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# The Long Electronics Winter is Ending

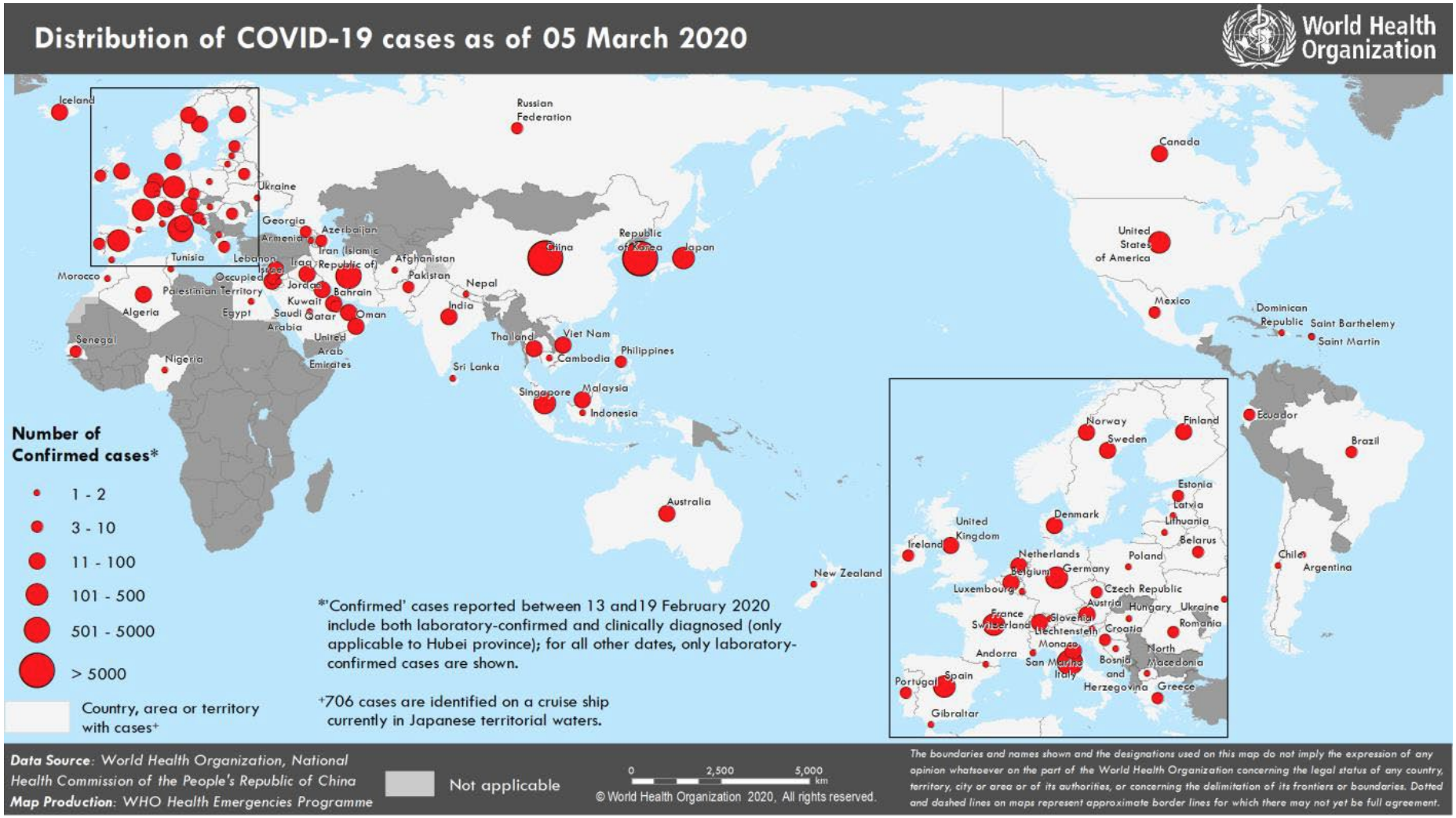
## Is Spring in the Air … or a Virus?

Dale Ford – Chief Analyst
March 6, 2020

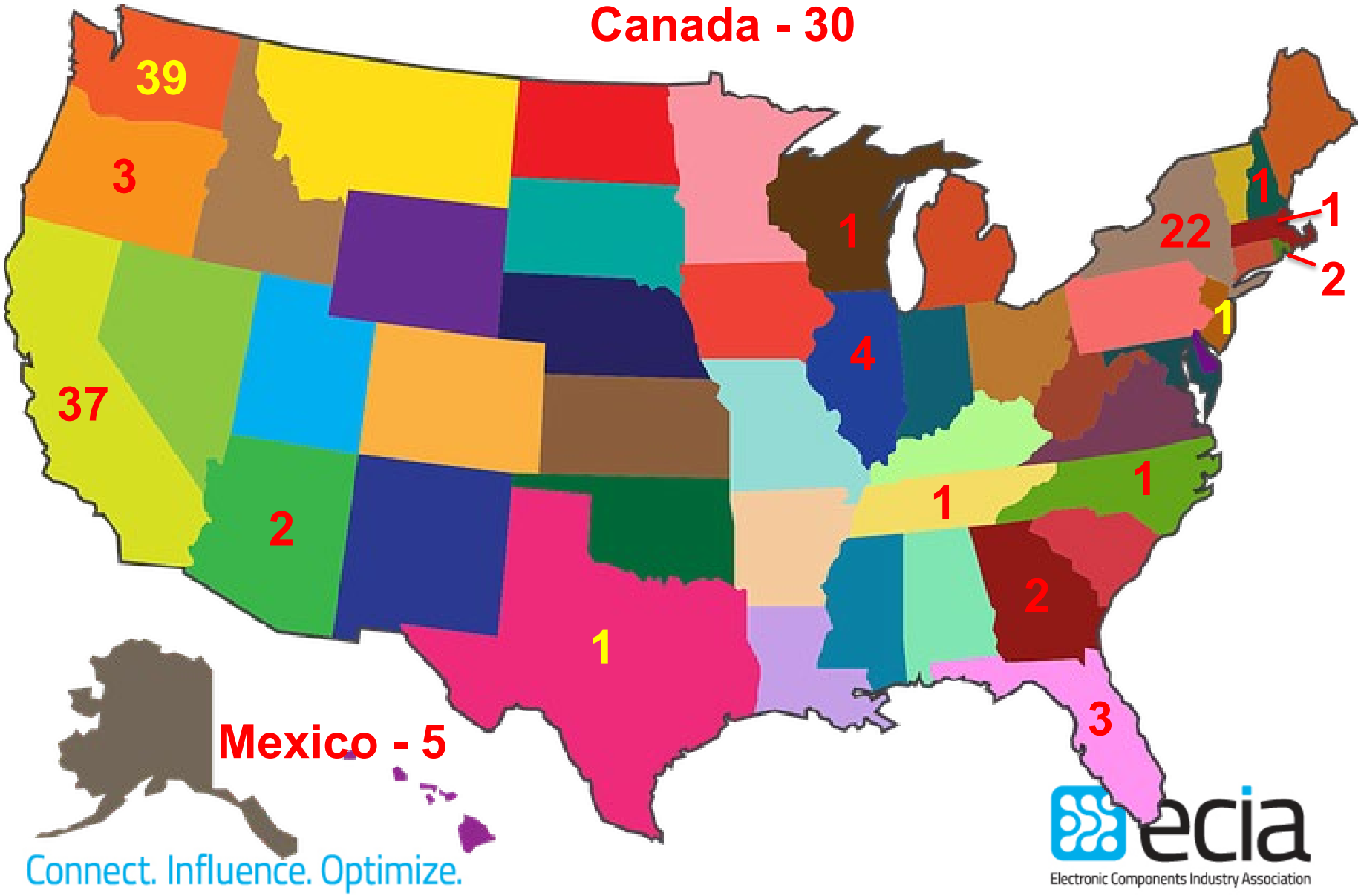
# Coronavirus

## Status – March 5

# The Future Was Bright – Then Coronavirus …



# Coronavirus Cases in North America as of March 3

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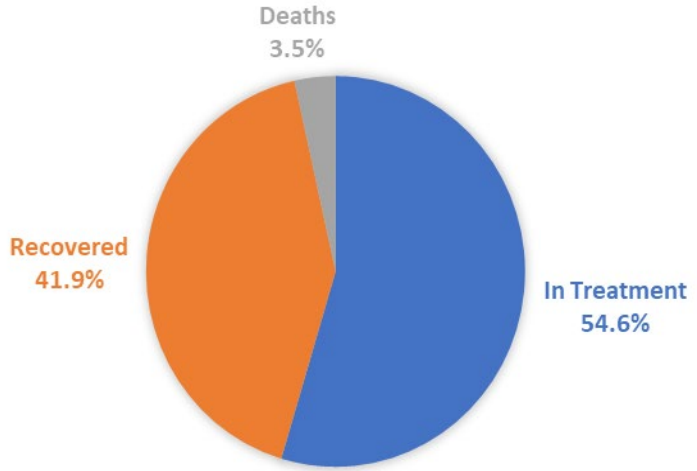
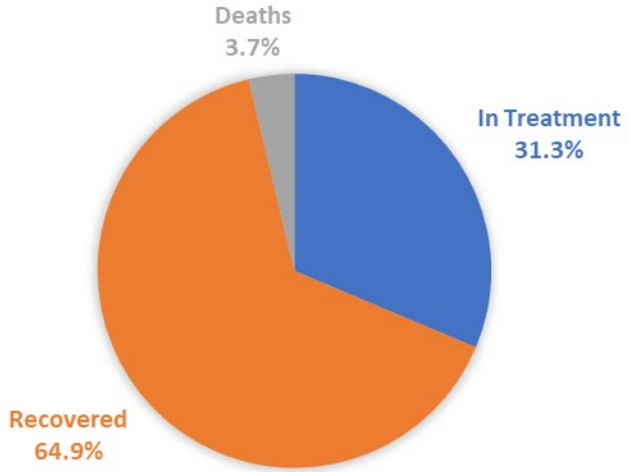
## CHINA CORONAVIRUS STATUS (2/27)



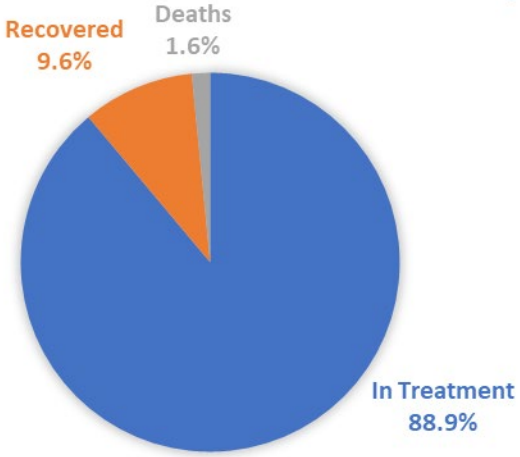

Total = 78,630

## CHINA CORONAVIRUS STATUS (3/5)



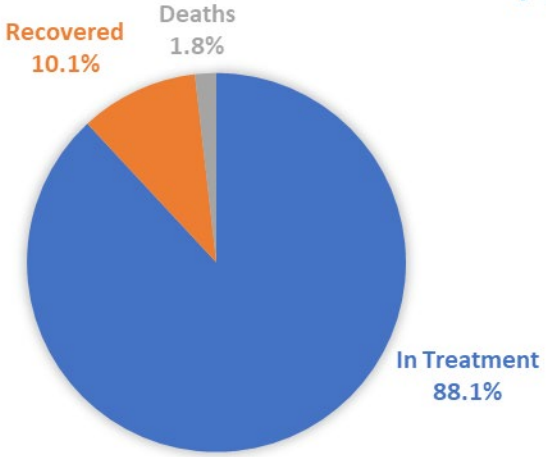

Total = 80,565

## OUTSIDE CHINA CORONAVIRUS STATUS (2/27)




Total = 3,664 (46 Countries)

## OUTSIDE CHINA CORONAVIRUS STATUS (3/5)




Total = 14,768 (84 Countries)

