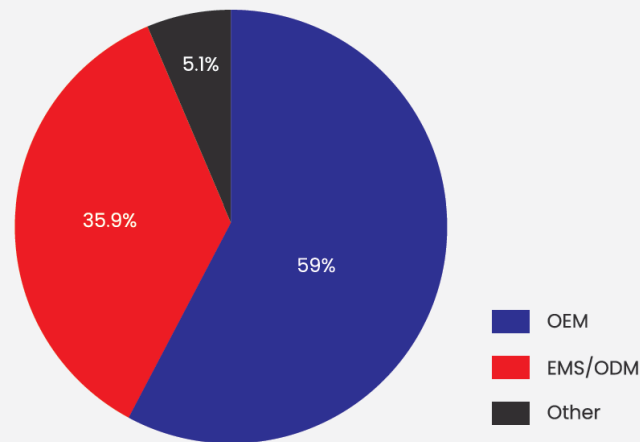


Revenue by Customer and End Market

North America Revenue by End Market - 2020



North America Customer Revenue Share - 2020

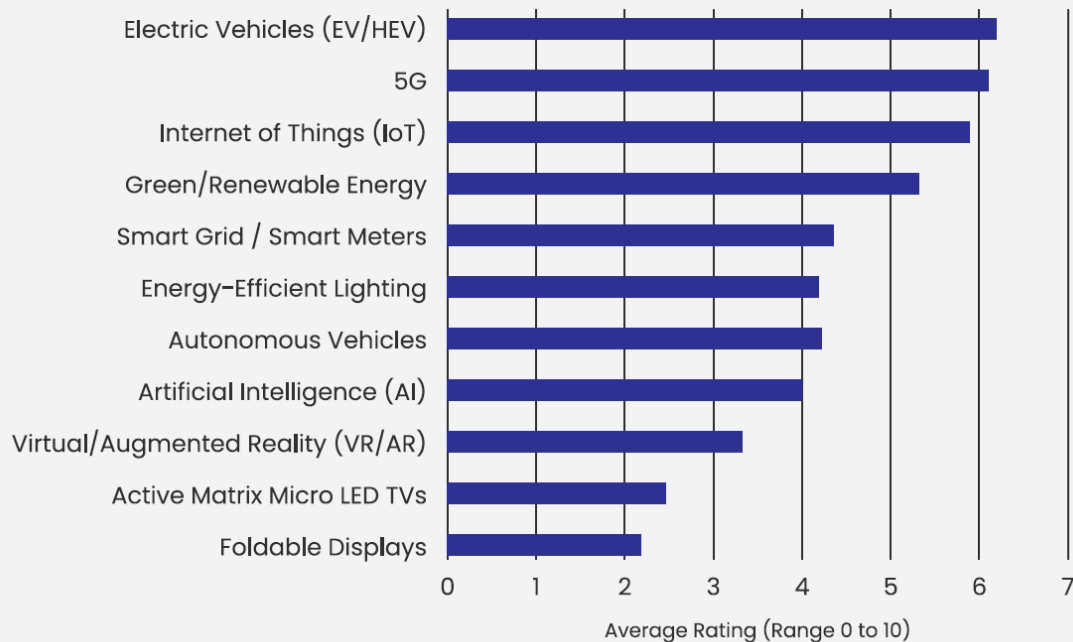


Total Revenue = \$21.4 B

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Electronic Component Distribution Growth Drivers

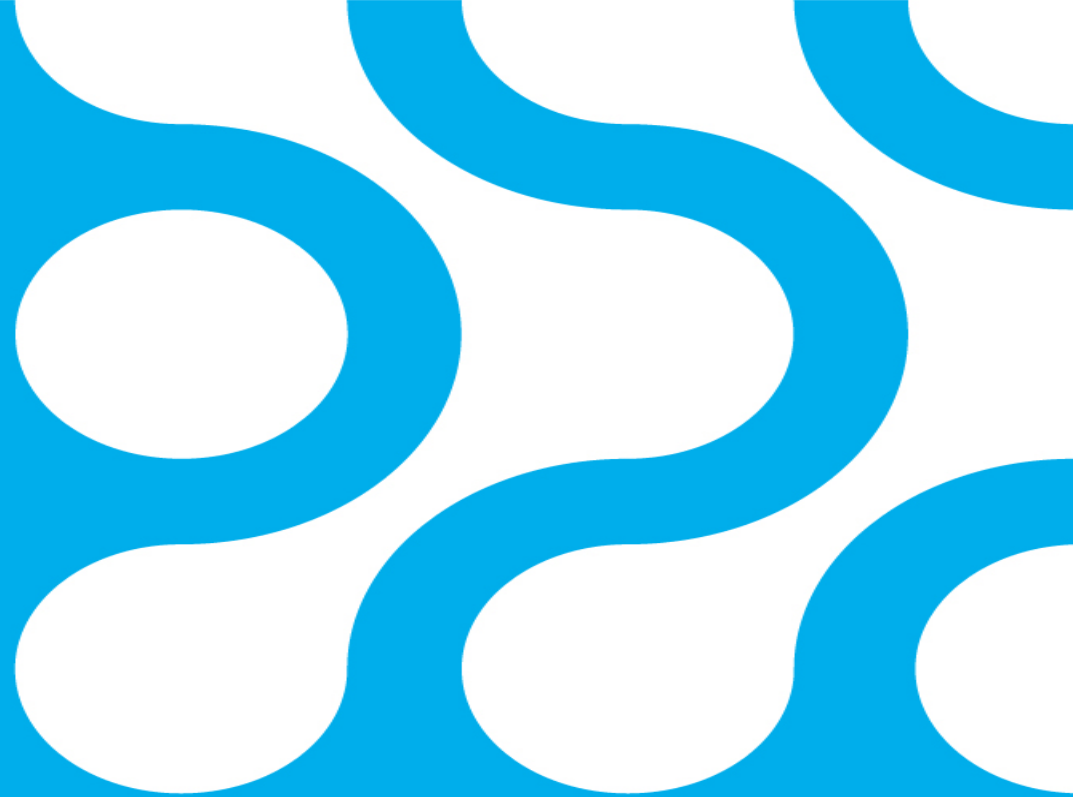
2021 Technology Sales Growth Driver Average Ratings



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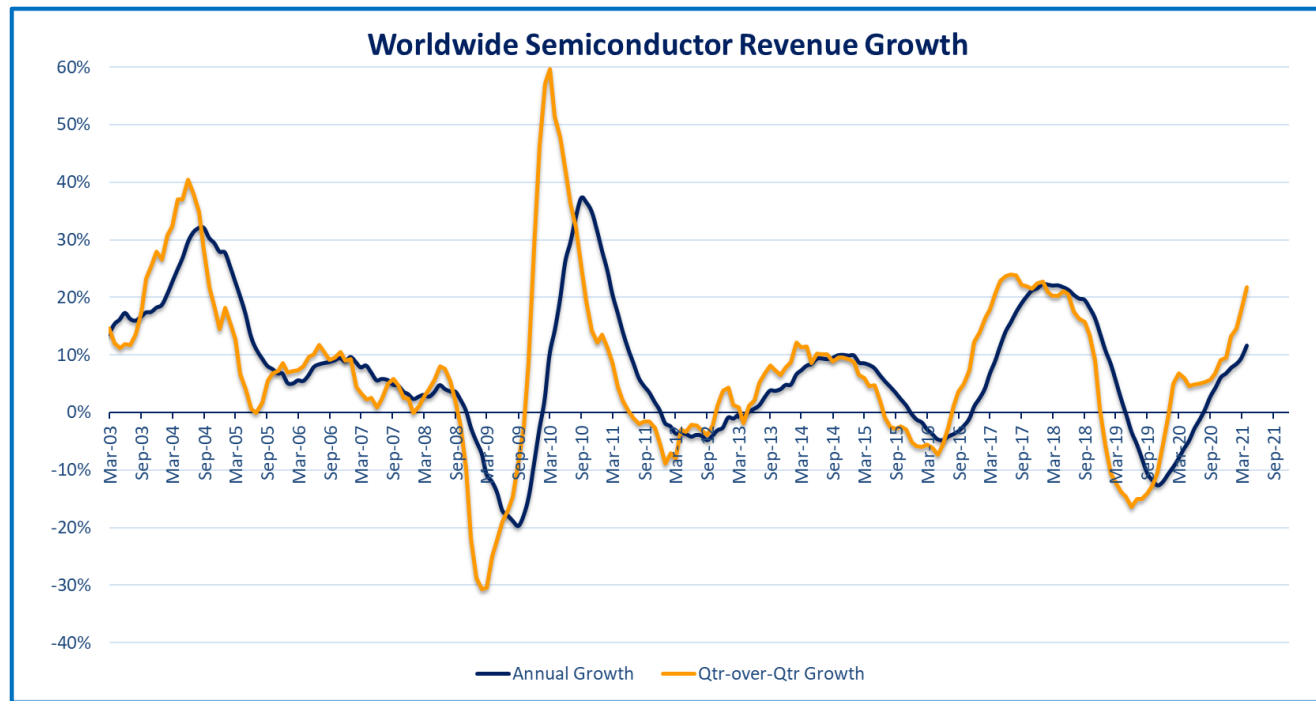
Cycle Analysis

~ 2021 ~



Semiconductor Revenue Growth Cycle

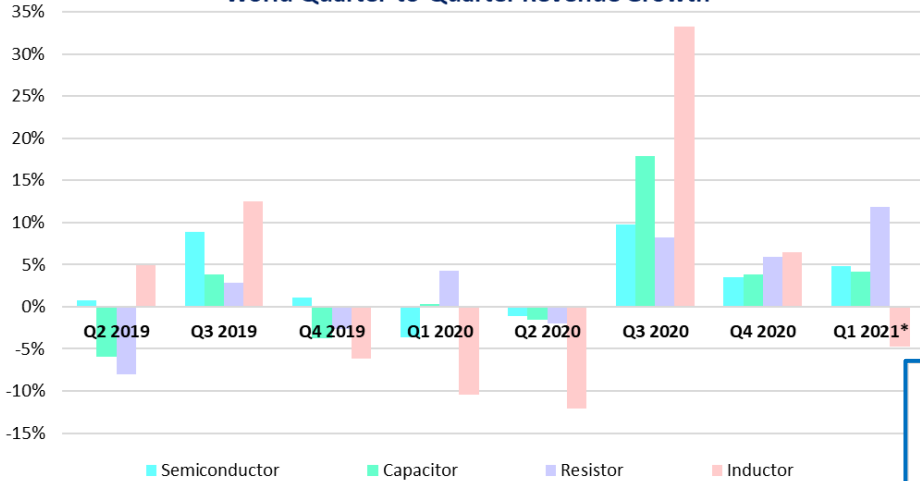
- 2021 Growth Surging
- Qtr-over-Qtr tops 20% in April
- Annual revenue growth profile continues steady and tops 10%
- No indication at this point of a slowing in the growth cycle
- Based on the current trend it would appear this cycle will top the peak in 2018
- Could supply limitation be the primary cause of a slowdown?



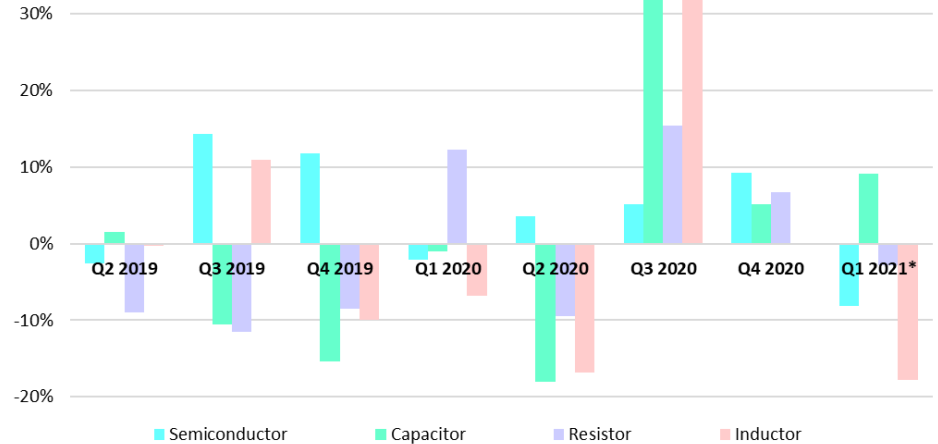
Source – WSTS

Electronic Component Revenue Growth

World Quarter-to-Quarter Revenue Growth



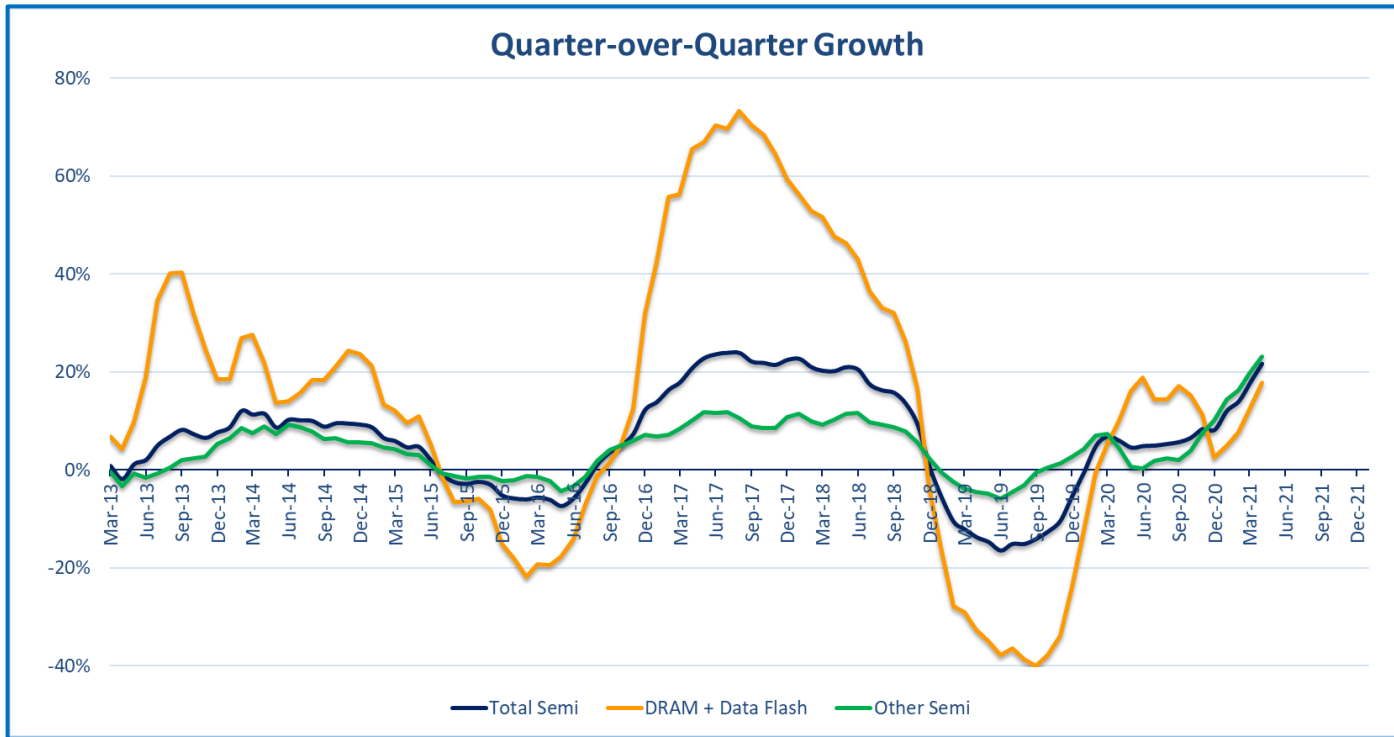
Americas Quarter-to-Quarter Revenue Growth



Source: World Semiconductor Trade Statistics (WSTS),
World Passive Trade Statistics (WPTS)

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Semiconductor Growth Trends

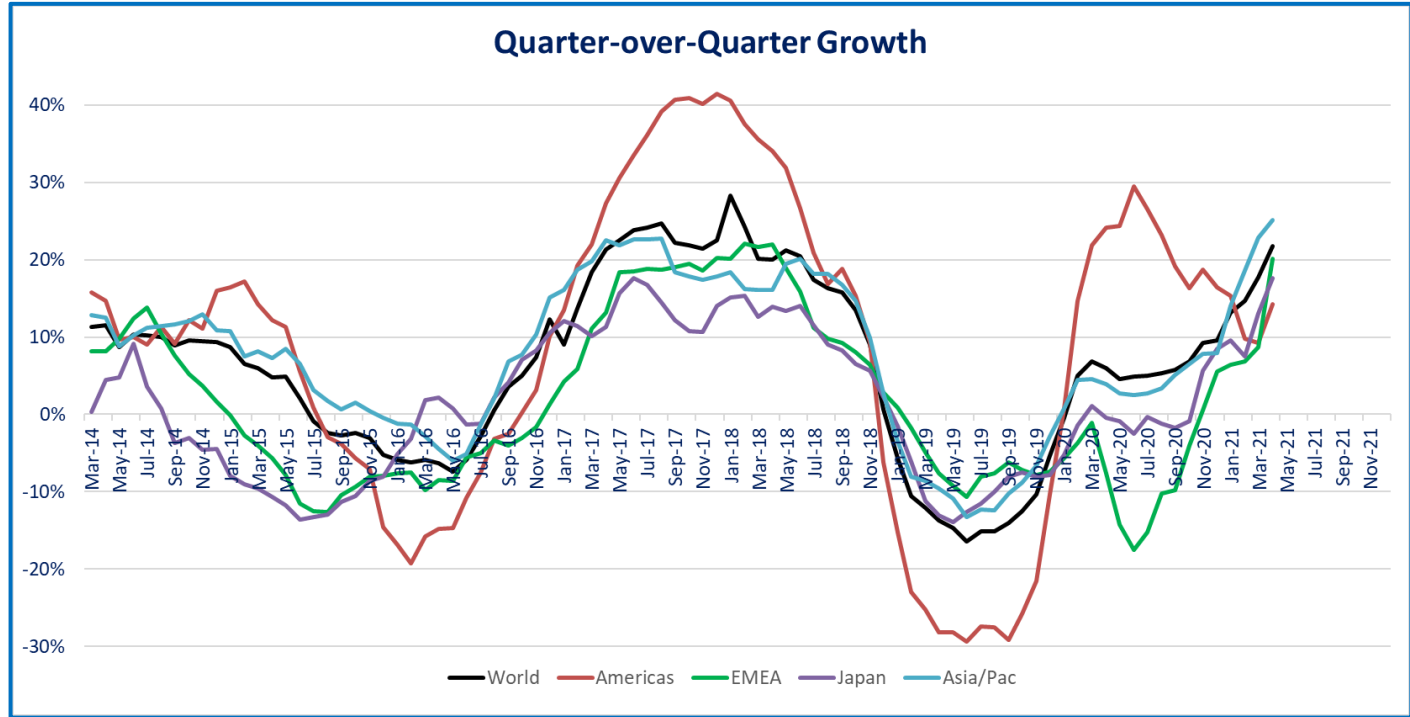


Source: WSTS

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Americas Semiconductor Market Rejoins Growth

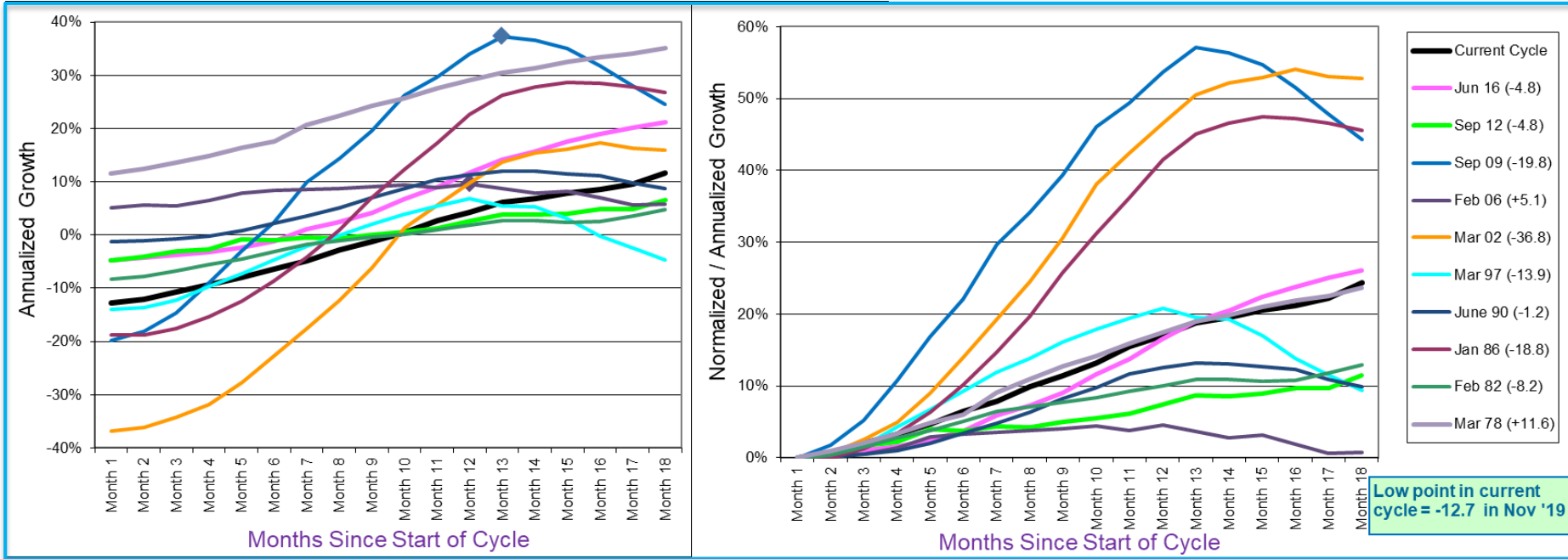
- With renewed memory growth Americas has now joined other regions in growth
- EMEA achieves a remarkable turnaround in growth – now only behind Asia/Pac
- Japan sustains strong growth after stagnation



Source – WSTS

Solid Start to Current Cycle

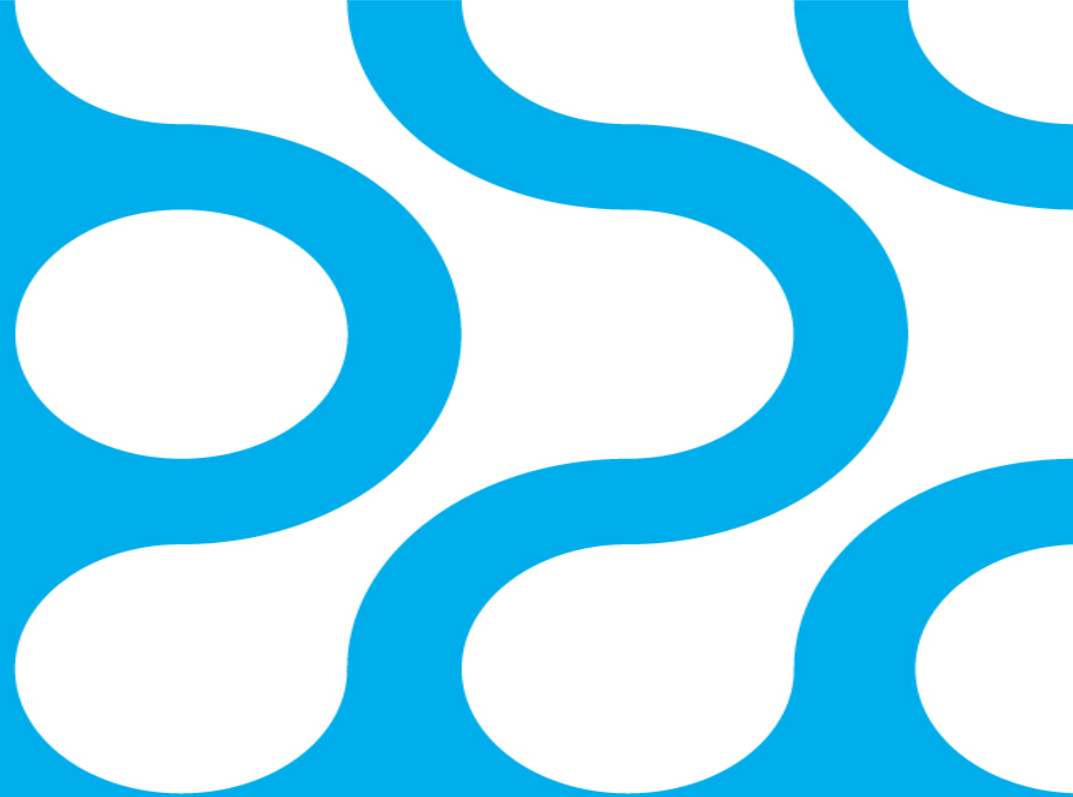
Current cycle showing both strength and endurance