*Source: WHO*

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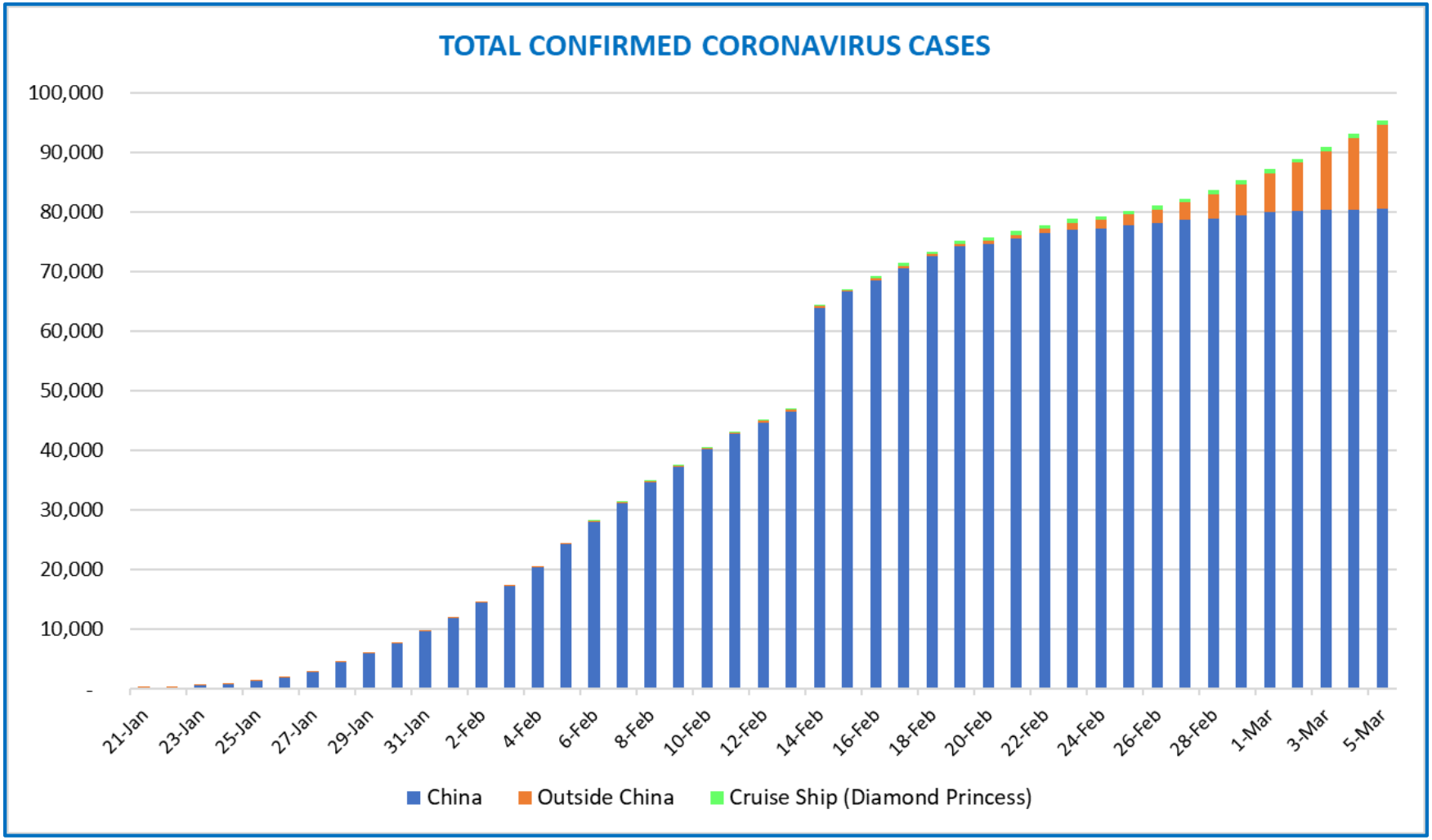


*Source: WHO*

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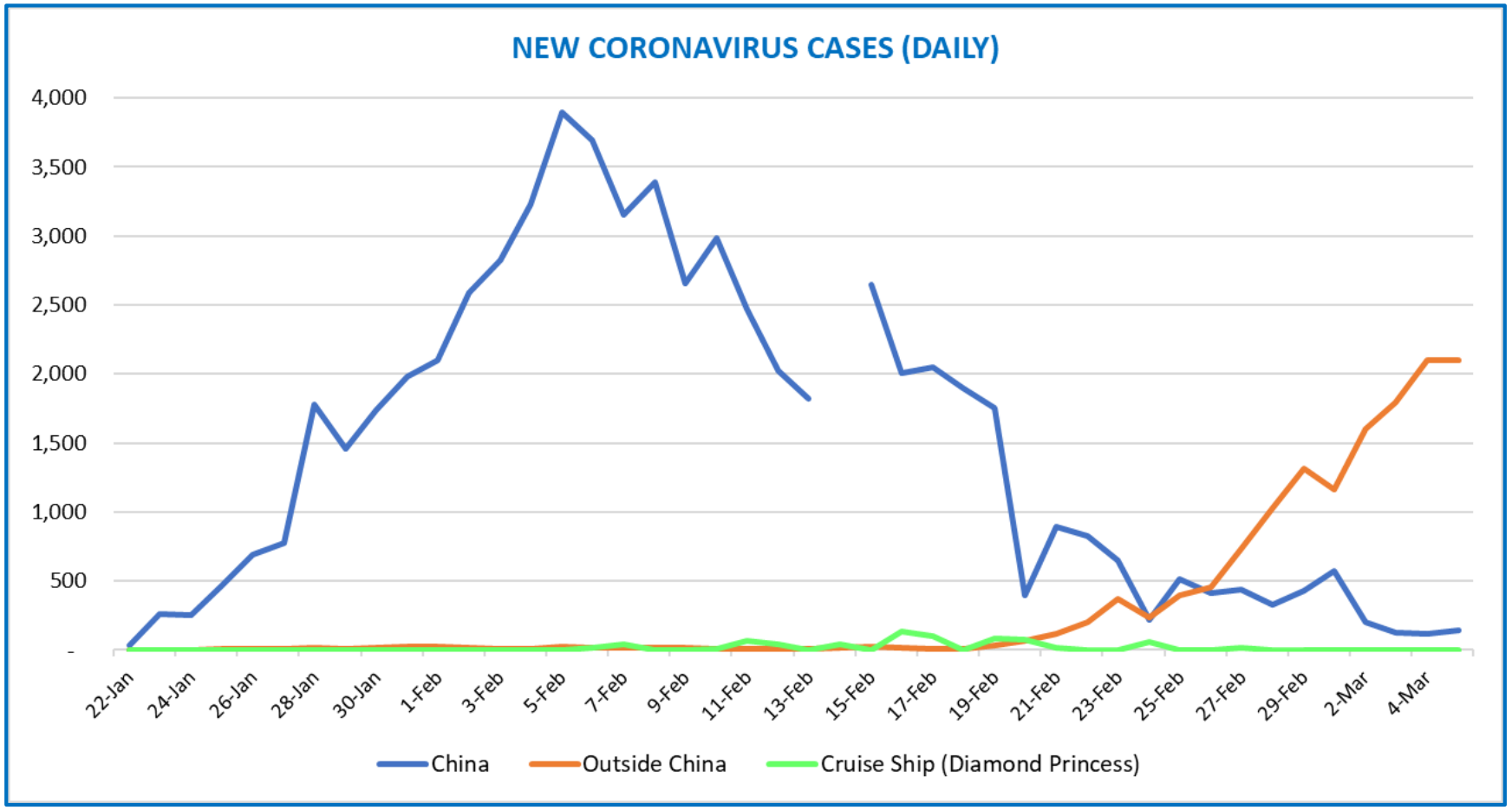
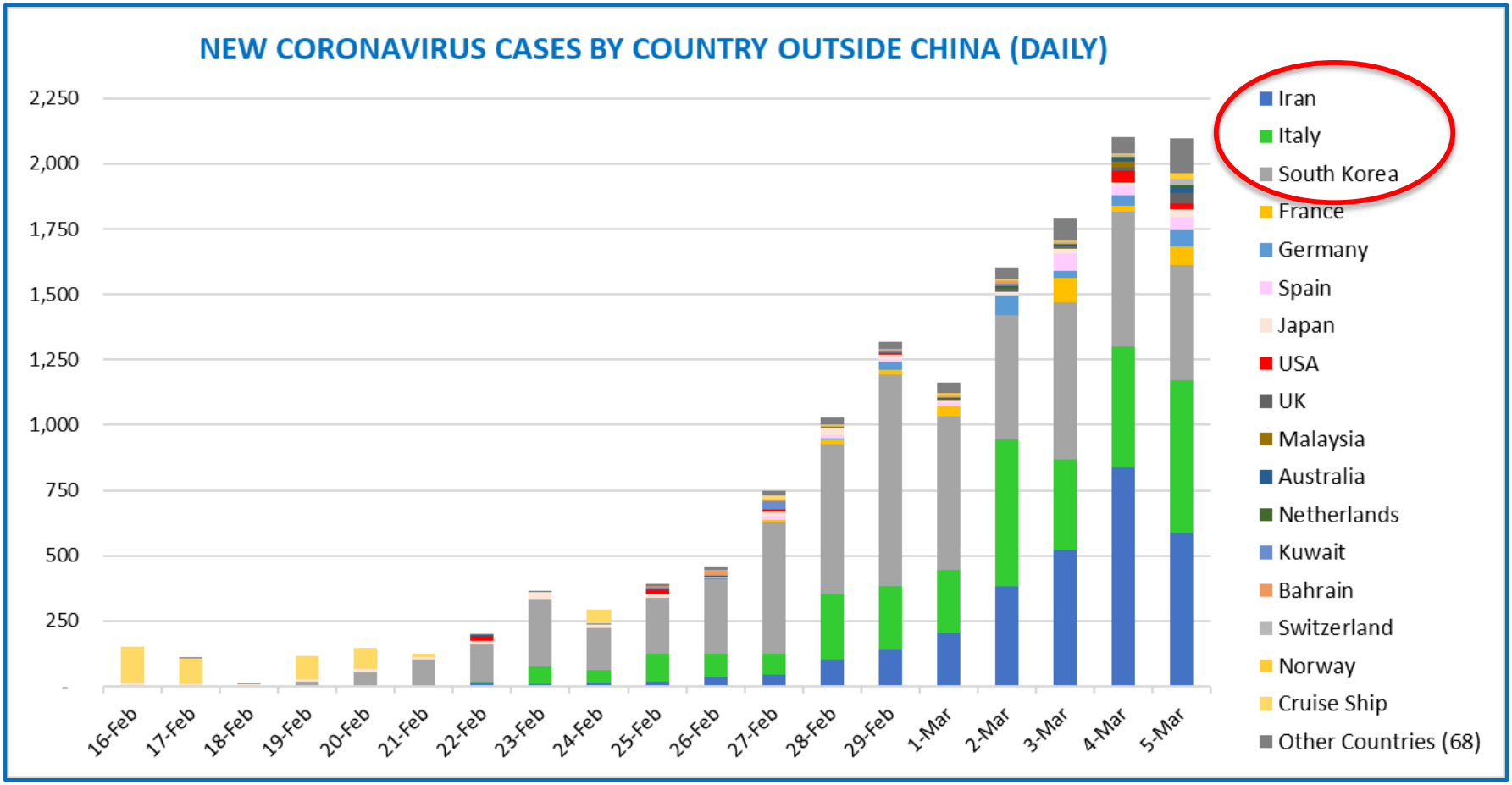

NEW CORONAVIRUS CASES (DAILY)
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
-
22-Jan
24-Jan
26-Jan
28-Jan
30-Jan
1-Feb
3-Feb
5-Feb
7-Feb
9-Feb
11-Feb
13-Feb
15-Feb
17-Feb
19-Feb
21-Feb
23-Feb
25-Feb
27-Feb
29-Feb
2-Mar
4-Mar
China
Outside China
Cruise Ship (Diamond Princess)

*Source: WHO*




*Source: WHO*

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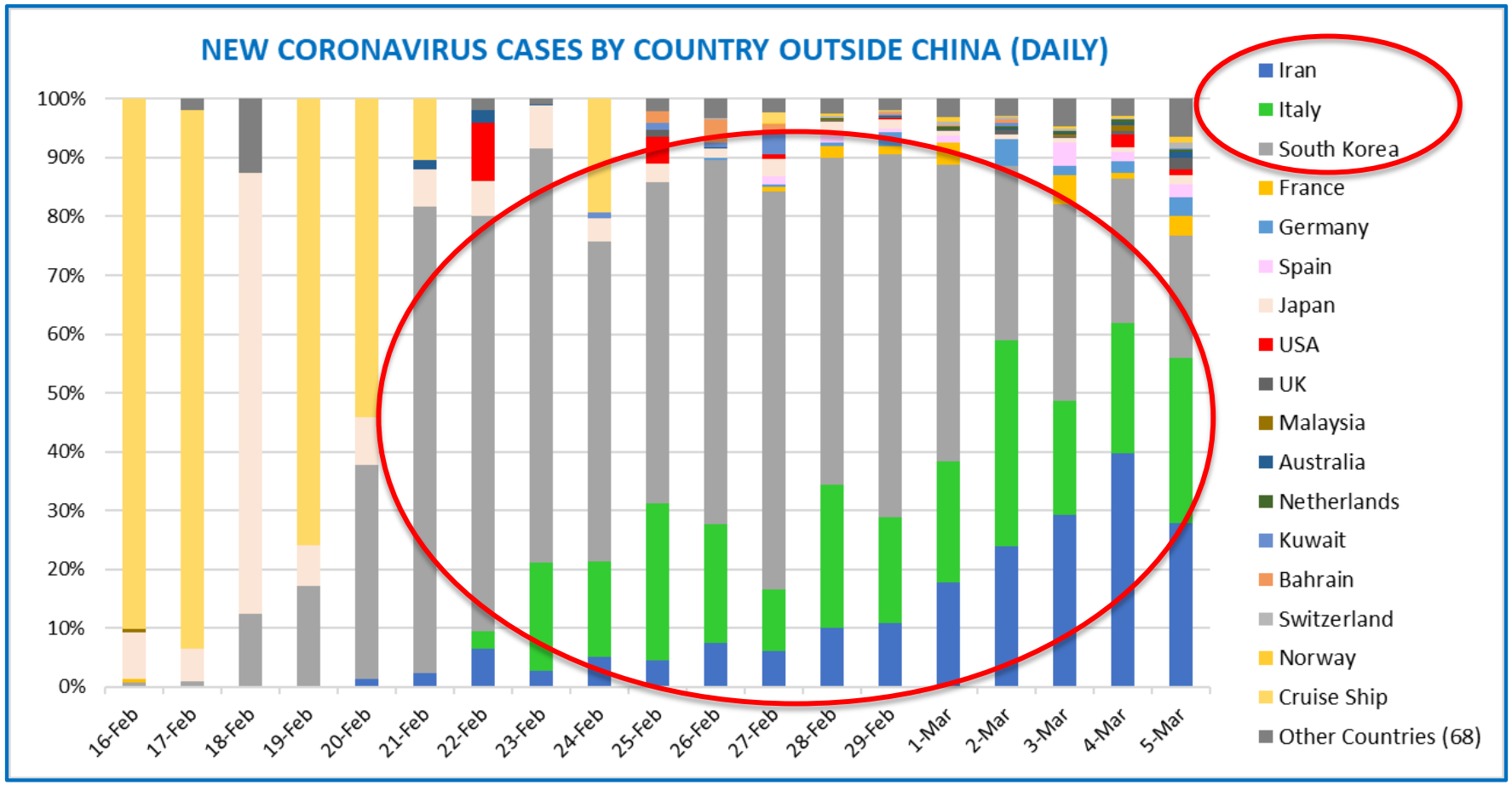
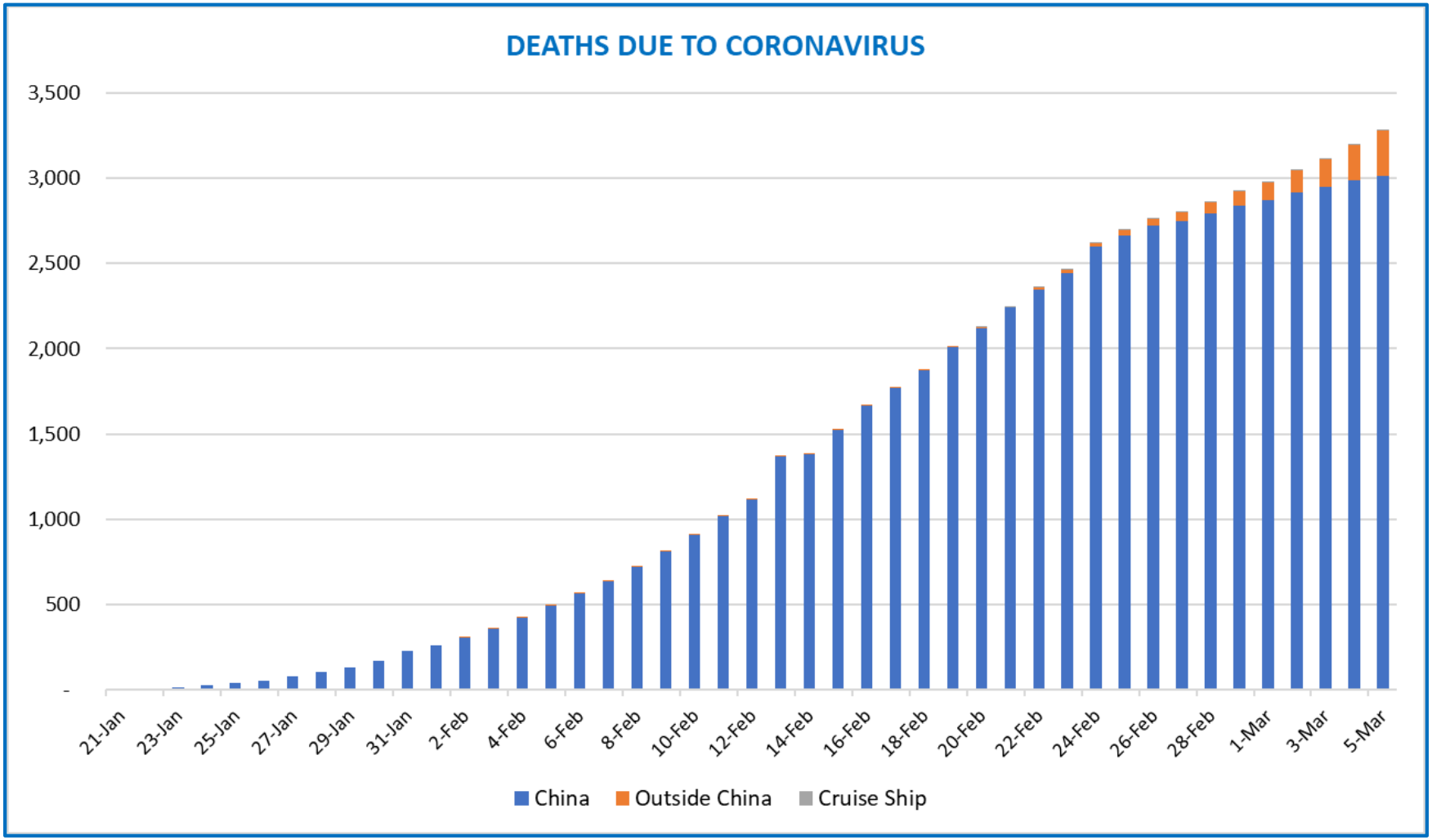

NEW CORONAVIRUS CASES BY COUNTRY OUTSIDE CHINA (DAILY)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
16-Feb
17-Feb
18-Feb
19-Feb
20-Feb
21-Feb
22-Feb
23-Feb
24-Feb
25-Feb
26-Feb
27-Feb
28-Feb
29-Feb
1-Mar
2-Mar
3-Mar
4-Mar
5-Mar
Iran
Italy
South Korea
France
Germany
Spain
Japan
USA
UK
Malaysia
Australia
Netherlands
Kuwait
Bahrain
Switzerland
Norway
Cruise Ship
Other Countries (68)

*Source: WHO*




*Source: WHO*

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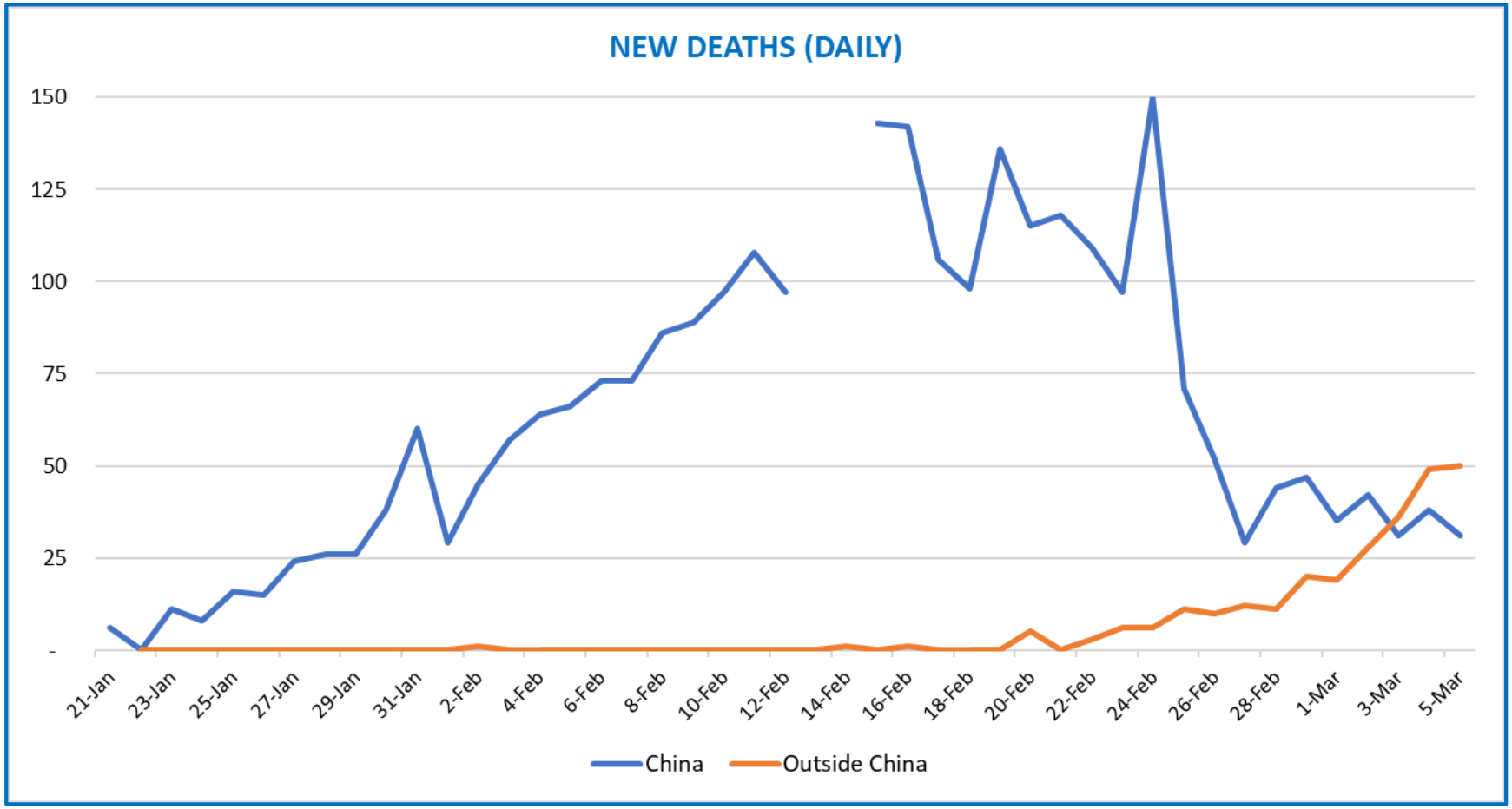
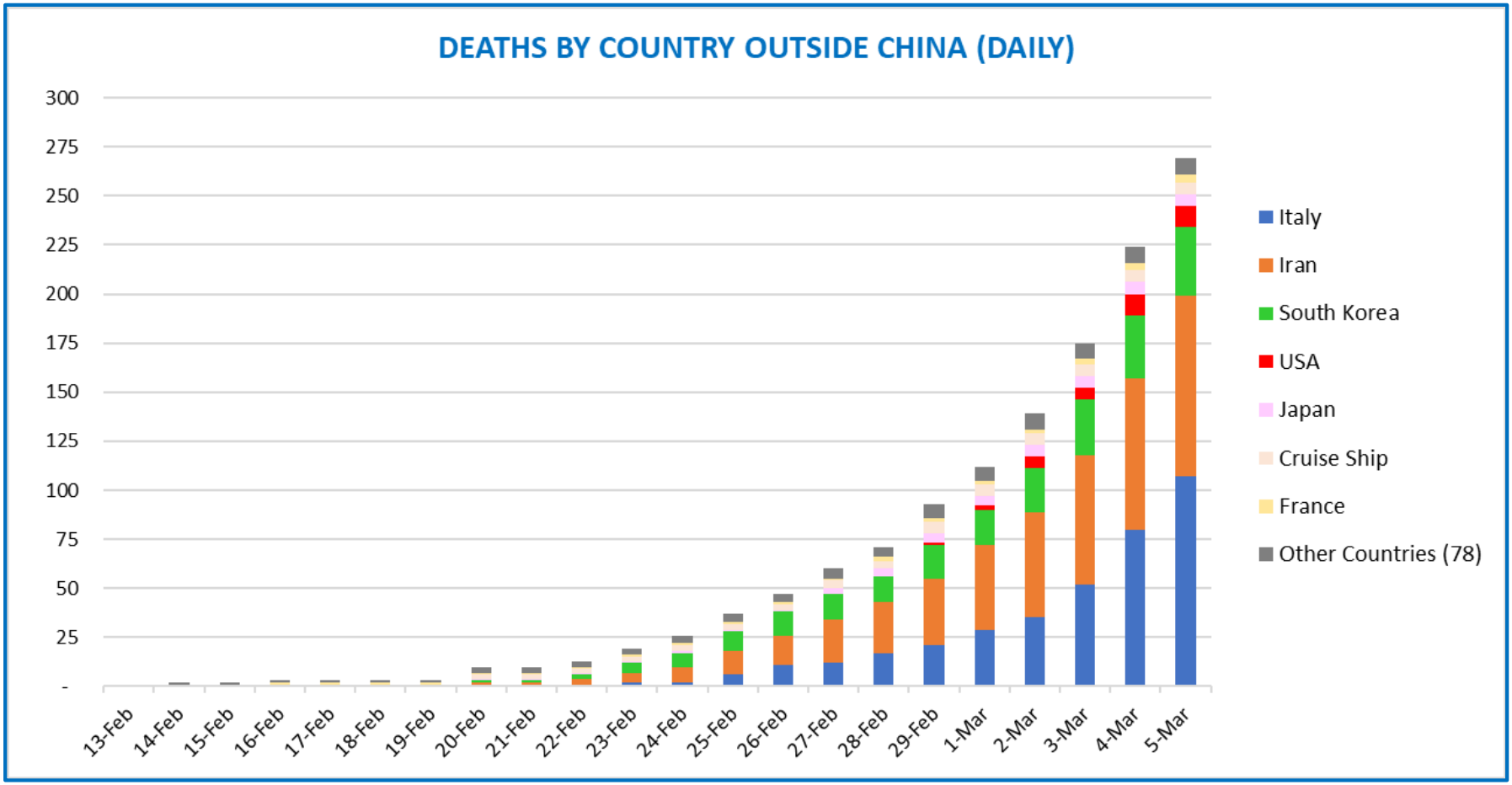