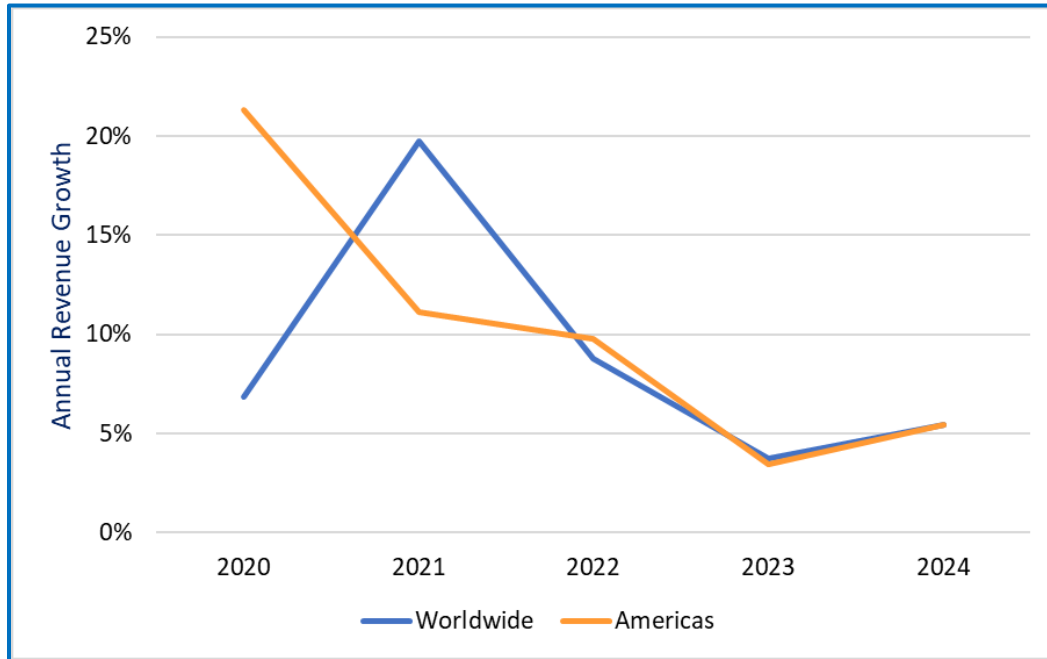
Source - WSTS

Looking Forward

~ 2021 ~



WSTS Spring Semiconductor Forecast



Source: WSTS

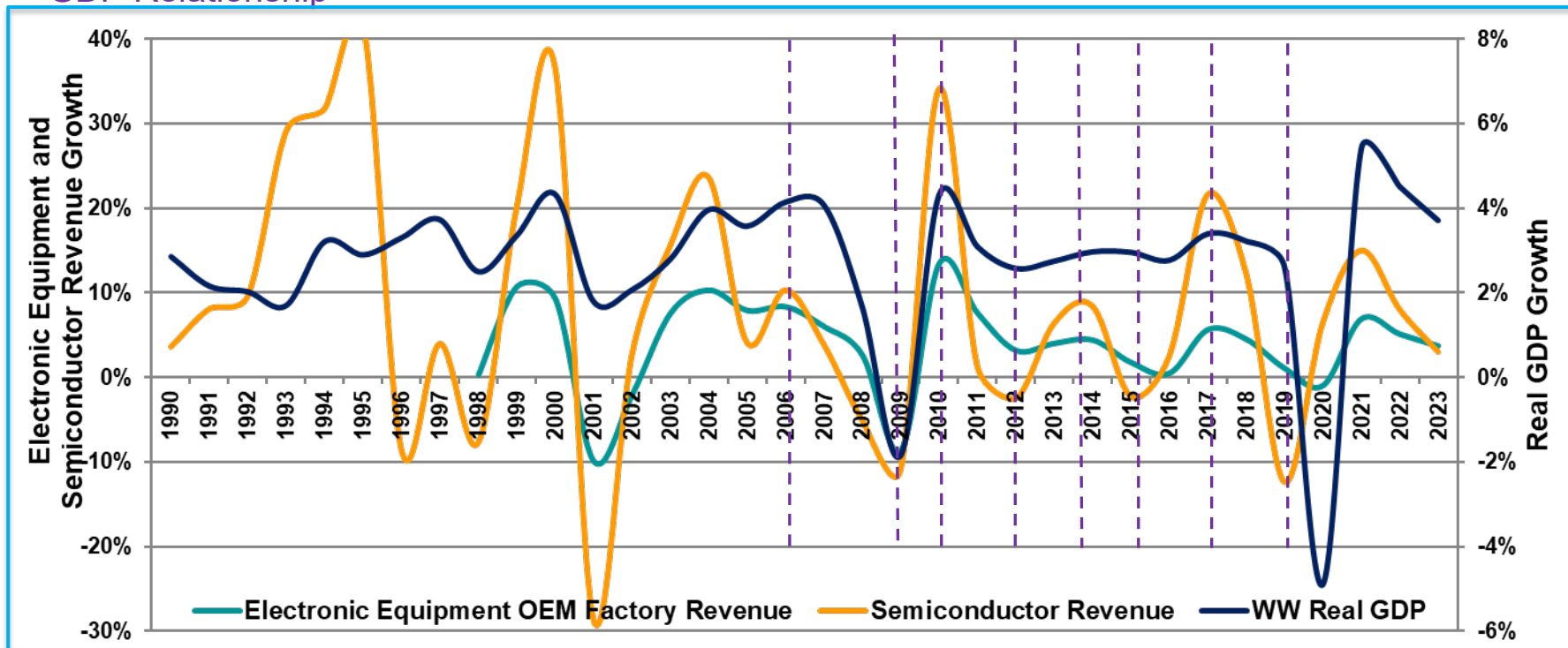
Observations:

- Forecast built up category-by-category with experienced analysts from all regions
- Follows a typical semiconductor cycle pattern
- Americas skewed by Memory IC dynamics
- BUT – there are indicators that the current cycle will be stronger and more durable than common expectations
- Also, WSTS data has yet to reflect recent price increases

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Semiconductor Revenue Growth Cycle

GDP Relationship



- Current Cycle – Global GDP creates drag on semiconductor growth

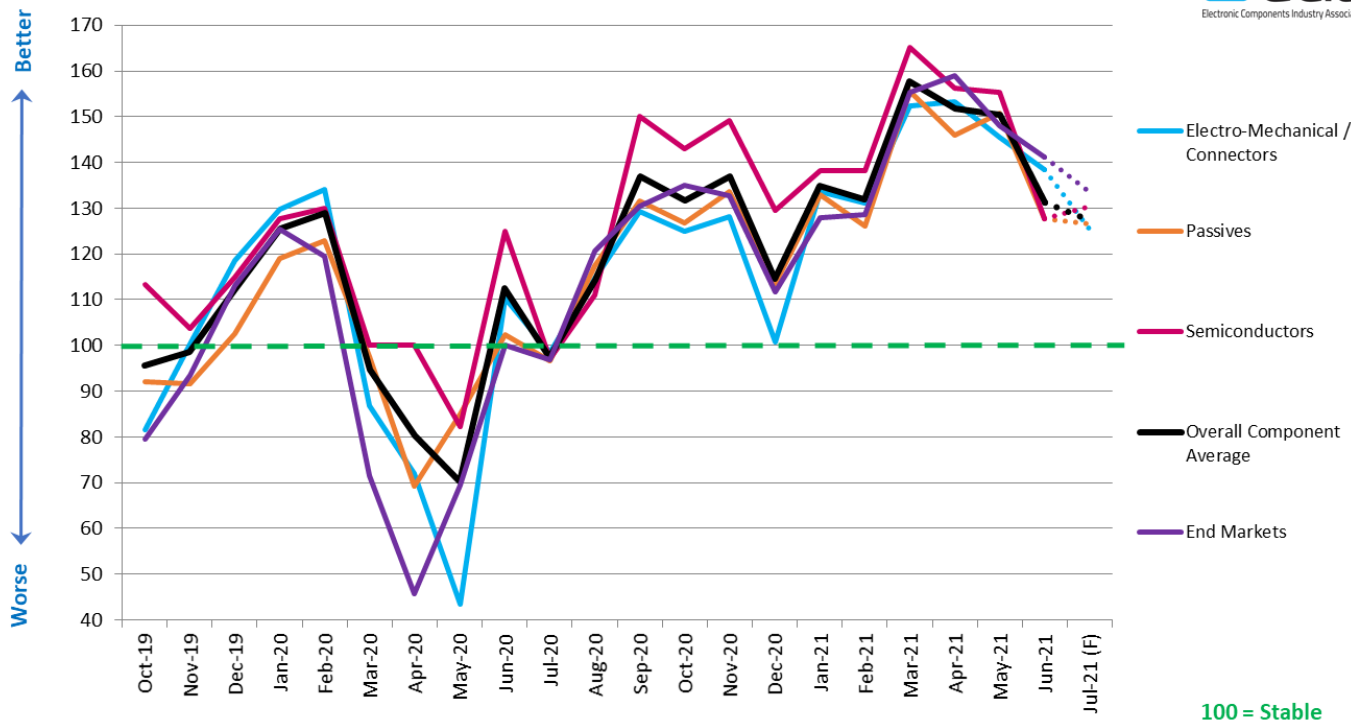
- Technology/Market forces aligning to support growth in 2020+

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Source: IHSM Global Insight, OMDIA, IMF Forecast averages

North America Sentiment Survey Trends

North American Sales Performance Compared to Prior Month



100 = Stable

- All segments cooling from their Apr to Jun highs – BUT still growing!
- Is this driven by supply limitations or end markets?
- Important to remember context – Month compared to prior Month
- Above 100 means continued improvement – Like keeping foot on accelerator

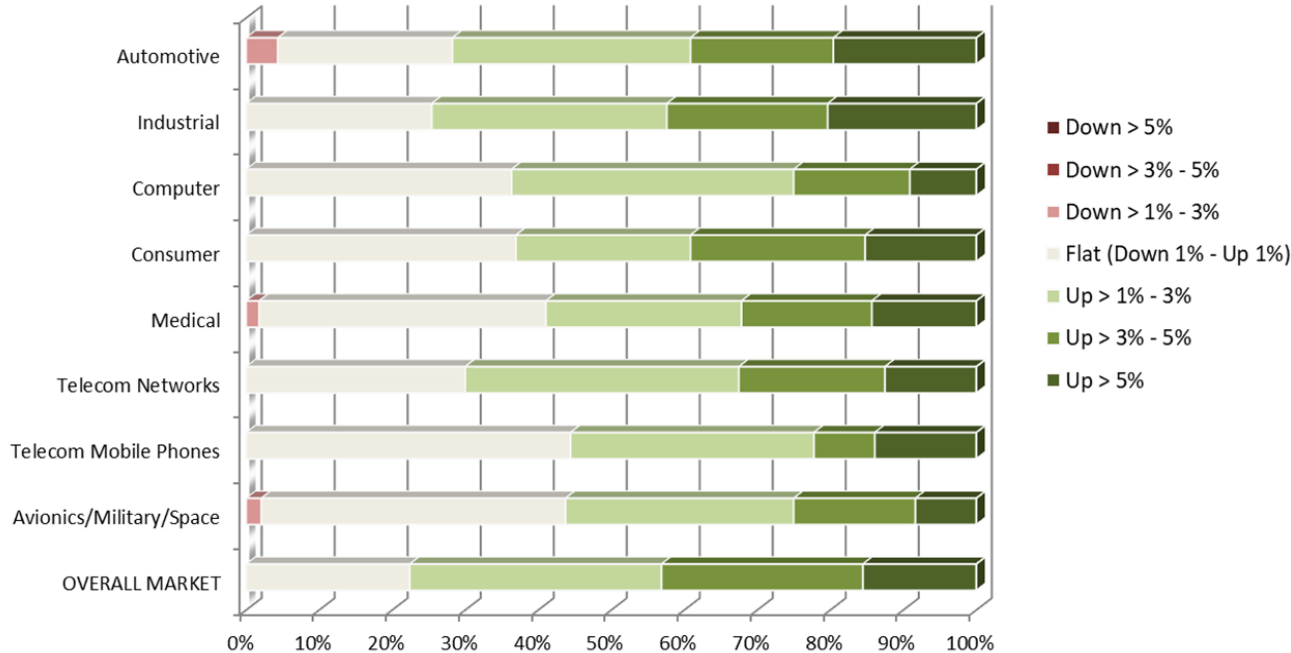
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Source: ECIA Electronic Component Sales Trends Survey



North America Sentiment Survey Trends

Market Outlook for the coming Q3 2021 quarter compared to current Q2 2021 quarter



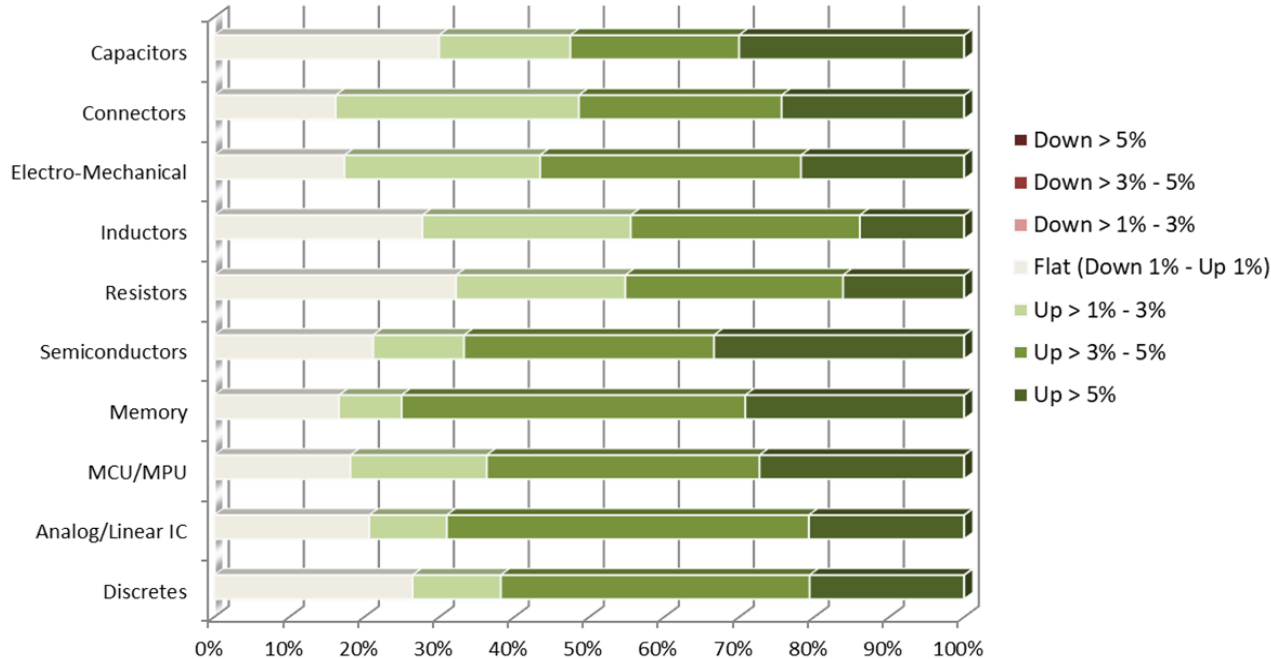
Source: ECIA Electronic Component Sales Trends Survey

- Optimism abounds!
- Broad-based confidence across the market
- Industrial, Telecom Networks & Automotive lead in optimism
- Between 55% and 75% growth expectation range across individual markets
- Percent of respondents expecting overall market growth = 77%

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North America Sentiment Survey Trends

Product Outlook for the coming Q3 2021 quarter compared to current Q2 2021 quarter