NEW DEATHS (DAILY)
150
125
100
75
50
25
-
21-Jan
23-Jan
25-Jan
27-Jan
29-Jan
31-Jan
2-Feb
4-Feb
6-Feb
8-Feb
10-Feb
12-Feb
14-Feb
16-Feb
18-Feb
20-Feb
22-Feb
24-Feb
26-Feb
28-Feb
1-Mar
3-Mar
5-Mar
China
Outside China

*Source: WHO*


DEATHS BY COUNTRY OUTSIDE CHINA (DAILY)
300
275
250
225
200
175
150
125
100
75
50
25
-
13-Feb
14-Feb
15-Feb
16-Feb
17-Feb
18-Feb
19-Feb
20-Feb
21-Feb
22-Feb
23-Feb
24-Feb
25-Feb
26-Feb
27-Feb
28-Feb
29-Feb
1-Mar
2-Mar
3-Mar
4-Mar
5-Mar
Italy
Iran
South Korea
USA
Japan
Cruise Ship
France
Other Countries (78)

*Source: WHO*

# Placing Viruses in Perspective

| VIRUS | YEAR IDENTIFIED | CASES | DEATHS | FATALITY RATE | NUMBER OF COUNTRIES |
|---|---|---|---|---|---|
| Marberg | 1967 | 466 | 373 | 80.0% | 11 |
| Ebola | 1976 | 33,577 | 13,562 | 40.4% | 9 |
| Hendra | 1994 | 7 | 4 | 57.1% | 1 |
| H5N1 Bird Flu | 1997 | 861 | 455 | 52.8% | 18 |
| Nipah | 1998 | 513 | 398 | 77.6% | 2 |
| SARS | 2002 | 8,096 | 774 | 9.6% | 29 |
| H1N1* | 2009 | 1,632,258 | 284,500 | 17.4% | 214 |
| MERS | 2012 | 2,494 | 858 | 34.4% | 28 |
| H2N9 Bird Flu | 2013 | 1,568 | 616 | 39.3% | 3 |
| Wuhan** | 2020 | 95,333 | 3,284 | 3.4% | 84 |

** Between 2009 and 2010; ** As of March 5, 2020*

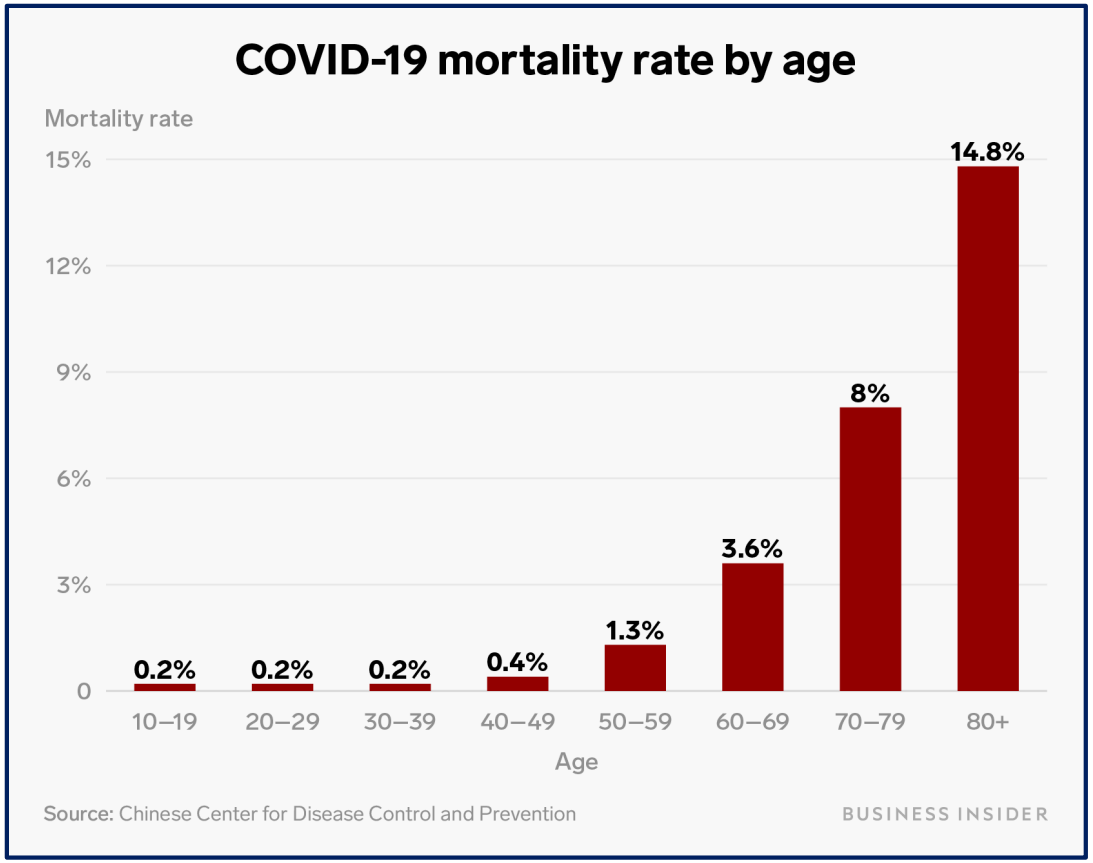
Sources: CDC; UN; World Health Organization; New England Journal of Medicine; Malaysian Journal of Pathology; CGTN; The Lancet

In 2020 alone, so far there have been 18,000 deaths and 32 million infected with the flu in the United States.

***Source: CDC***

# Risk Factors

- Location of Treatment
- Age
- Pre-existing Health Conditions
- Weak Immune Systems



# Setting Expectations

"Most of us are going to get this virus. It's undeniable. You won't find a single expert out there who is saying that this is going to be contained.“

"And, the more we learn about it, the more we see that the spread is going to be global and, for the most part, that's OK because the data we know from China shows that roughly 98 to 99 percent of us are going to do very, very, well."

***- Dr. James Philips; George Washington University School of Medicine***

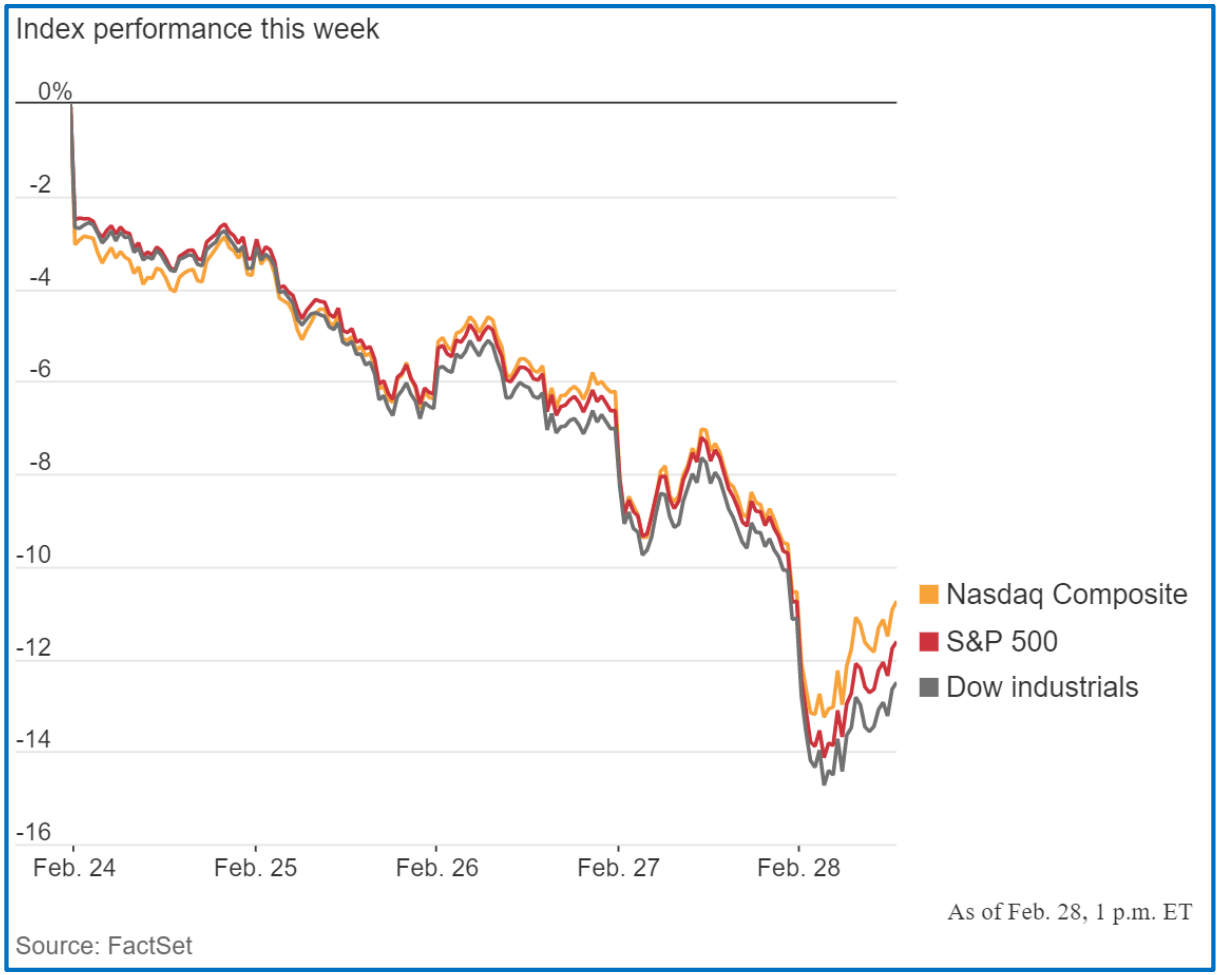
- More testing kits and increased availability of tests will identify a growing number of infected individuals
- How will markets, government officials and company leaders respond? – Perception is Reality

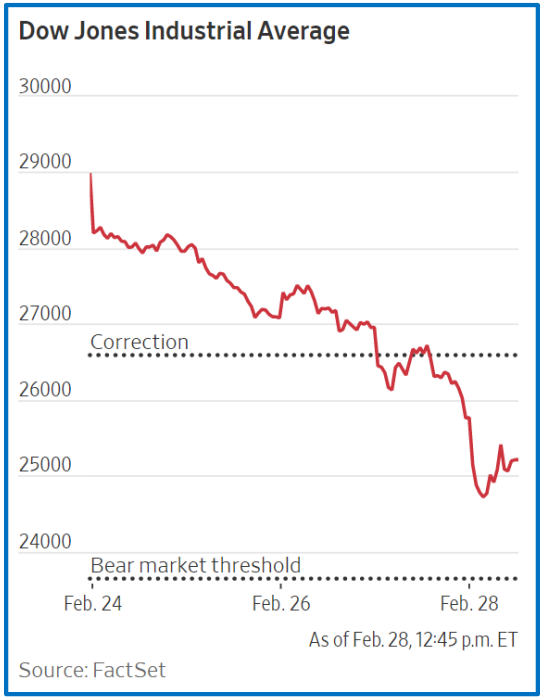
# Coronavirus

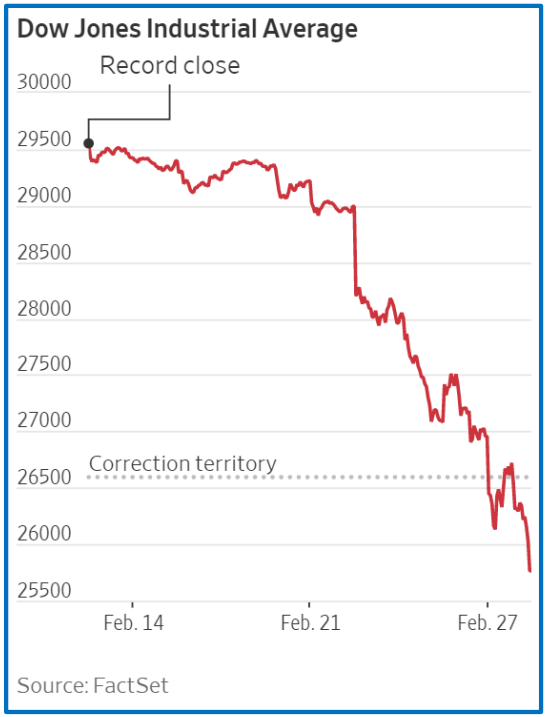
## Economic Impact

# Record Setting Market Correction Starting Feb 24

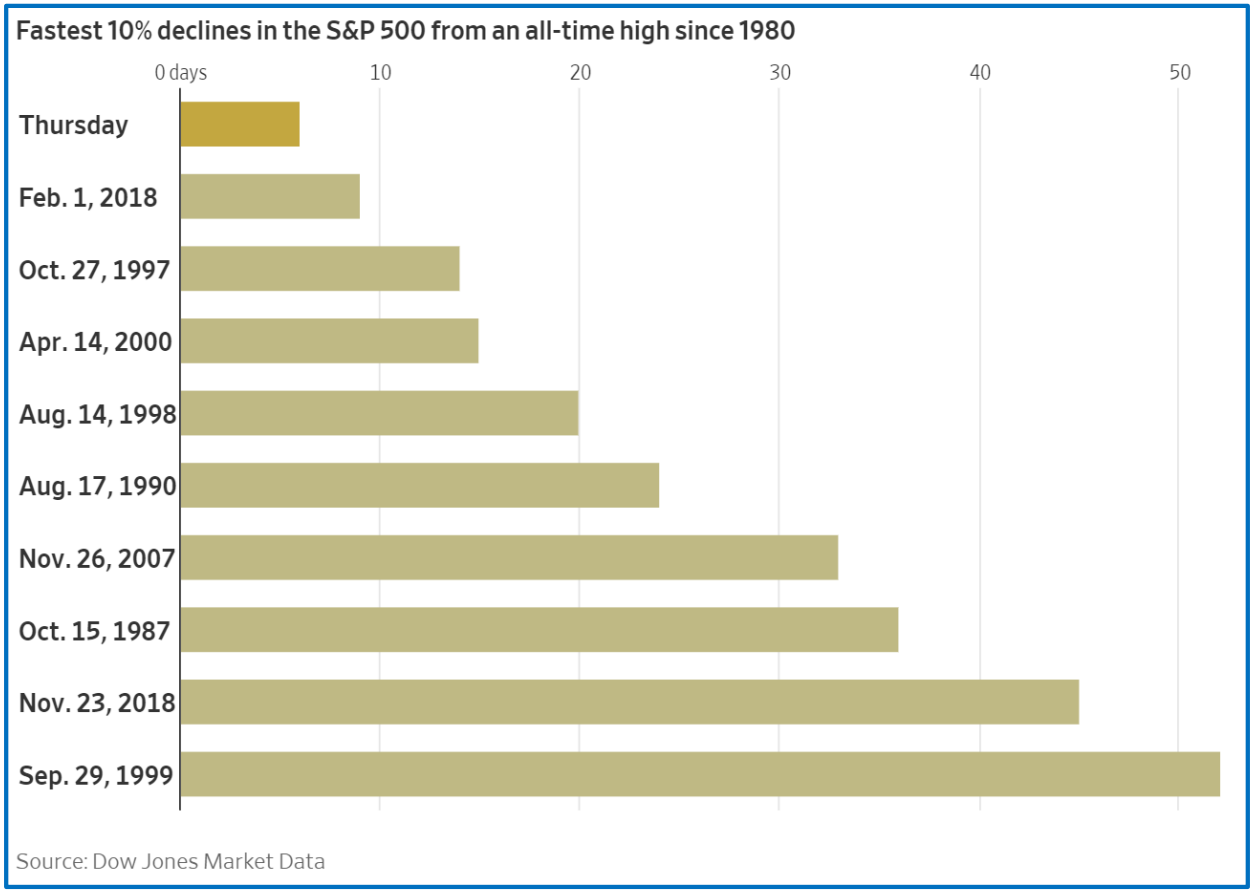
- The definition of FUD
- “Known Knowns, Known Unknowns, Unknown Unknowns”
- Reasonable?
- “Keep Calm and Carry On”



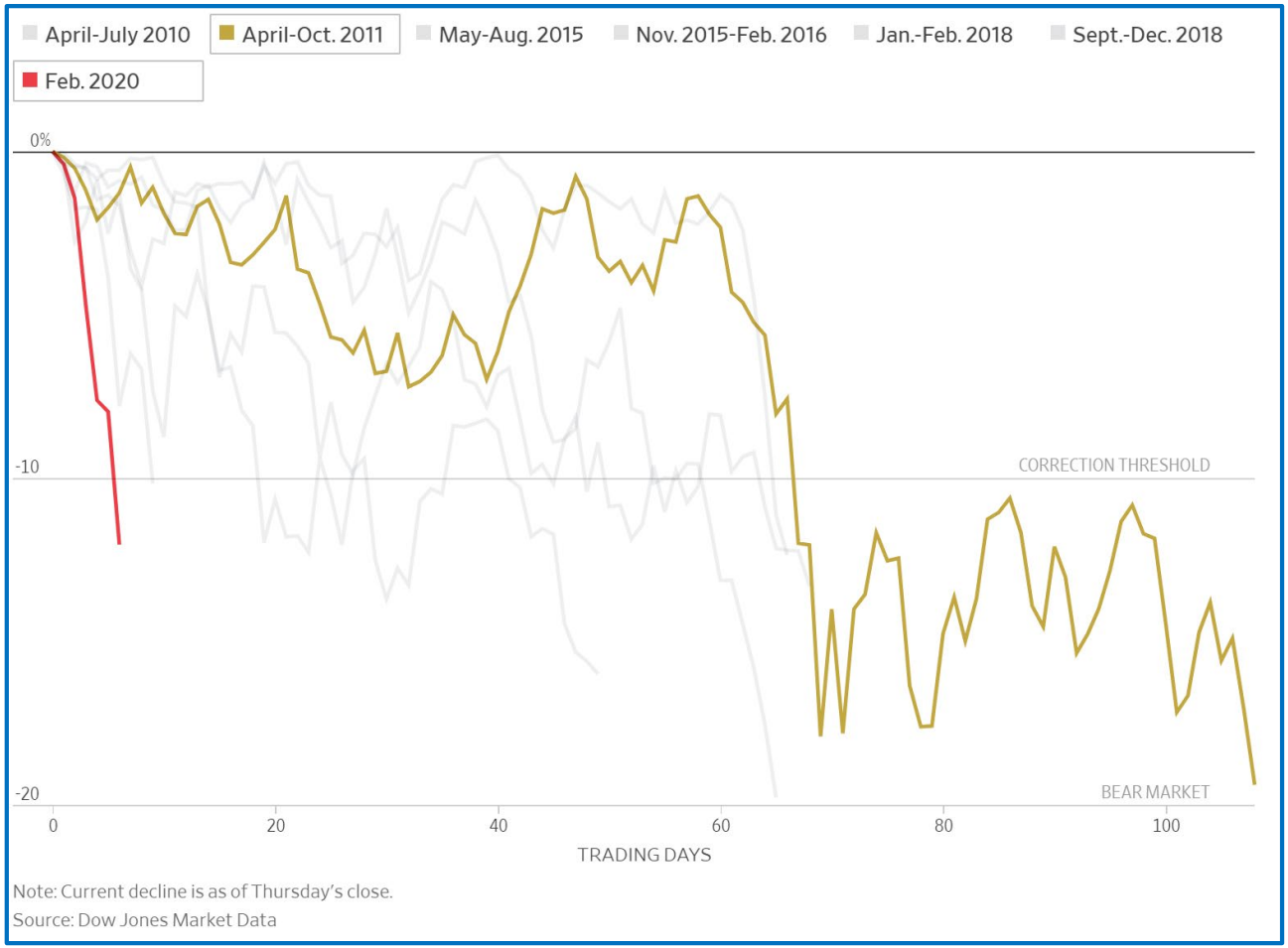



# Record Setting Market Correction – Feb 24, 2020



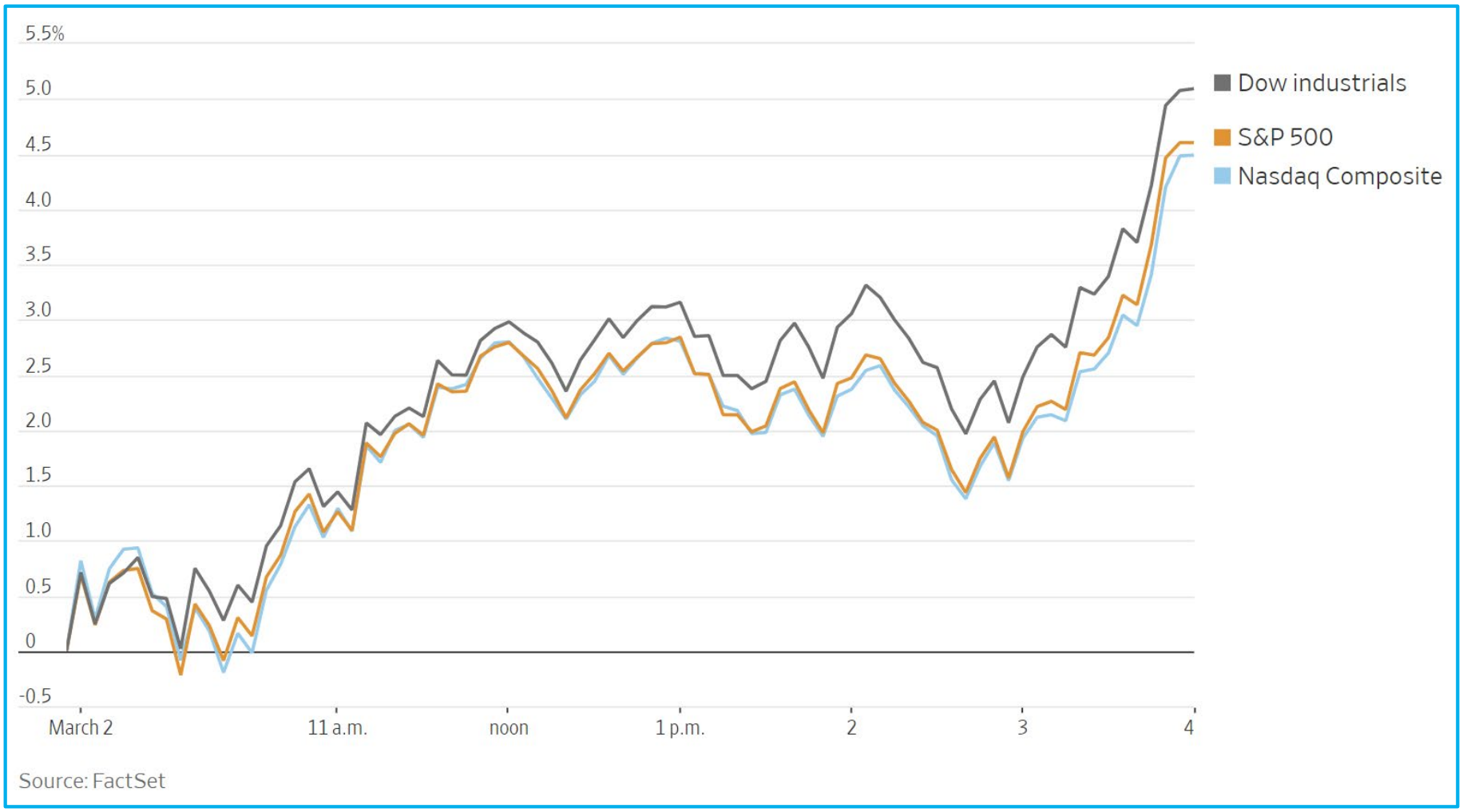
# Going Down

The S&P 500's cumulative decline from its Feb. 19 peak through Feb. 27 compared to each of the six corrections that have occurred in the current bull market