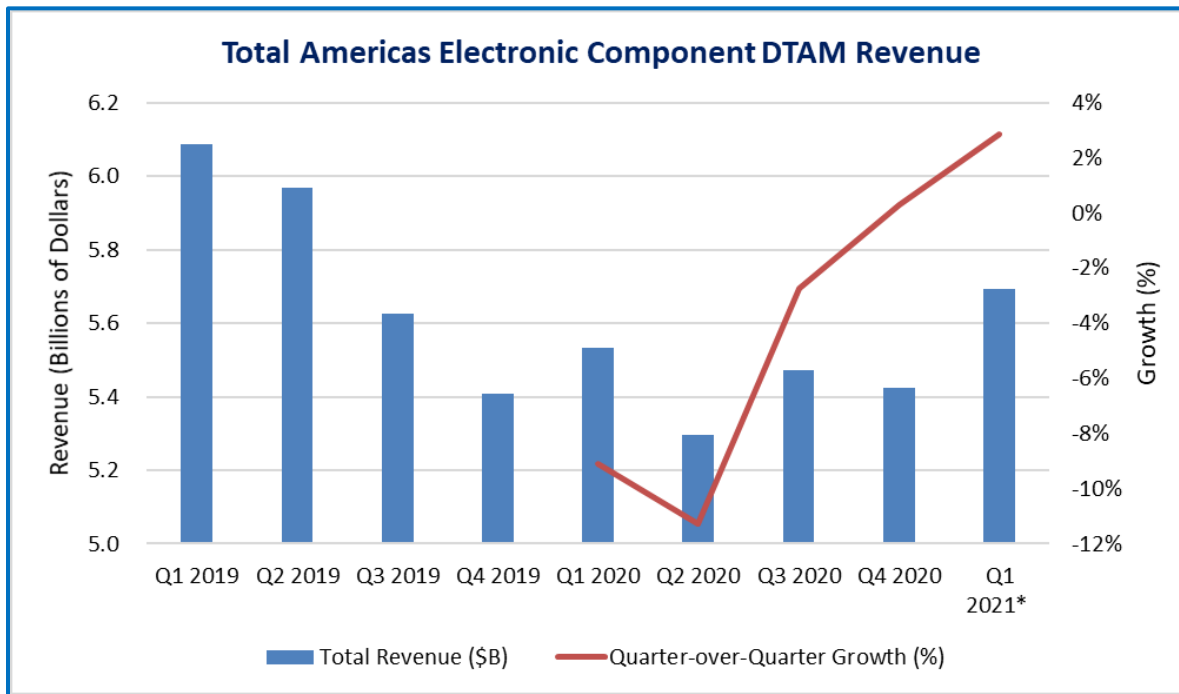


- Not a cloud in the sky!
- Positive growth expectations range between 77% and 88% of survey respondents
- Semiconductors & Capacitors see the strongest expectations in growth above 5% followed by Connectors & Electro-Mechanical
- Percent of respondents expecting overall market growth = 79%

Source: ECIA Electronic Component Sales Trends Survey

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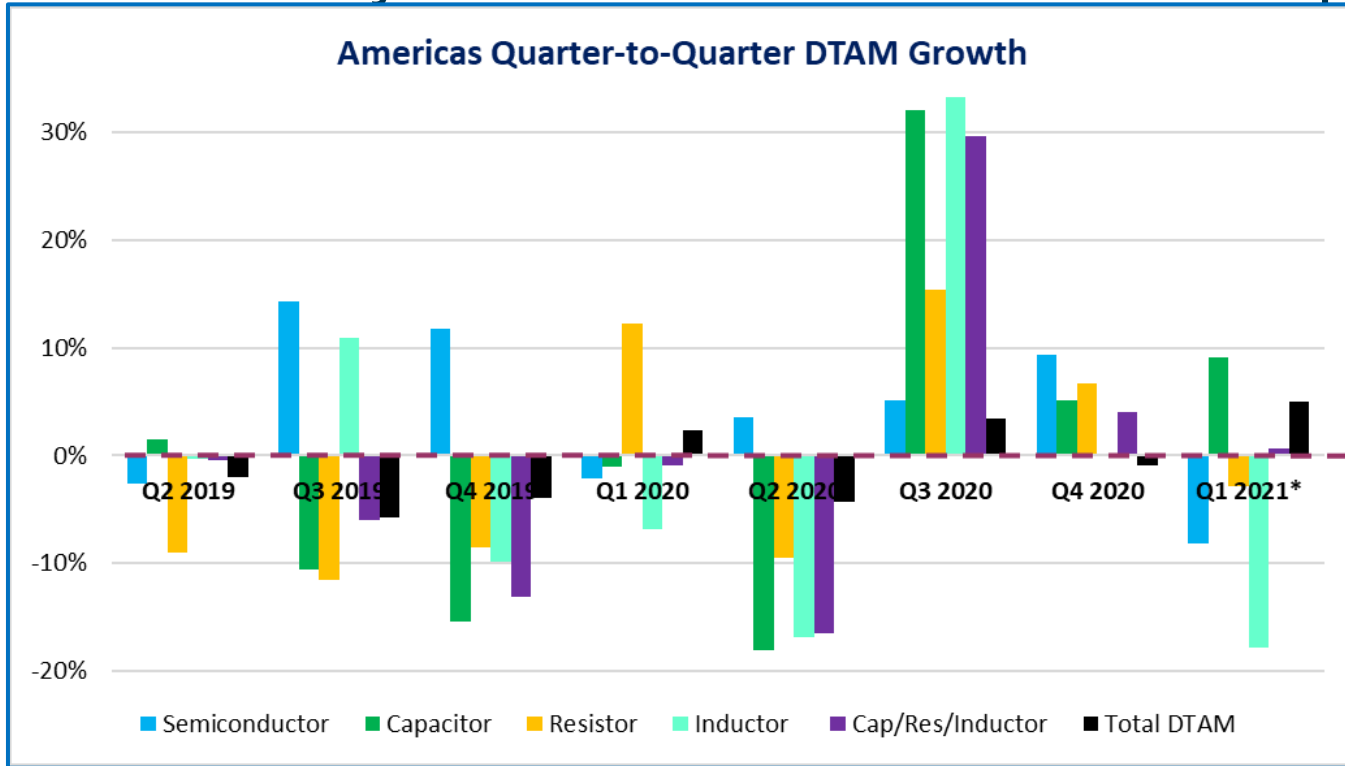
Quarterly DTAM Estimates



Source: ECIA

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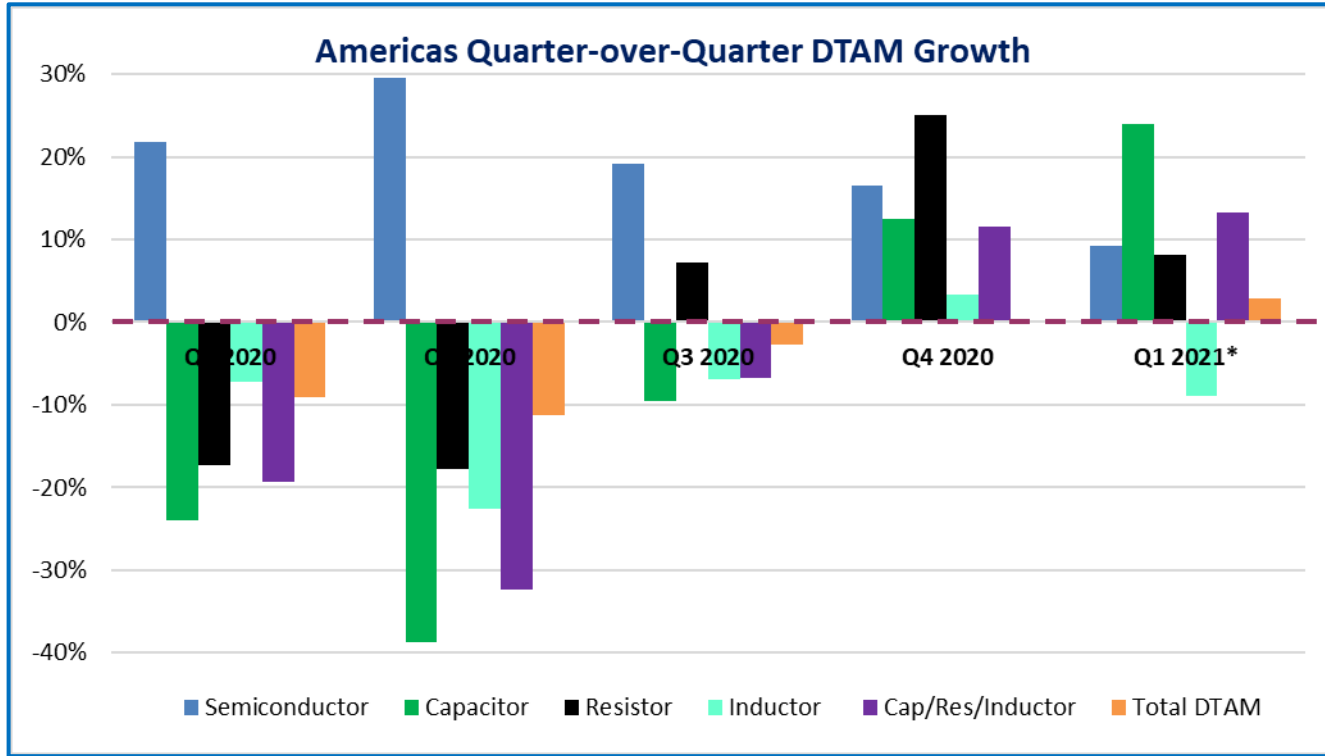
Americas Quarterly DTAM and TAM Growth Comparison



Source: ECIA / WSTS

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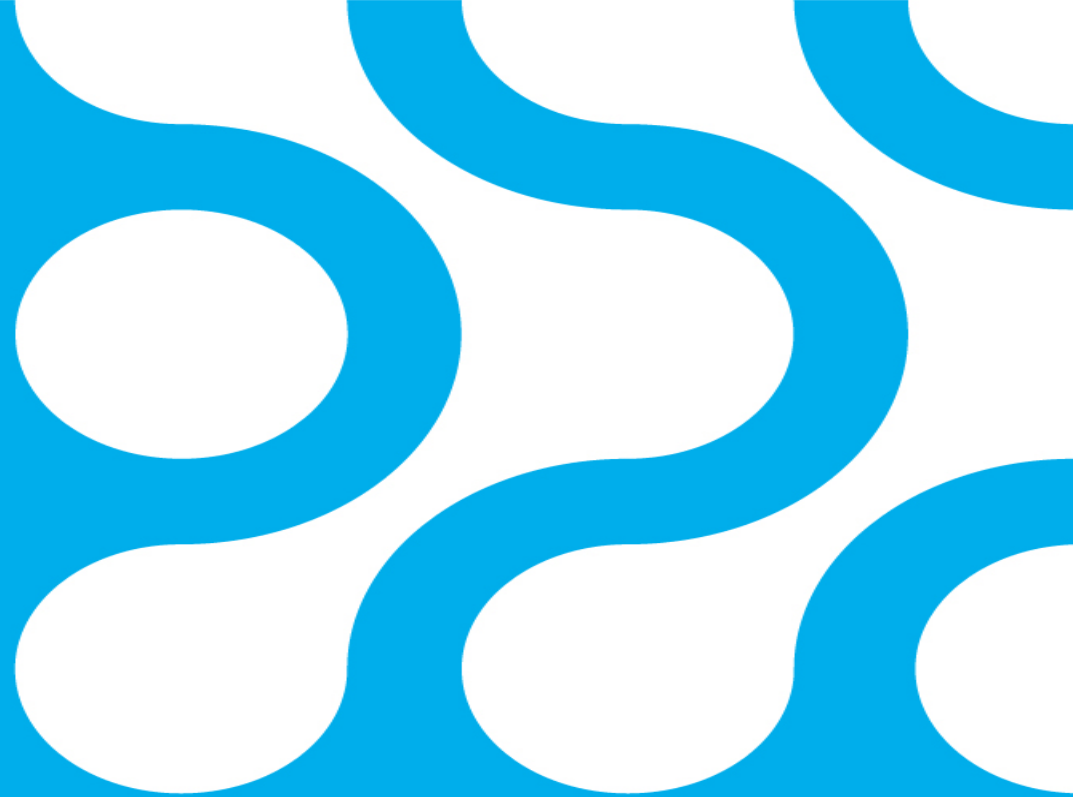
Americas Quarterly DTAM and TAM Growth Comparison



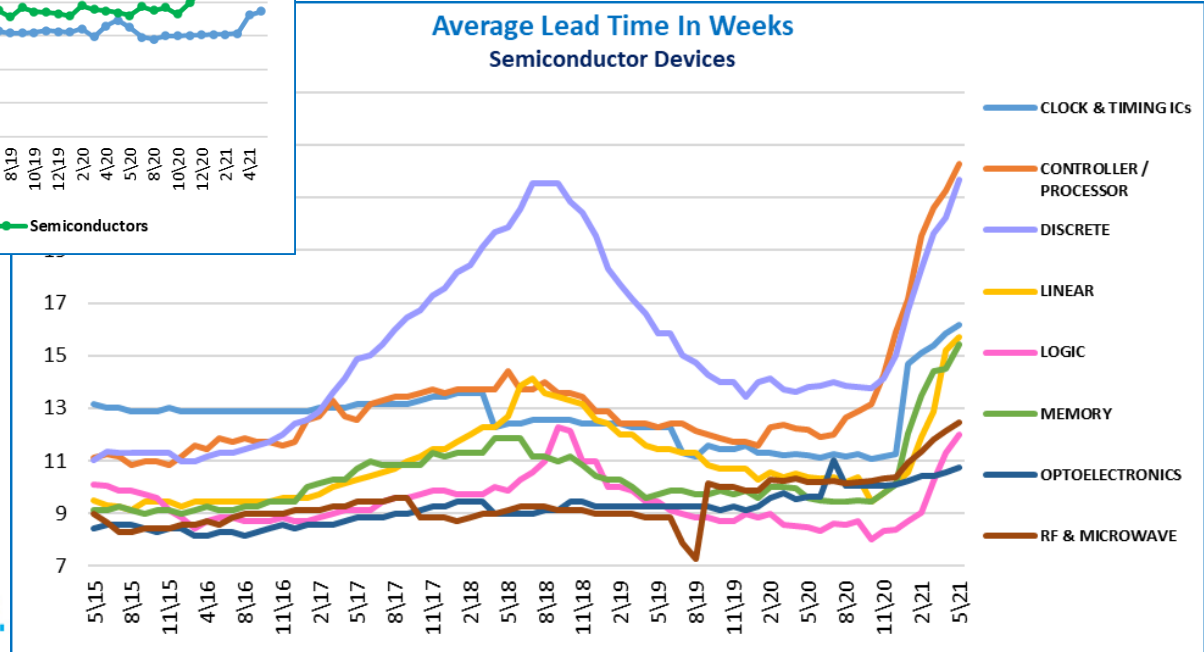
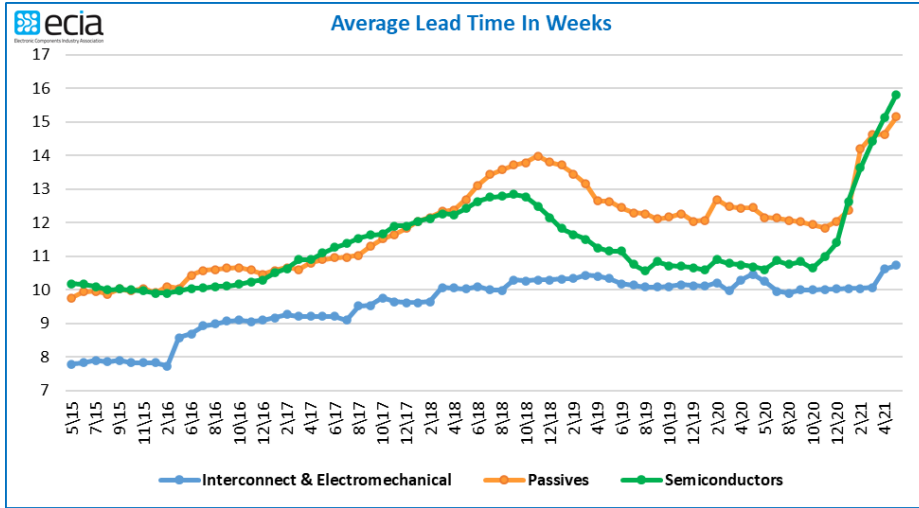
Source: ECIA / WSTS

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What About the Electronics & Components Supply Chain?

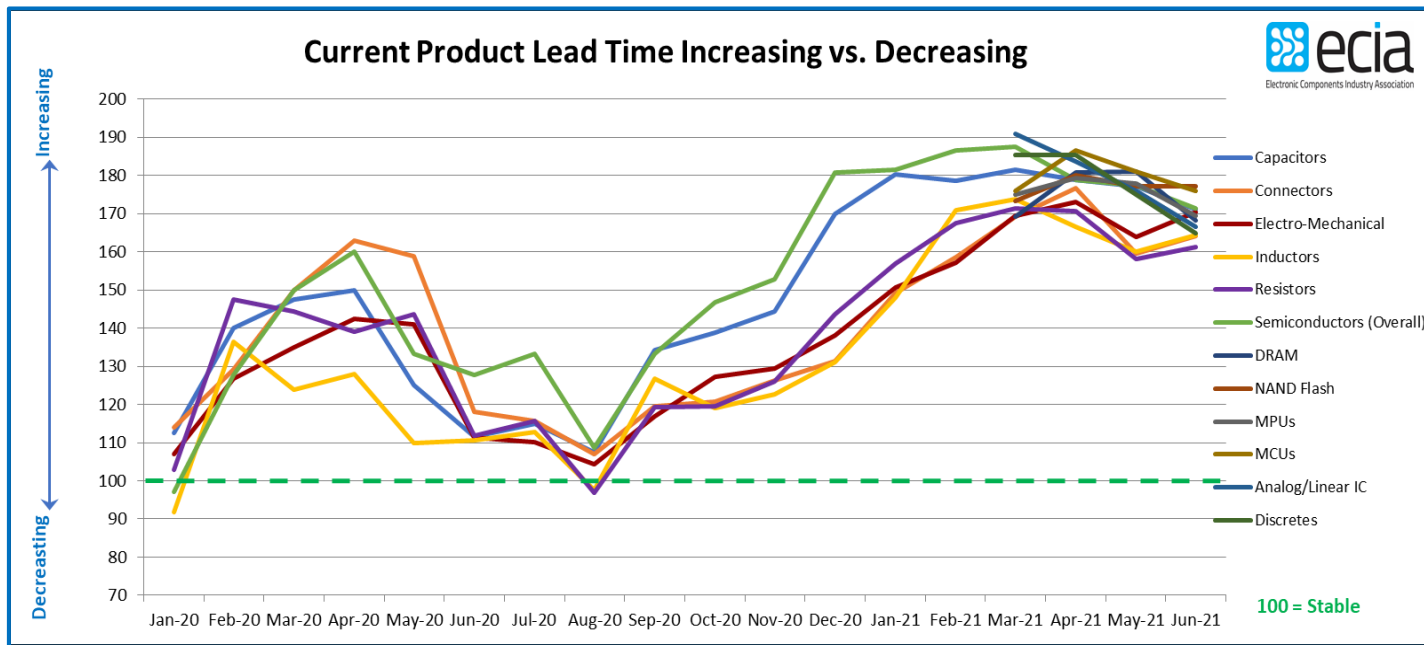


North America Lead Time Trends – Record Setting



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Lead Time Status – ECIA Member Monthly Survey



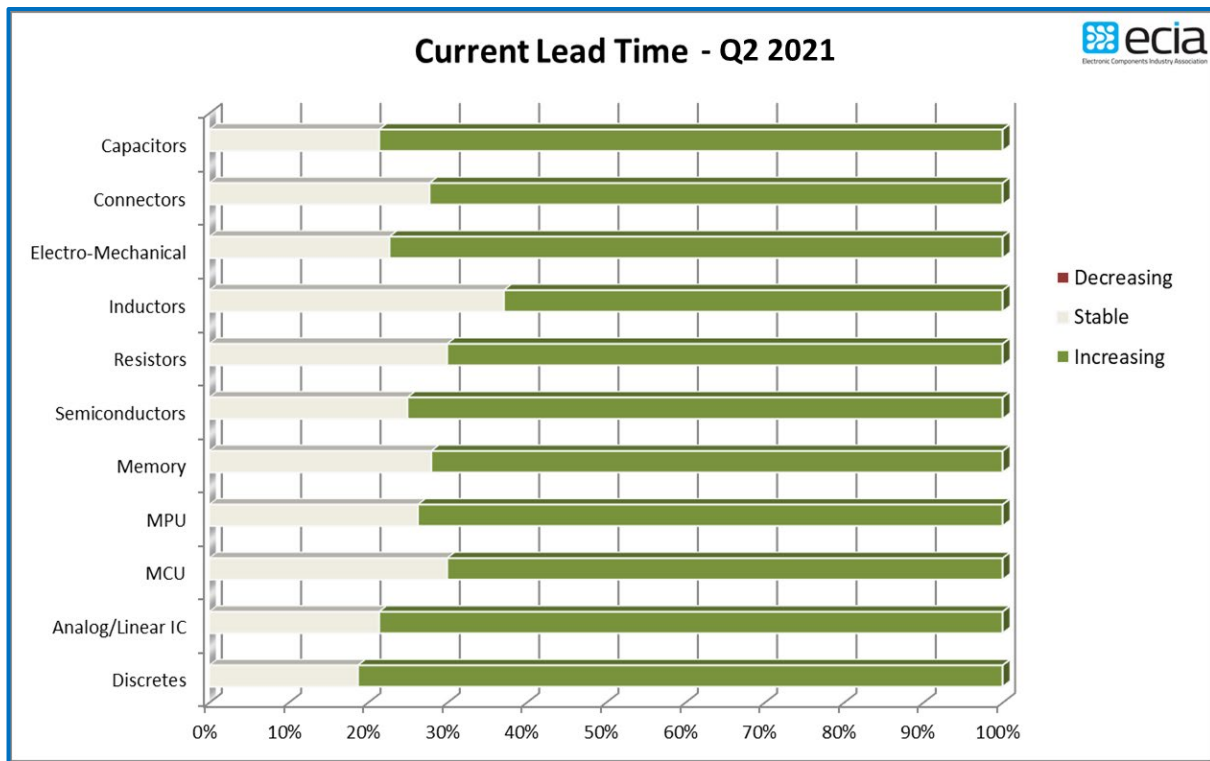
Minor Index Decline

- Like temperature falling from 120° to 115° - still blazing hot!
- On average 69% see increasing / No reported decreases
- 78% of Mfr Reps report increasing

Index Calculation Formula = (%Decreasing * 0) + (%Stable * 100) + (%Increasing * 200)

Source: ECIA

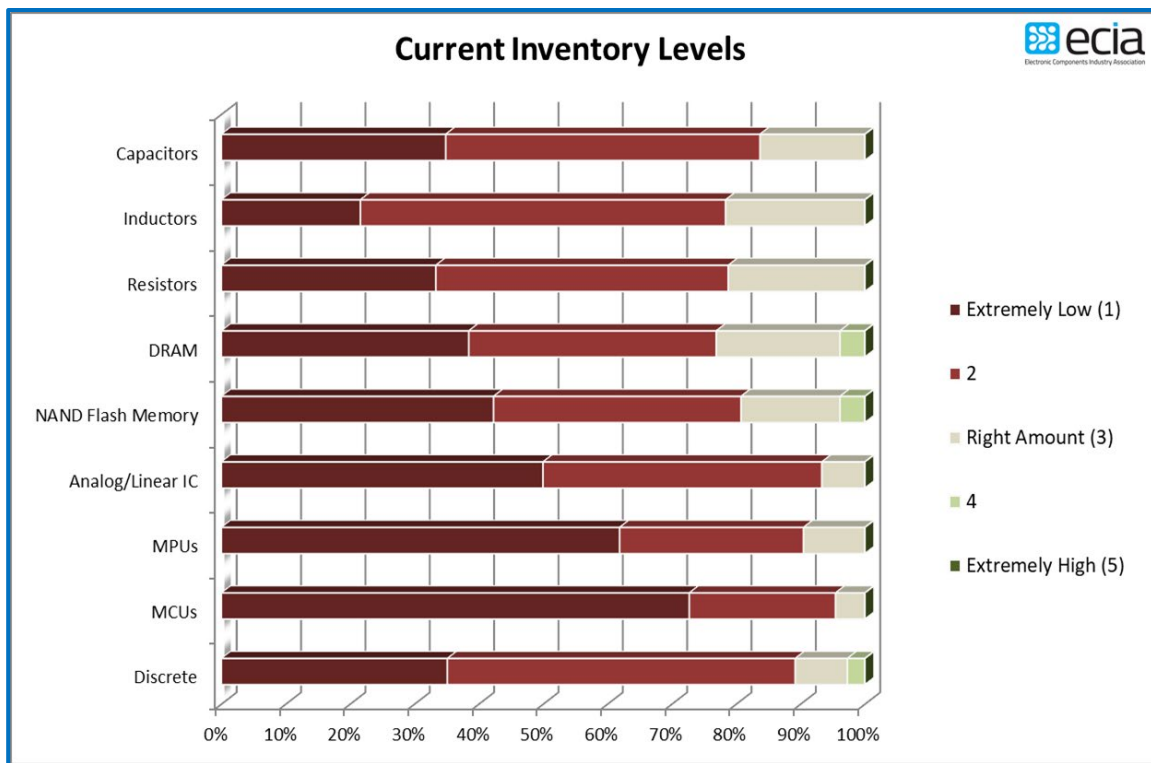
Lead Time Status – ECIA Member Quarterly Survey



Source: ECIA

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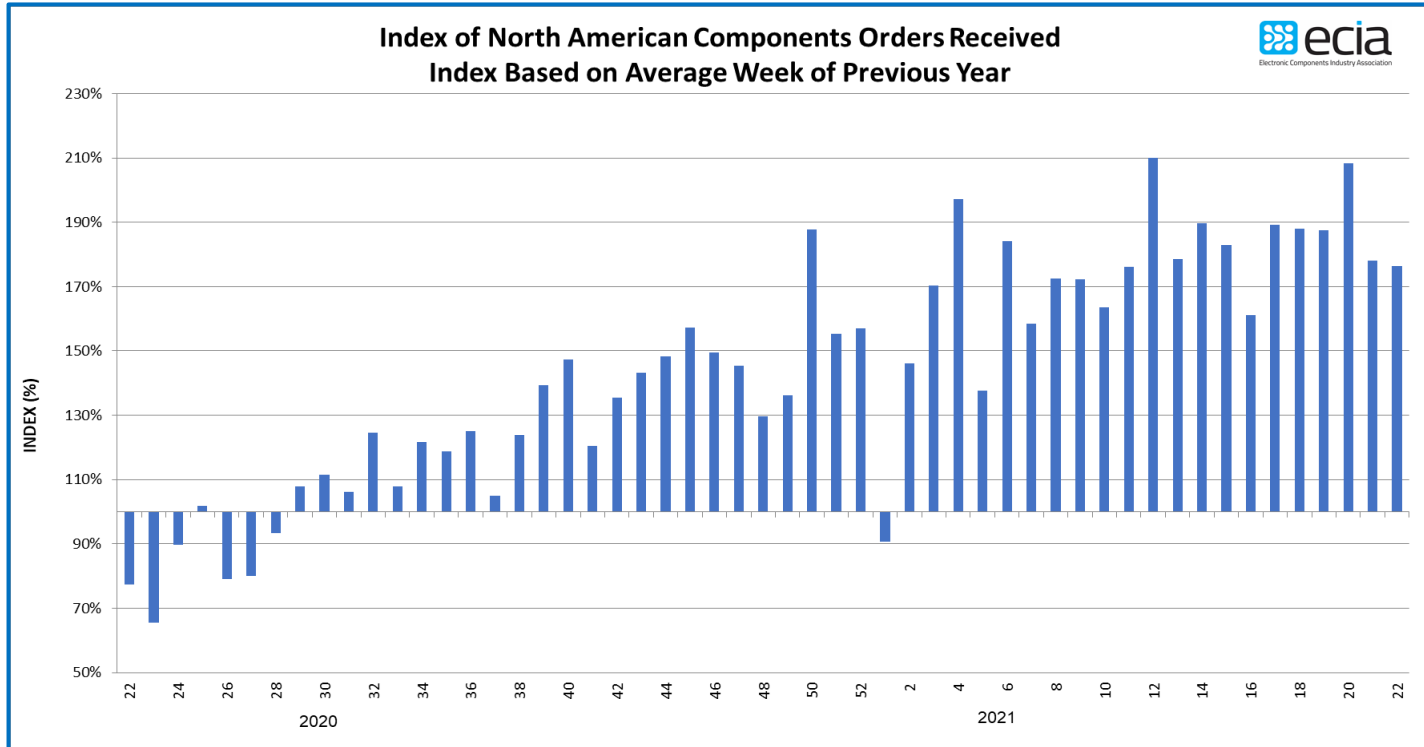
Critical Inventory Levels in Every Category