# Then Up!  Dow Industrials Rally 5.1% on Stimulus Hopes

***Record setting nearly 1,300 point rally***

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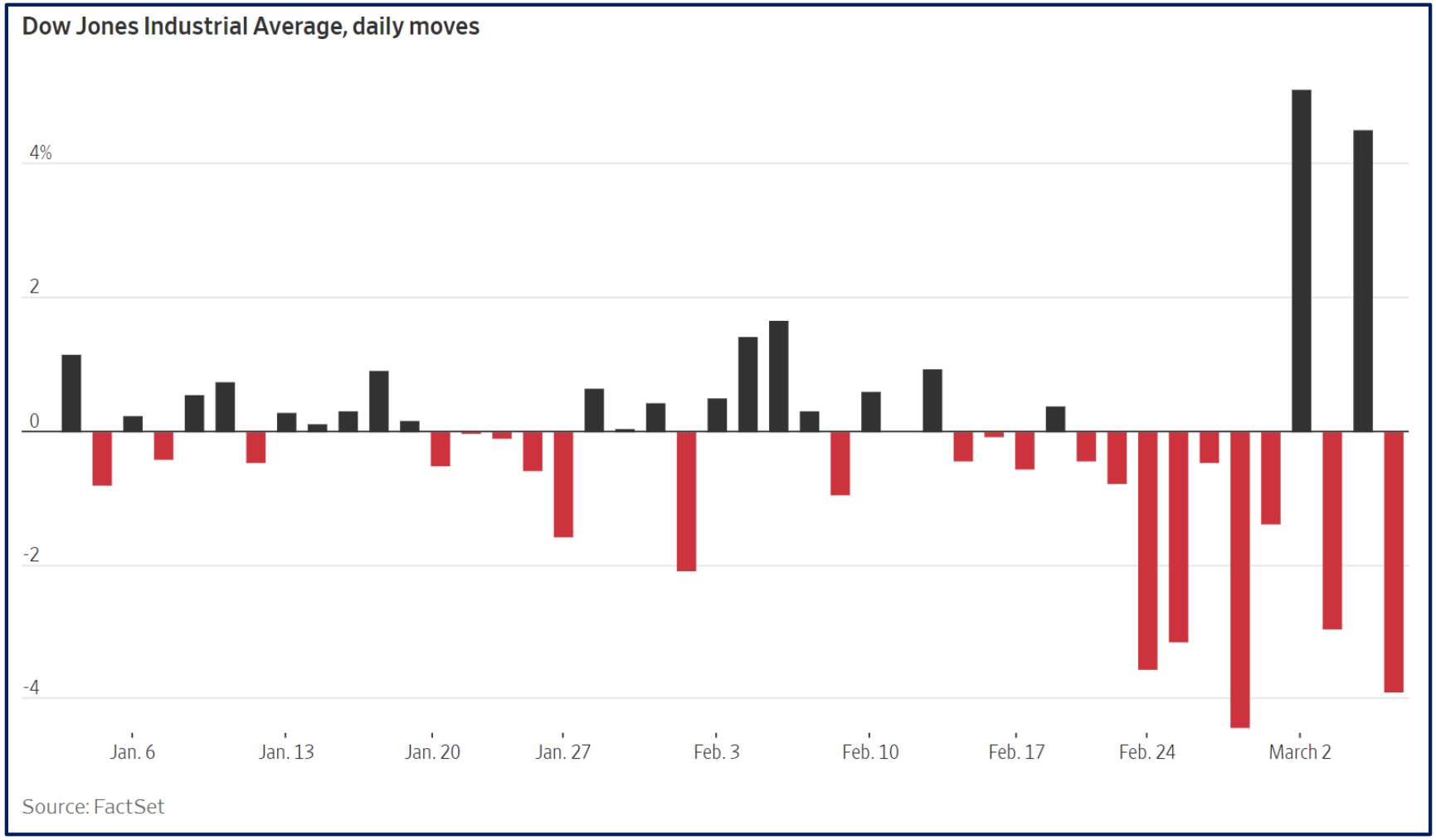
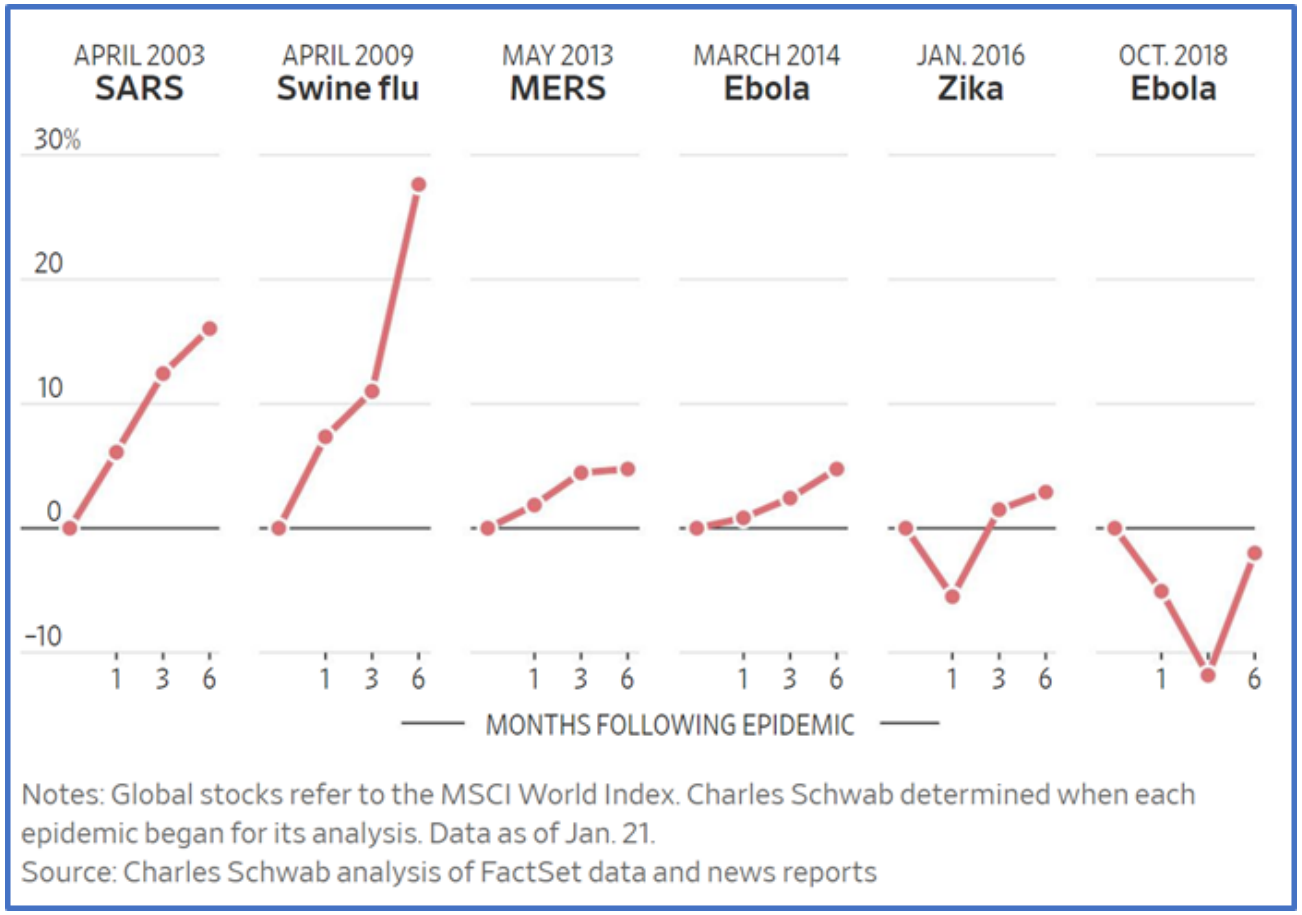
# FUD Drives Volatility



# Global Stock Performance Following Epidemics




Notes: Global stocks refer to the MSCI World Index. Charles Schwab determined when each epidemic began for its analysis. Data as of Jan. 21.
Source: Charles Schwab analysis of FactSet data and news reports

# Coronavirus

## Electronic Supply Chain Impact

# The Scope of Electronics Component Manufacturing Impact in China

| | |
|---|---|
| Electronic Component Mfr Sites in China Impacted | 5,057 |
| Electronic Component Mfr Sites Completely Shutdown | 43 |
| Electronic Component Suppliers Impacted | 3,855 |

* According to X2Data, these are the statistics of companies which have been effected due to the virus (as of Feb 18)

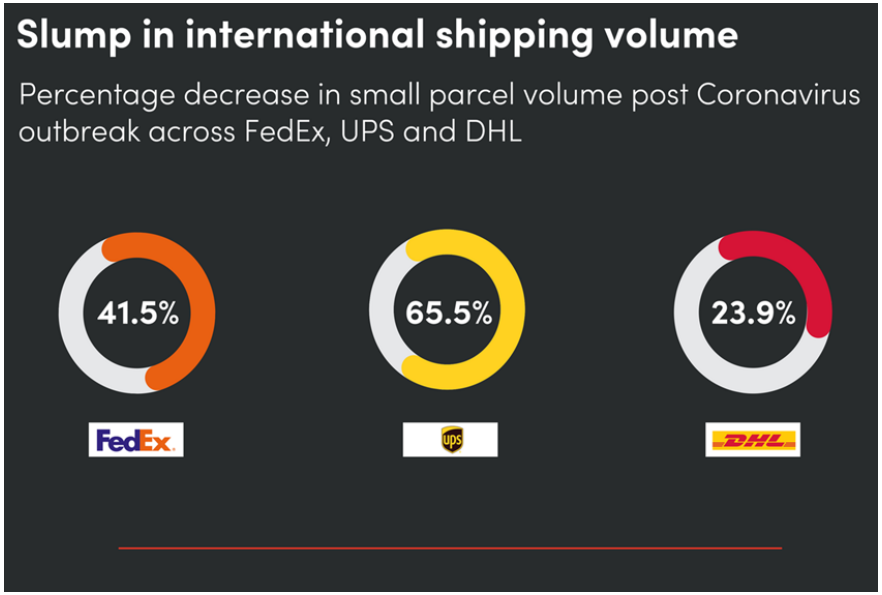
- Many impacted sites only operating at 50% to 60% manned capacity
  - Many suppliers only operating on 1 to 2 months cash
  - No banking access – financially viable?
- Supply AND Demand are both impacted
- High volume manufacturers production declines for different reasons
  - Xiaomi, Huawei, etc – Collapse of China demand
  - Apple, Microsoft, etc – Supply limitations
- China production resuming with government support
  - Due to diminishing concerns about health crisis?
  - Or due to government concerns about economy?
- China deployed AI and Big Data to combat virus spread?

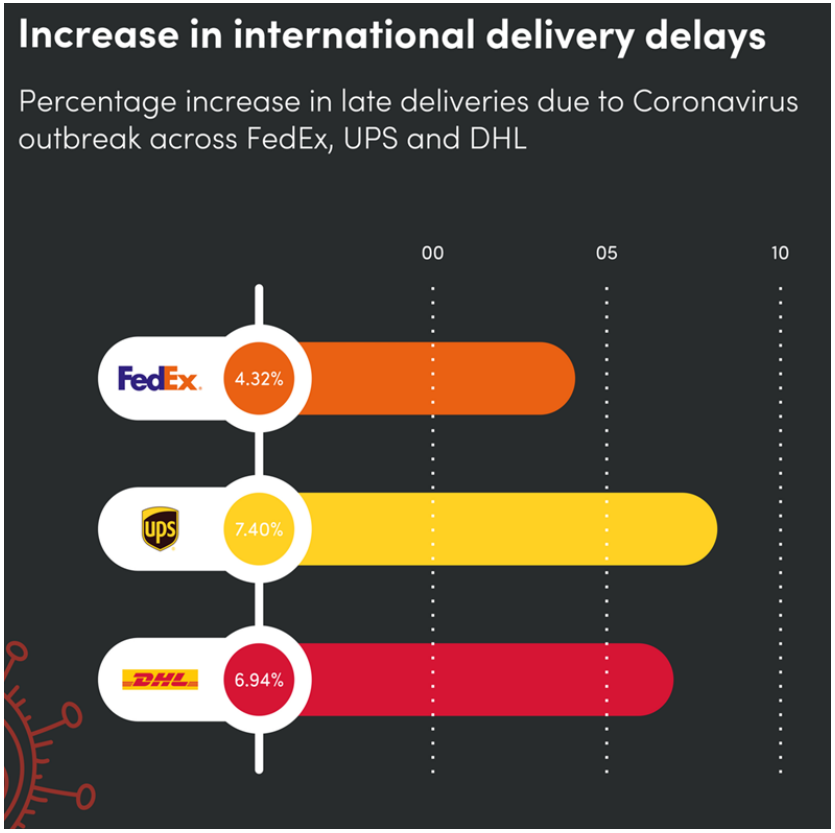
# Shipping & Logistics Challenges

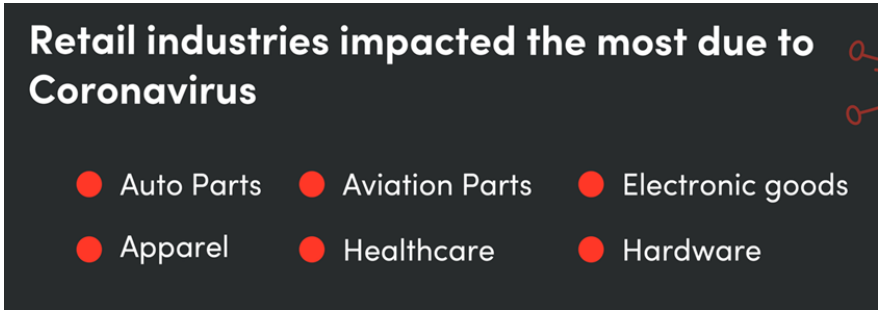
- February Air Cargo Down 9% Compared to Year Ago
- Chinese Trucking Still Crippled by Coronavirus; Trucking in China Moves 73% of Its Freight
  - Citywide lockdowns/quarantines are keeping half of China's truck drivers off the roads
  - Trucking in the south is closer to pre-virus levels of activity, operating at 60%
- Chinese Ports Resume Normal Activity
  - Workers moving cargo that was set to be shipped after the Lunar New Year
  - Could be idled again if there are continued supply chain disruptions or reduced demand
  - Canceled containership sailings are also down
- U.S. Ports Expect Activity to Drop
  - Expecting a 20% drop in cargo
  - Expecting recovery after several weeks
  - Over 100 transpacific ships to North America have been canceled between February and April