Source: ECIA

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IP&E – Interconnect, Passive, Electro-Mechanical Orders



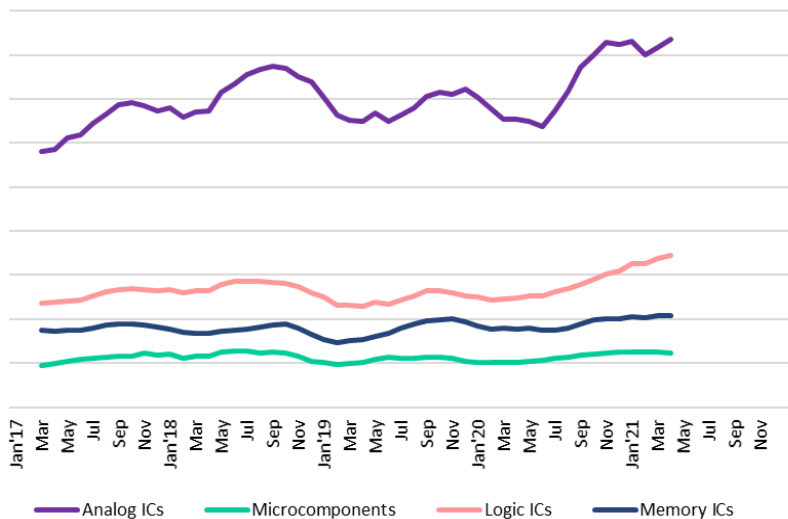
Source: ECIA

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Worldwide Semiconductor Unit Shipments

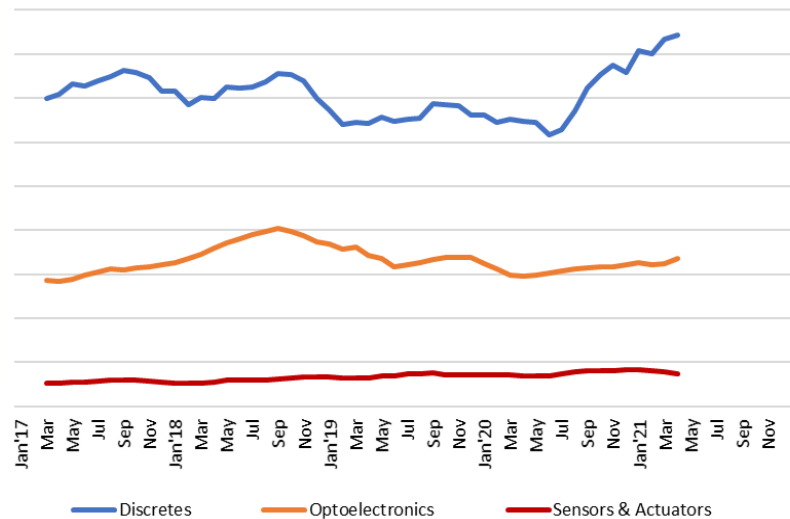
WSTS

Global IC Unit Shipments - 3 Month Average



WSTS

Global Non-IC Unit Shipments - 3 Month Average



Source: WSTS

Increase From:

- Discretes
- Analog ICs
- Logic ICs

Previous Peak

10.6%
7.8%
20.3%

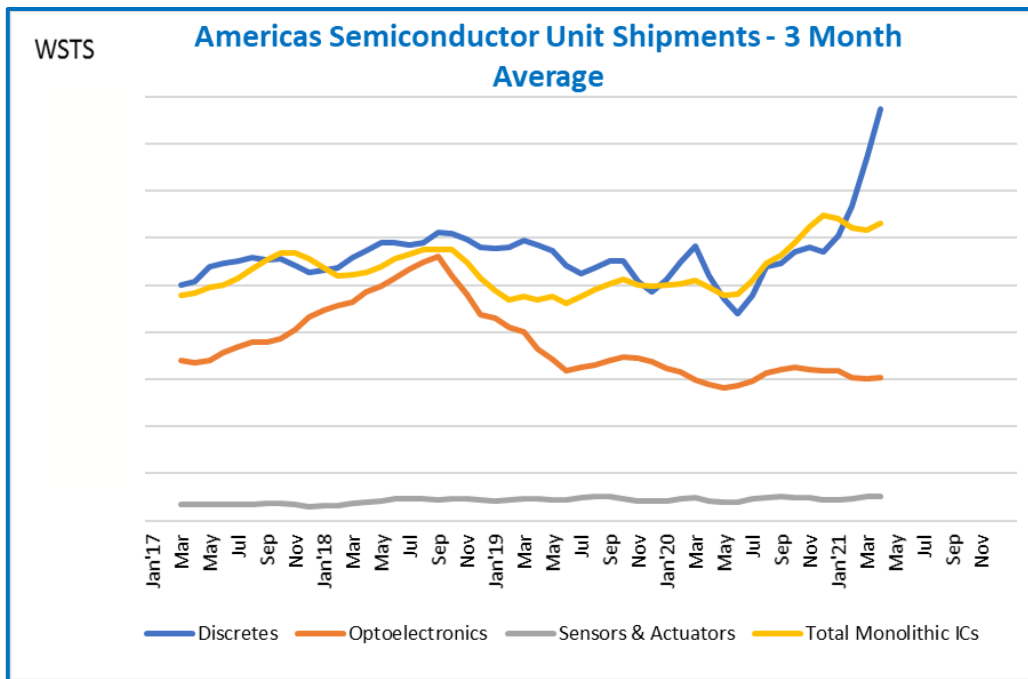
Recovery Start

36.8%
31.0%
40.8%

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Americas Semiconductor Unit Shipments



Source: WSTS

Increase From:

- Discretes
- ICs

Previous Peak

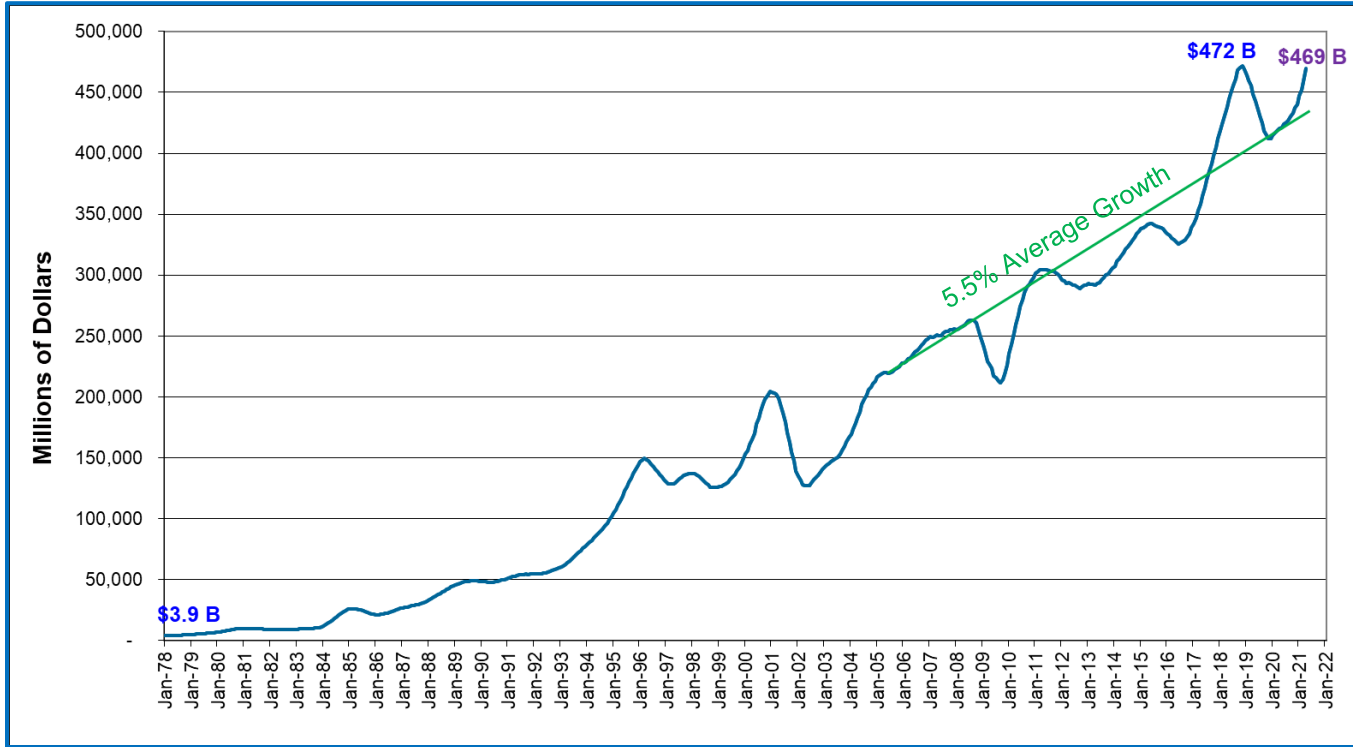
42.9%
9.9%

Recovery Start (10 months ago)

98.5%
32.1%

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Worldwide Annualized Semiconductor Revenue



Source: WSTS

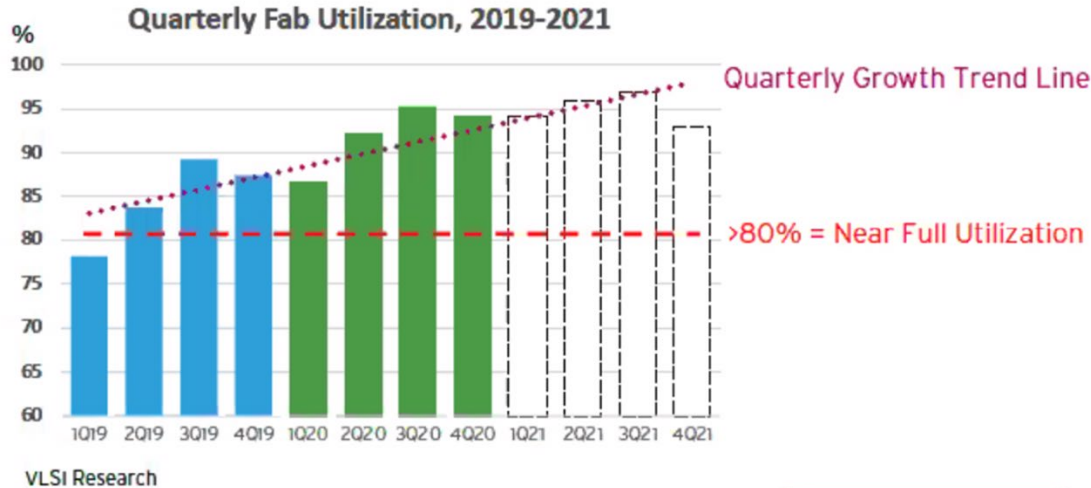
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Growth Swings

- Jun '16 to Nov '18
 - 29 Months
 - +\$146B; +45%
- Nov '18 to Nov '19
 - 12 Months
 - -\$60B; -13%
- Nov '19 to Apr '21
 - 17 Months
 - +\$57B; +14%
- ^Volatility = ^Risk
- ^Risk = ^Required ROI

The Challenge of Balancing CAPEX

Surge vs Steady State



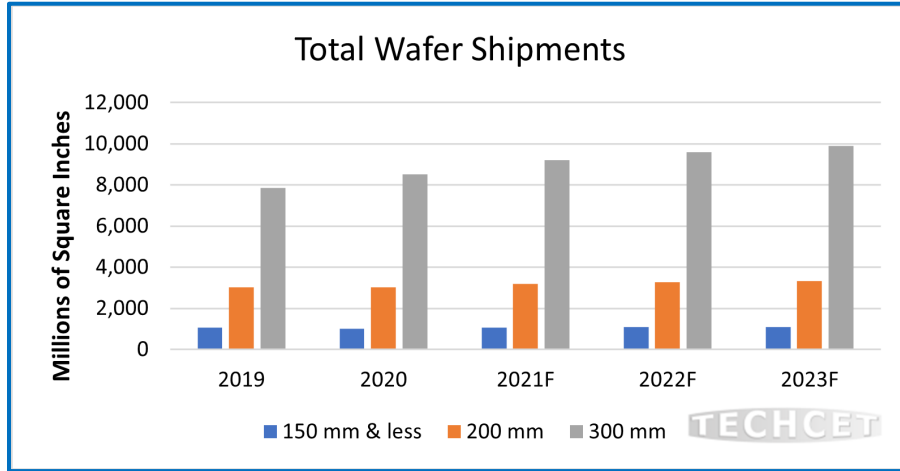
63 companies own a 200mm fab (down from 76 in 2007)