*Source: Thomasnet.com*

# Shipping & Logistics Challenges




*Source: AuditShipment.com*

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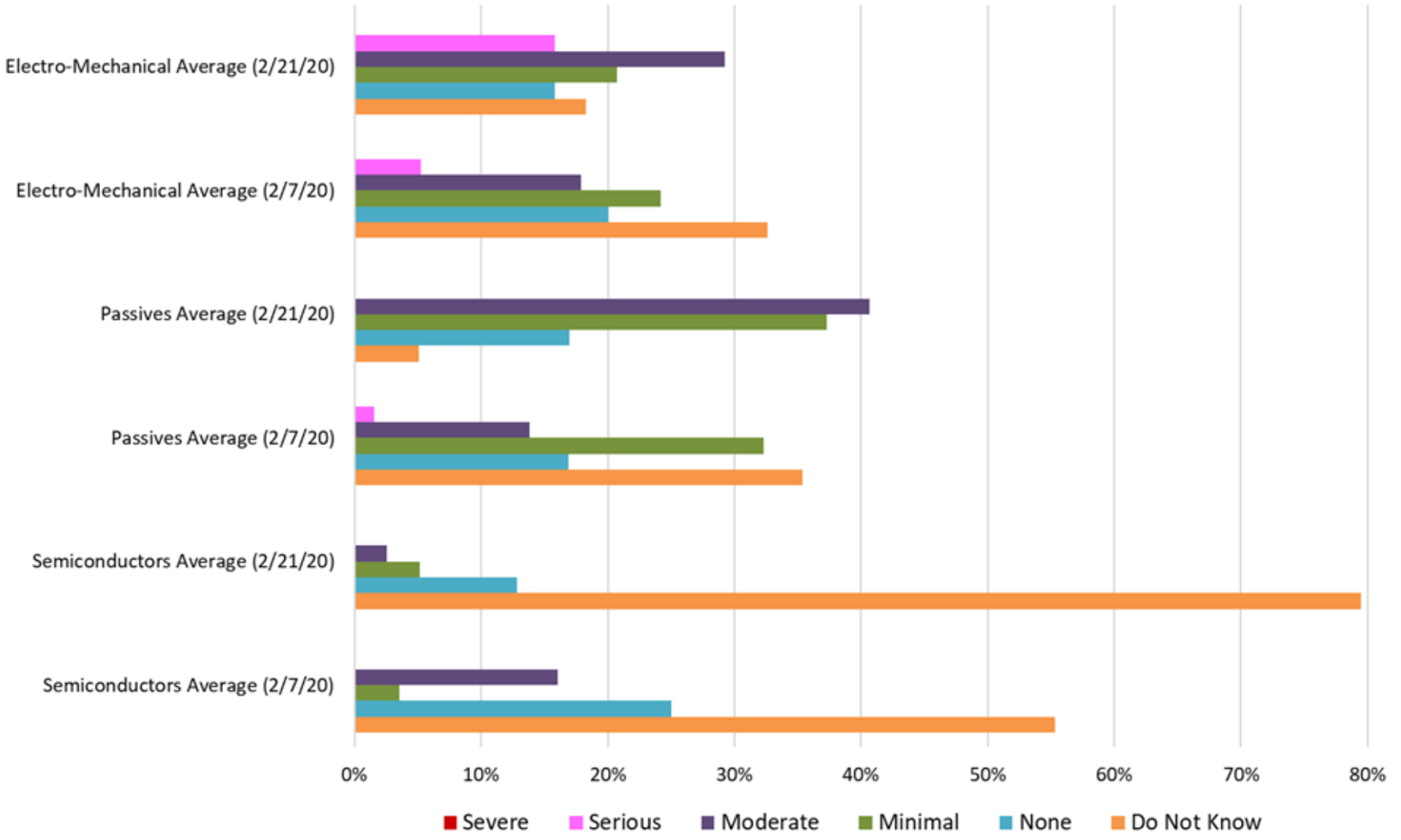
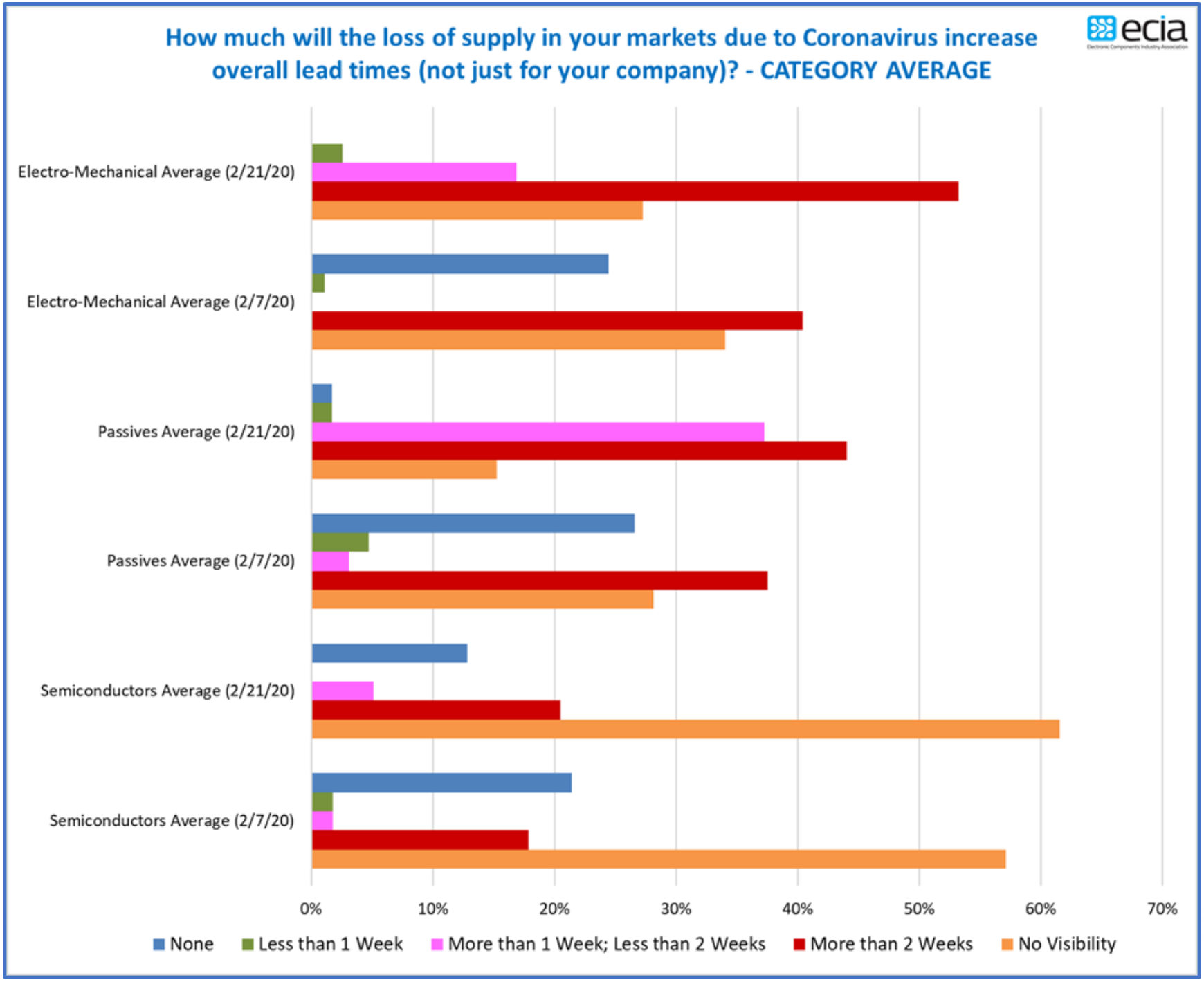
# What is the impact level of the Coronavirus on your company's ability to supply your customers on time? - CATEGORY AVERAGE




How much will the loss of supply in your markets due to Coronavirus increase overall lead times (not just for your company)? - CATEGORY AVERAGE
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Electro-Mechanical Average (2/21/20)
Electro-Mechanical Average (2/7/20)
Passives Average (2/21/20)
Passives Average (2/7/20)
Semiconductors Average (2/21/20)
Semiconductors Average (2/7/20)
0%
10%
20%
30%
40%
50%
60%
70%
None
Less than 1 Week
More than 1 Week; Less than 2 Weeks
More than 2 Weeks
No Visibility

# The latest ECIA survey on the Coronavirus impact on the electronic components supply chain ends today

Please Support This Survey!!

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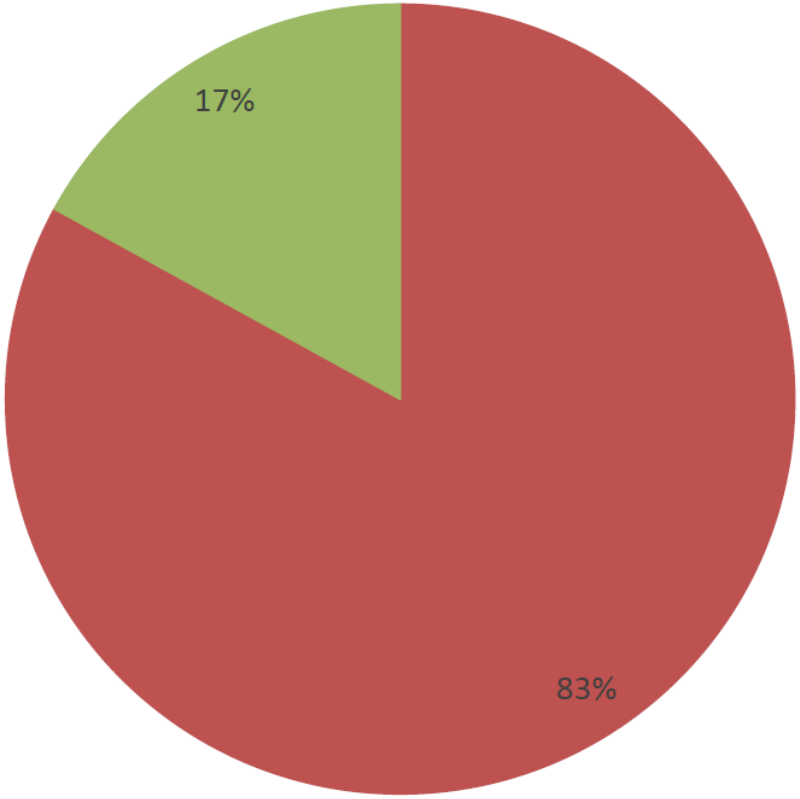
# Have you seen a negative impact to component demand and/or production due to the Coronavirus?