28 companies own a 300mm fab

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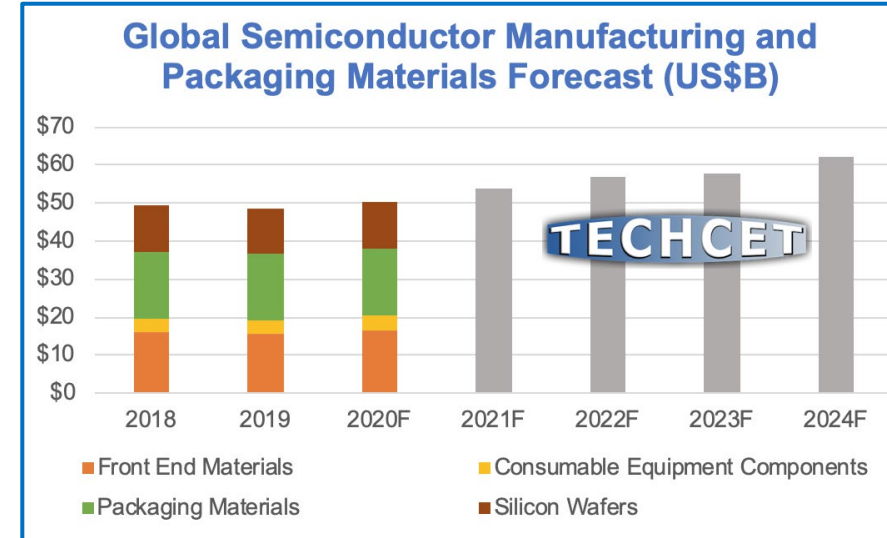
- Strong addition of fab capacity in 2020 still outstripped by surge in demanding starting in H2 2020
- Added CAPEX investments by major fabs announced
 - But, building new fabs typically takes 18 to 36 months
- Will steady state demand settle back and eventually leave industry with excess capacity?
- This is the continual semiconductor industry challenge and a driver of the cycle

Wafer Supply Challenges



Constrained wafer supply through 2024 likely

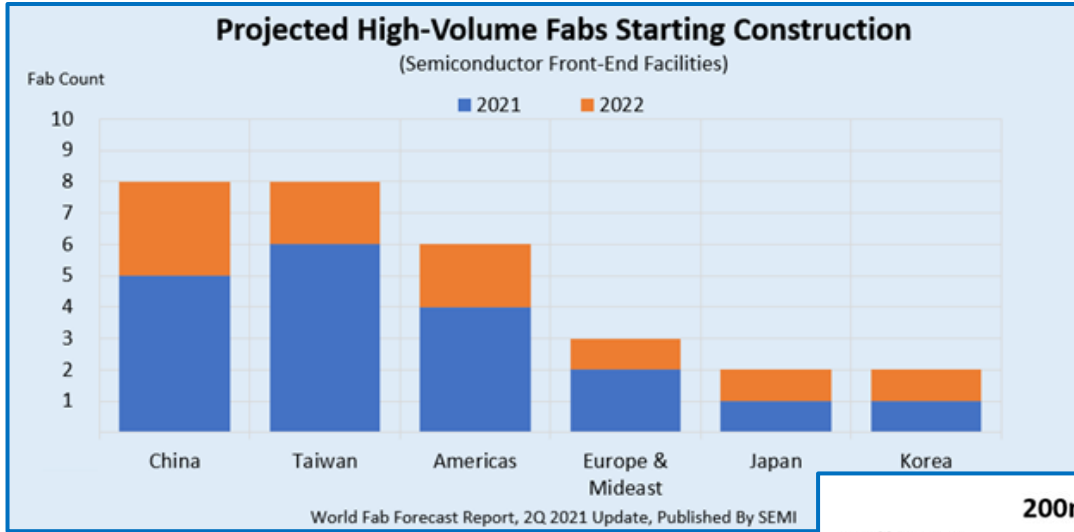
- 300 mm prime wafer demand will be at >99% of utilization production capacity in 2022
- 300 mm wafer production capacity will need to expand by 6% or more over the next two years to avoid a shortage
- No new plants announced, If investment starts today new capacity will not happen until 2024 at the earliest.
- New greenfield investments will require LTAs based on higher pricing



Semi Materials Market to Grow ~7% in 2021

- Localism is an ongoing global trend, with China, the European Union, South Korea, Taiwan, and the United States all investing in electronic materials capacities
- Critical materials for the fabrication of advanced logic and memory chips such as cobalt and lanthanum have been in short supply

Meeting the Wafer Supply Challenges

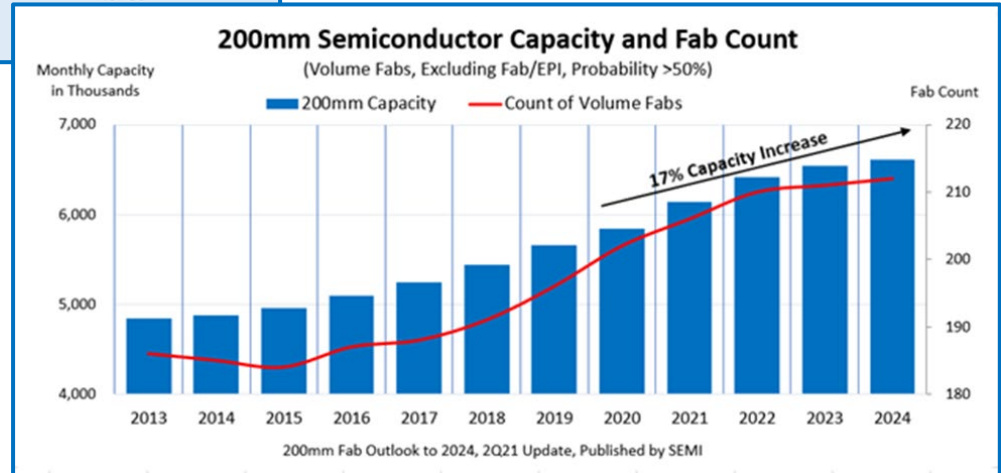


Plans for Record Setting 200 mm Wafers

- Semiconductor manufacturers worldwide are on track to boost 200mm fab capacity by 950,000 wafers, or 17%, from 2020 through 2024 to reach a record high of 6.6 million wafers per month
- Investments projected to remain above \$3 billion in 2022. Foundry accounting for more than half of the spending, followed by discrete/power at 21%, analog at 15%, and MEMS and sensors at 7%.

Fab Construction Plans

- 19 new high-volume fabs by the end of 2021 and break ground on another 10 in 2022. 300 mm wafer production capacity will need to expand by 6% or more over the next two years to avoid a shortage
- Equipment spending expected to surpass \$140 billion over the next few years



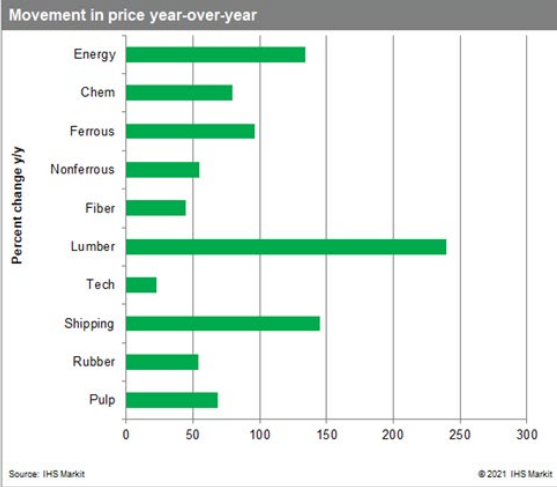
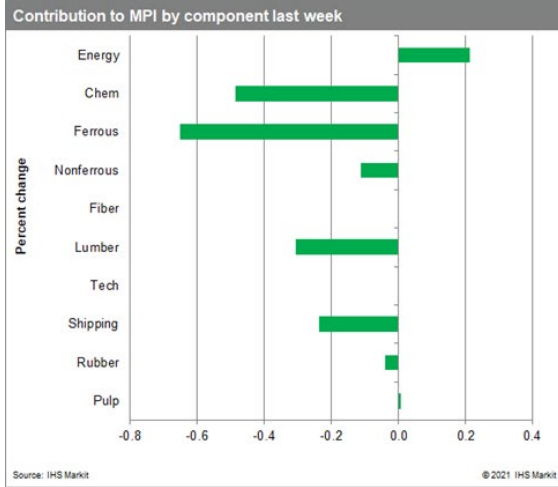
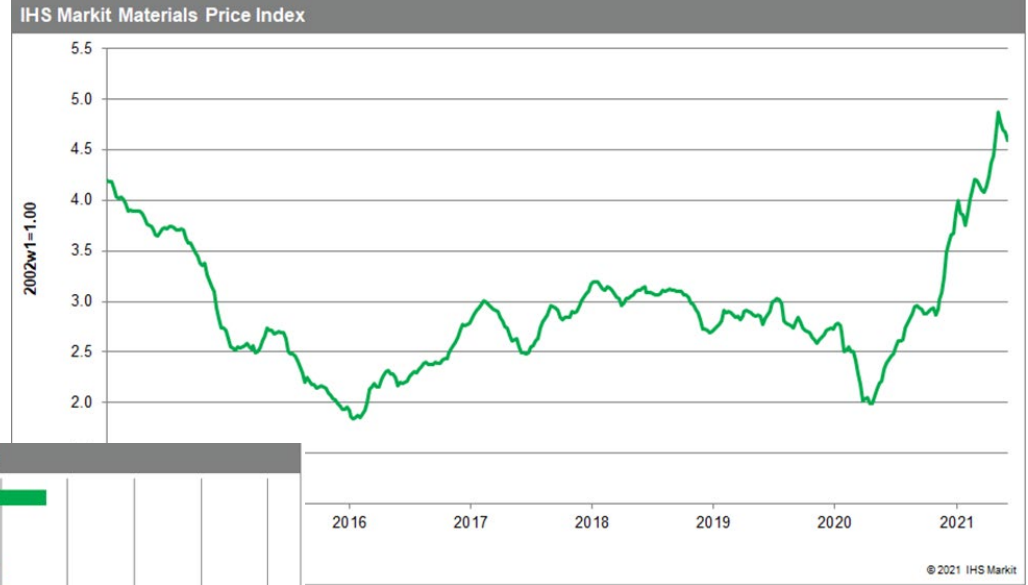
Materials Supply Issues

- US wet chemical supply capacity and demand volumes are running so closely that any plant shut-down or appreciative increase in demand can cause a shortage
- Several semiconductor process materials in the petroleum supply-chain are running short because of lower overall oil refinery further impacted by the Texas snowstorm
 - Materials including acetone, PGMEA, NMP, and IPA, a few of several solvents, rely on the petrochemical refinery supply-chain
 - Specialty polymers used to make photoresist, and CMP pads are also part of this chain, although used in lower volumes than solvents
 - Plastics production, required by high purity chemical providers for packaging and wet processing equipment, is experiencing raw material price increases due to availability issues
- Most advanced IC fabs for logic and memory chips require purity levels in materials so extreme that trace contaminants below parts-per-billion can cause millions in dollars of commercial yield losses

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Raw Material Pricing Trends – IHS Markit Index

- Index declined in seven of the past 13 weeks
- Prices dropped for eight out of ten subcomponents
- Prices 94% above last year's levels
- Prices up 18% since the beginning of 2021



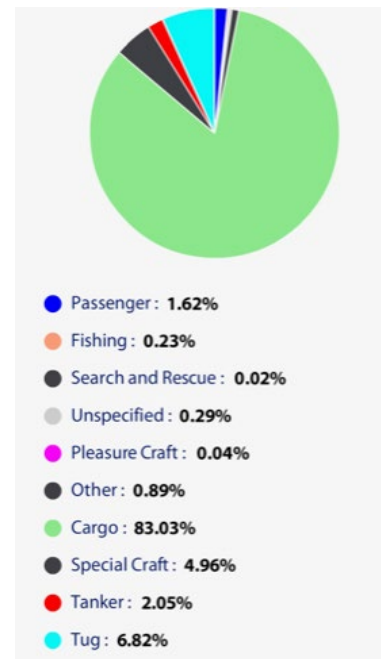
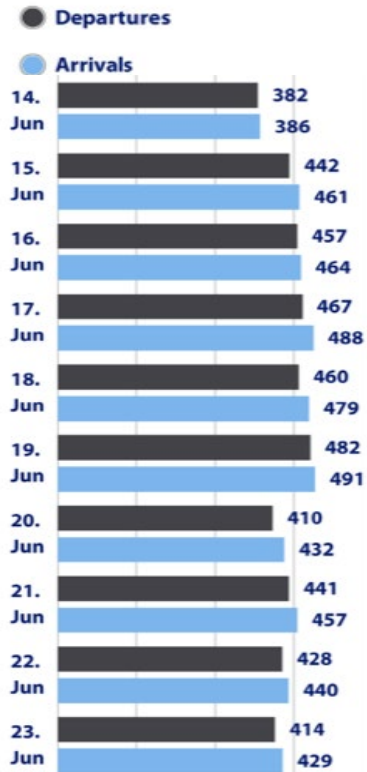
Supply Chain Challenges Abound

One example – Shenzhen Port a Major Bottleneck



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Select Port Calls Type:

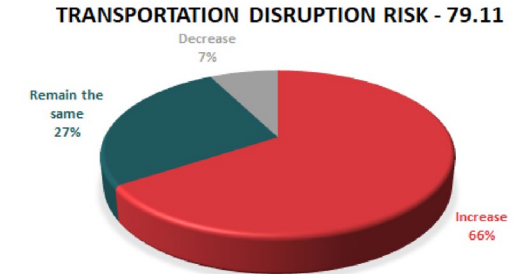
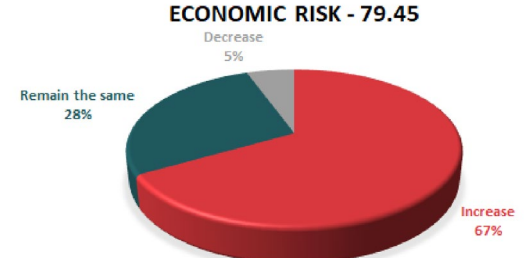


Lehigh University Supply Chain Risk Index – Q2 2021

Risk Type	Current Risk Index	Last Quarter Risk Index	Trend
Economic Risk	79.45	72.66	↑ +6.79
Transportation Disruption Risk	79.11	77.34	↑ +1.77
Cybersecurity and Data Risk	78.42	71.88	↑ +6.54
Supplier Risk	74.66	71.88	↑ +2.78
Government Intervention Risk	70.55	71.88	↓
Customer Risk	67.47	74.22	↓
Technological or Competitive Risk	60.27	55.47	↑
Environmental Risk	54.79	53.91	↑
Operational Risk	53.77	61.72	↓
Quality Risk	52.74	55.47	↓
Average Risk Index	67.12	66.64	↑

Risk Type	Current Risk Index	1st Quarter 2021	4th Quarter 2020	3rd Quarter 2020
Economic Risk	79.45	72.66	78.26	79.89
Transportation Disruption Risk	79.11	77.34	69.60	77.27
Cybersecurity and Data Risk	78.42	71.88	72.13	69.89
Supplier Risk	74.66	71.88	74.38	75.00
Government Intervention Risk	70.55	71.88	70.43	70.11
Customer Risk	67.47	74.22	70.66	81.81

- 1st Rank
- 2nd Rank
- 3rd Rank
- 4th Rank



Source: Lehigh Univ, CSCMP

Connected and autonomous supply chain ecosystems 2025

Digital – Physical Integration

2020- The Gartner Supply Chain Top 25

Rank	Company	Rank	Company	Rank	Company
1	Cisco Systems	11	Walmart	21	British American Tobacco
2	Colgate-Palmolive	12	HP Inc.	22	3M
3	Johnson & Johnson	13	Coca Cola	23	Reckitt Benckiser
4	Schneider Electric	14	Diageo	24	Biogen
5	Nestle	15	Lenovo	25	Kimberly-Clark
6	PepsiCo	16	Nike		
7	Alibaba	17	AbbVie		
8	Intel	18	BMW		
9	Inditex	19	Starbucks		
10	L'Oreal	20	H&M		

Digital Champions

- Aggressively invest in digital supply chain technologies - achieve operational savings of 6.8% annually in supply chain costs
- The same companies are posting 7.7% annual revenue increases
- 28% say they now have more effective risk management due to their advanced supply chain capabilities

Study by PwC



Will “Bifurcation” Avoid Balkanization?



- Asymmetric Competition: A Strategy for China & Technology
 - Proposal produced by group formed by Eric Schmidt and Jared Cohen
 - Schmidt refers to proposal as “Bifurcation”
- “Advances policies that position the U.S. to out-compete China without inviting escalatory cycles of confrontation, retaliation, or unintended conflict”
- Functional Capabilities a core part of proposal
 - **“Supply Chains**. Building more resilient supply chains is critical to diminishing our vulnerability to Chinese control, but will require significant investment in domestic infrastructure, ally-centric production, and advances in automation.”
- **Next Generation Chips** – Defined as “Critical Technology” in “Technological Battleground”

The Push to Rebuild US Semiconductor Manufacturing

CHIPS for America Act

- Bipartisan support
- \$52 billion semiconductor investment over next 5 to 10 years
- Includes a range of federal investments to advance U.S. semiconductor manufacturing
 - \$10 billion for a new federal grant program that would incentivize new domestic semiconductor manufacturing facilities
 - Refundable investment tax credit for the purchase of new semiconductor manufacturing equipment and other facility investments
 - Significant federal investments at the Department of Defense, the National Science Foundation, and the Department of Energy to promote semiconductor research and drive chip technology breakthroughs
 - Establish a National Semiconductor Technology Center to conduct research and prototyping of advanced chips, as well as create a center on advanced semiconductor packaging.
- Congressional legislation died in the last congress

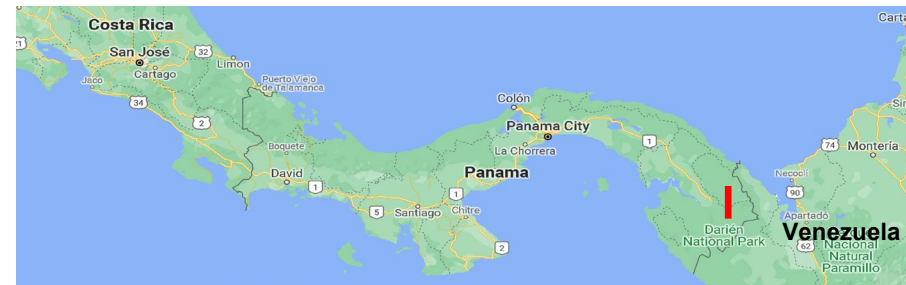
Connect. Influence. Optimize.

A Pan-American Manufacturing Ecosystem

HBR Article by Bindiya Vakil, Tom Linton, and Dale Rogers

- Build a reliable, cost-effective land-based transportation network that connects the three Americas
- Only with strong partnerships and a Pan-American transportation network will the United States be able to bring manufacturing home from Asia
- Would benefit all involved
 - Creating jobs and promoting political stability in poor countries
 - Build wealth in these nations
 - Slow migration from them to the United States.
- Leveraging Mexico's and Central America Younger Populations
- Finding Sources of Renewable Water
- Constraining China and Russia
- Modernizing the Pan-American Transportation Network

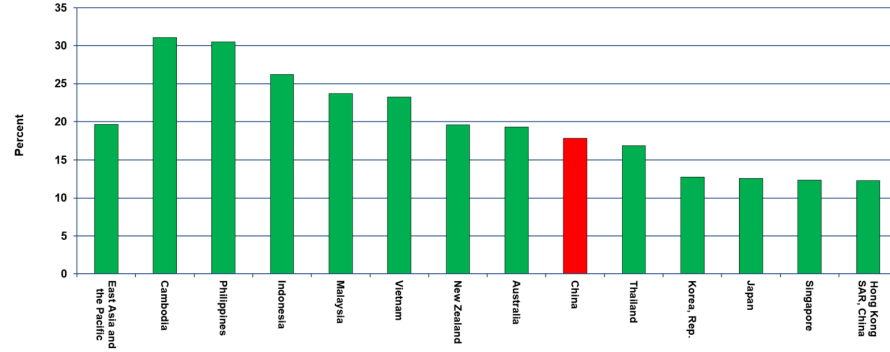
BUT – There are Challenges



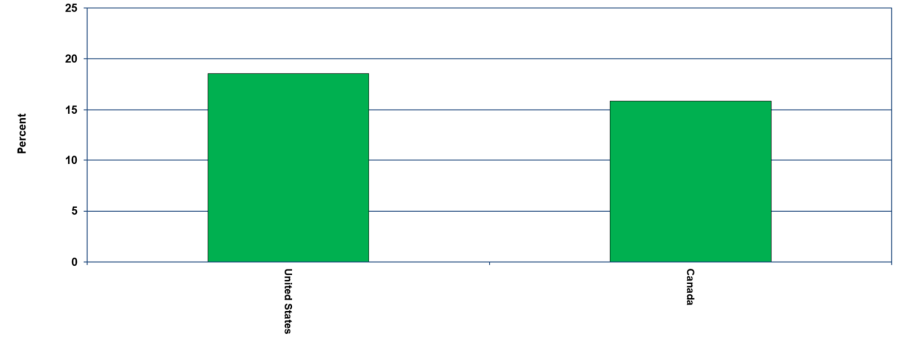
Connect. Influence. Optimize.

Demographics as a Factor in Regional Strength

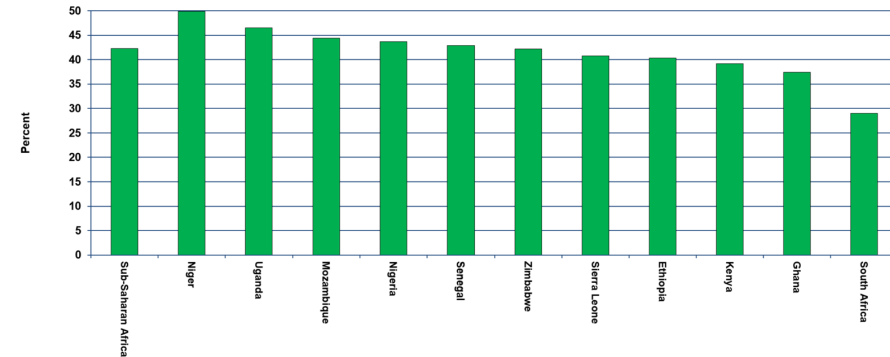
Percent of the Population in the 0 to 14 Age Cohort, Key East Asia and Pacific Countries, 2019



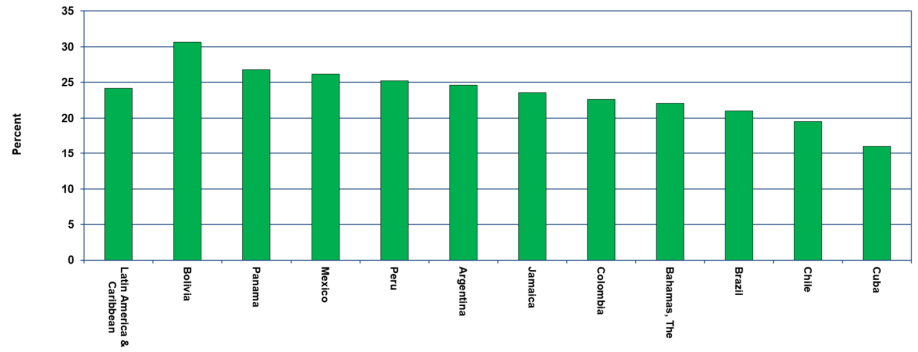
Percent of the Population in the 0 to 14 Age Cohort, North America, 2019



Percent of the Population in the 0 to 14 Age Cohort, Sub-Saharan Africa, 2019

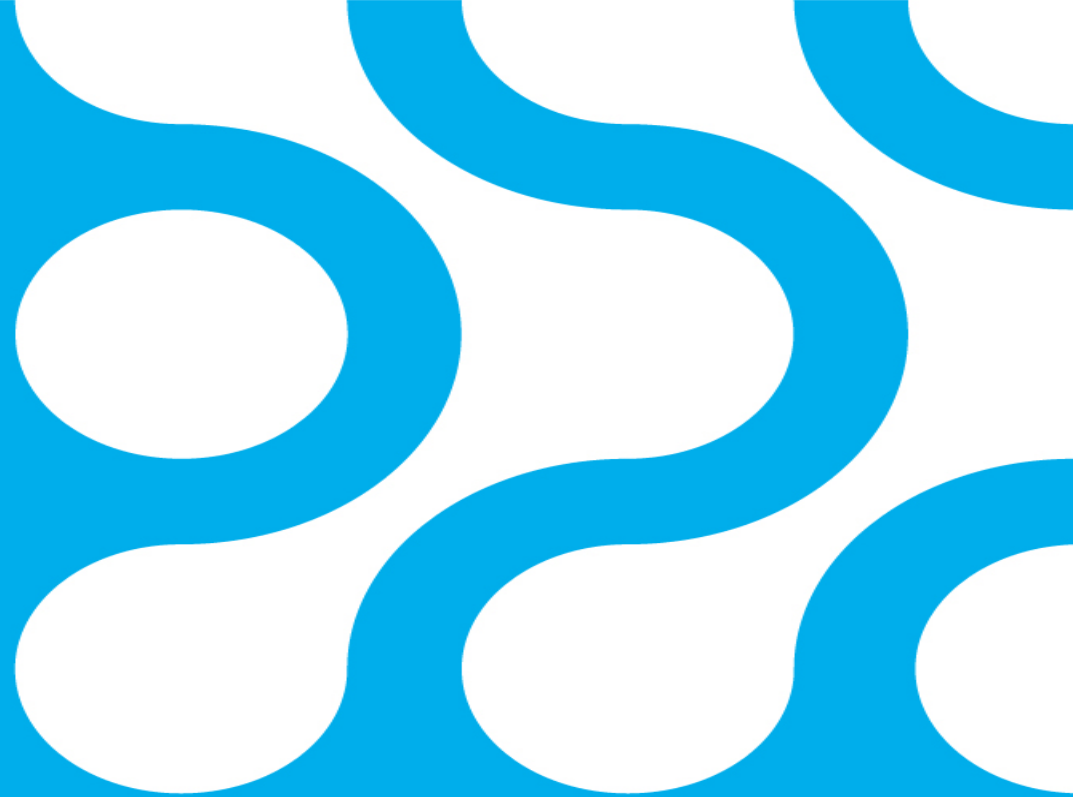


Percent of the Population in the 0 to 14 Age Cohort, Latin America and the Caribbean, 2019



Electronics & Components

Market Drivers



Growth Drivers for Semis & IP&E Components

- New technologies enable/drive new system and network architectures
- Creation of new classes and categories of devices
- Motivator to upgrade and enhance current installed base of electronics
 - Commercial AND consumer / Competition
- Pressure on next level performance from devices through networks
 - GaN & SiC devices, process geometry shrinks, sensors, processing architectures, energy harvesting...

Technology / Market Disruption Will Create an Explosion in New Design Win Opportunities

Connect. Influence. Optimize.

Thank you!

Dale Ford – Chief Analyst
dford@ecianow.org



ecia

Electronic Components Industry Association