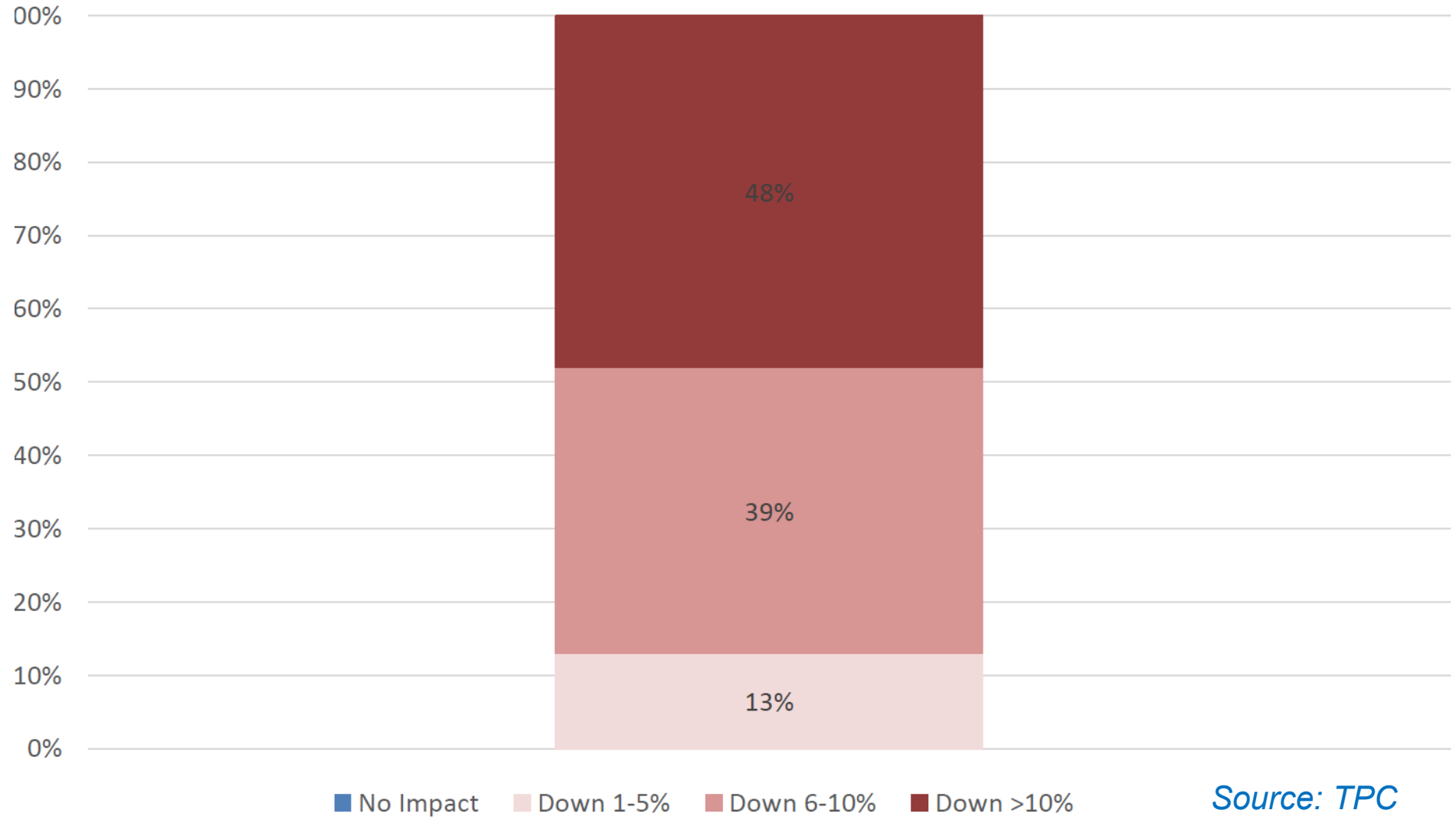
Survey Date: February 11-15 Respondents: ~6000 Location: Worldwide/China focus (~85% China) Who: Active Electronics Industry Professionals




*Source: TPC*

# What % do you think this will impact C1Q's electronics production vs. previous plans?

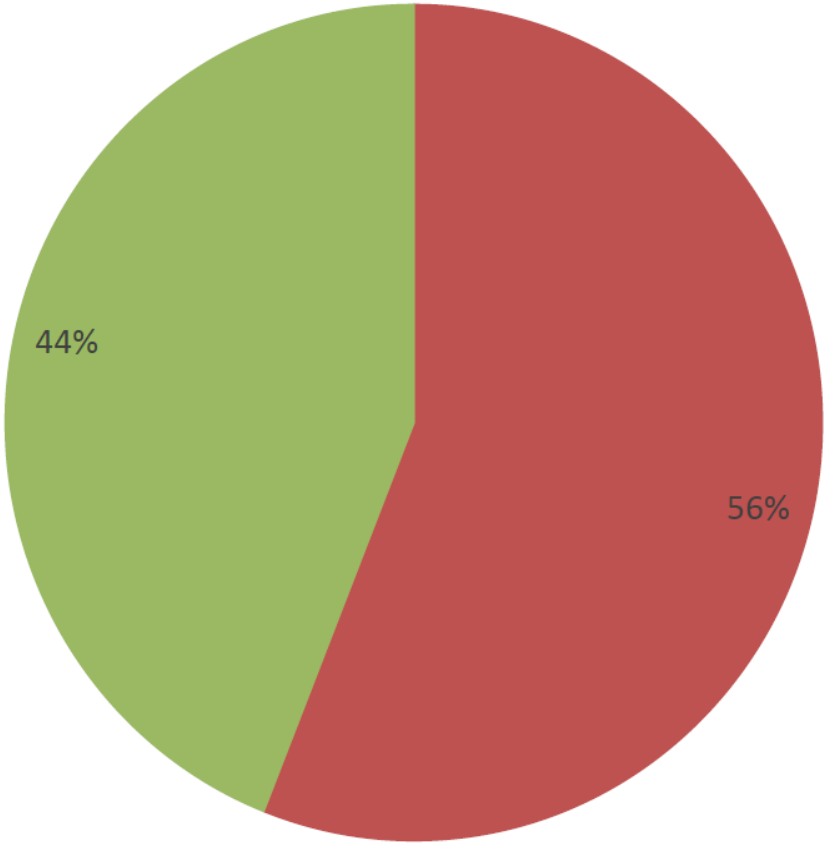
Survey Date: February 11-15 Respondents: ~6000 Location: Worldwide/China focus (~85% China) Who: Active Electronics Industry Professionals




Source: TPC

# Do you think this production delta will be recovered in C2Q?

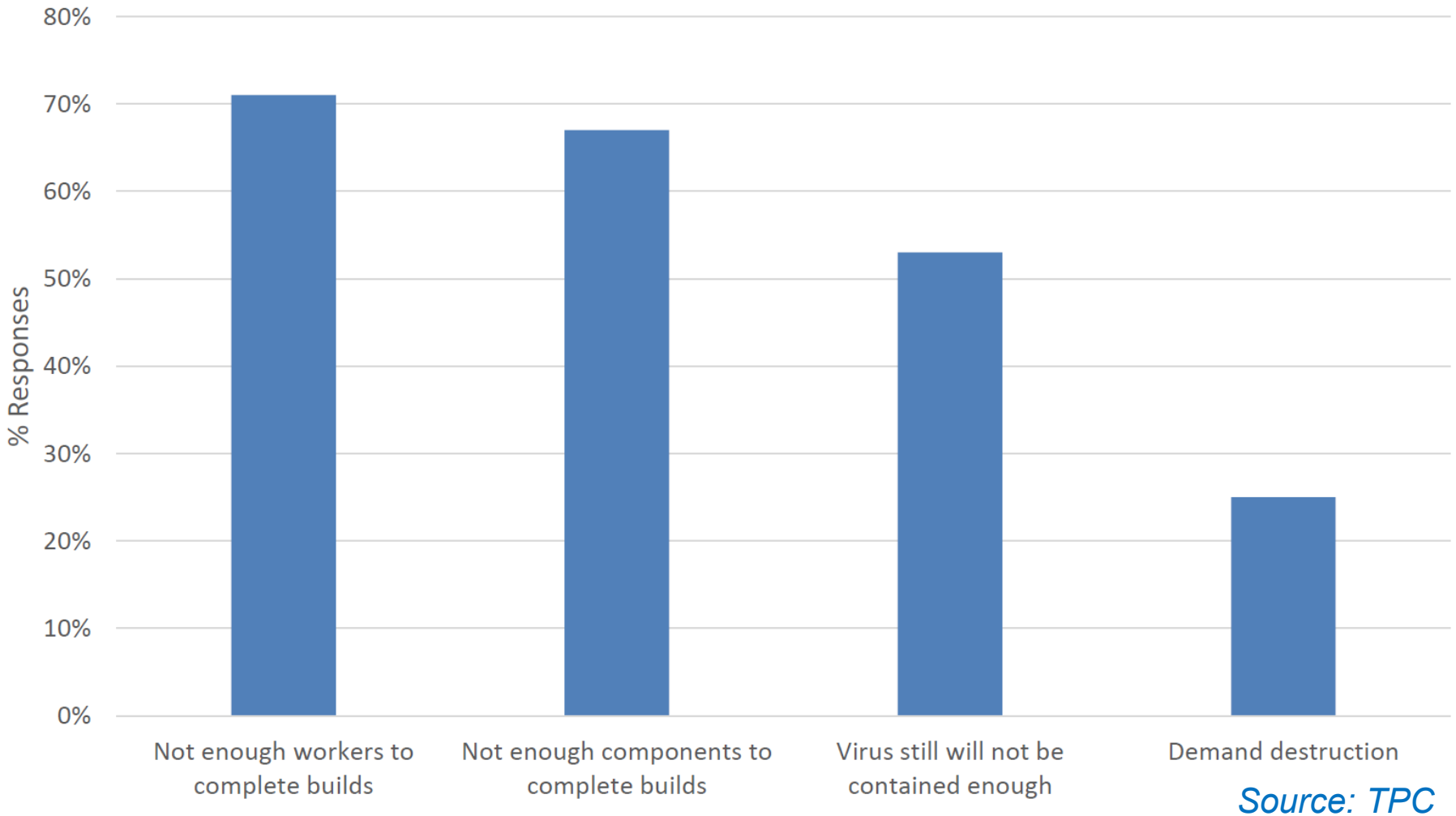
Survey Date: February 11-15  Respondents: ~6000  Location: Worldwide/China focus (~85% China)  Who: Active Electronics Industry Professionals




*Source: TPC*

# If production delta will not be recovered in C2Q, why?
## (multiple answers OK)

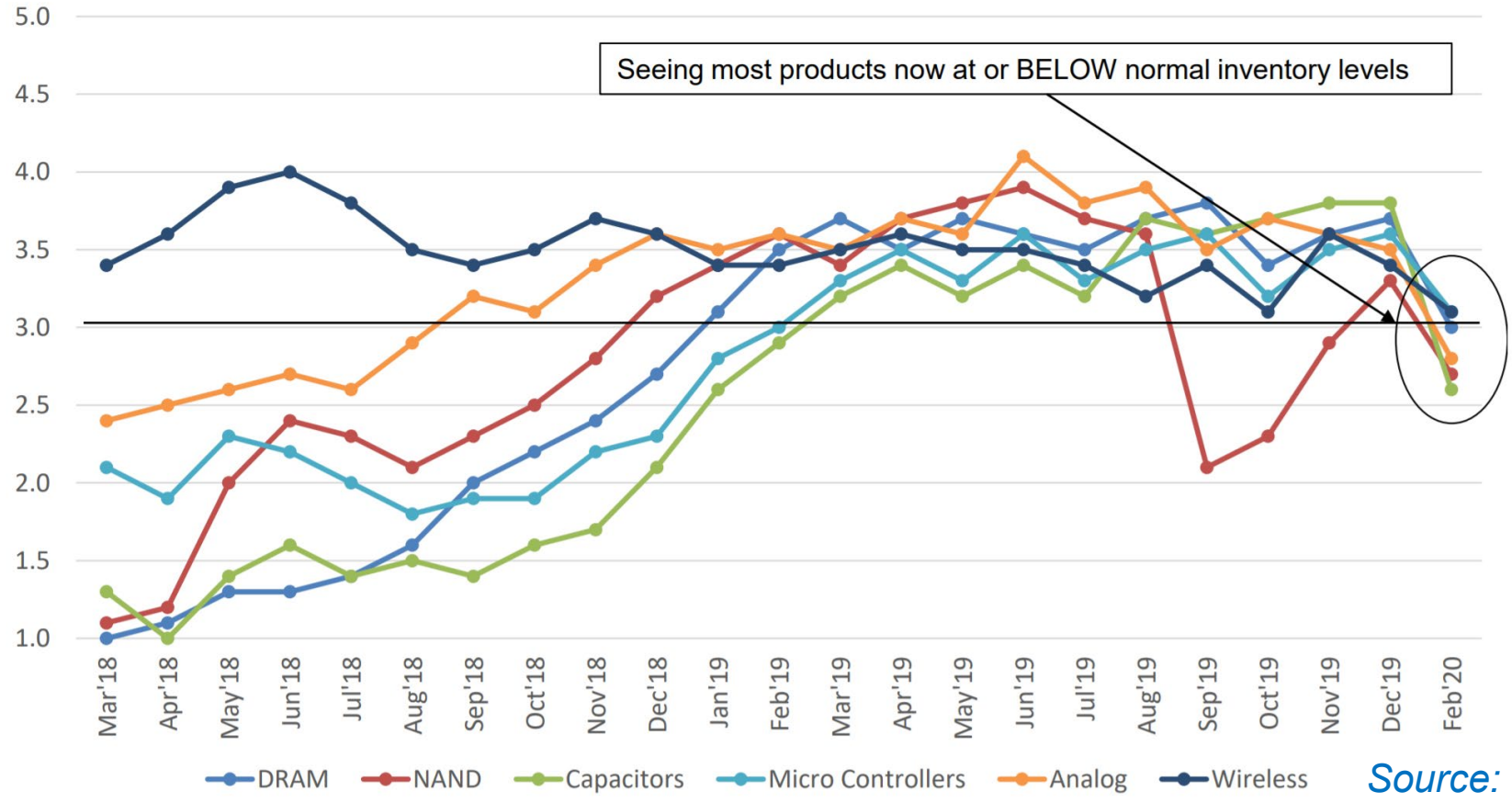
Survey Date: February 11-15 Respondents: ~6000 Location: Worldwide/China focus (~85% China) Who: Active Electronics Industry Professionals




Source: TPC

# Inventory Status

(Using a scale of 1 to 5 with 1 being extremely low inventory, 3 being the normal amount, and 5 being extremely high; how do you view inventory levels for the following products?)




Source: TPC

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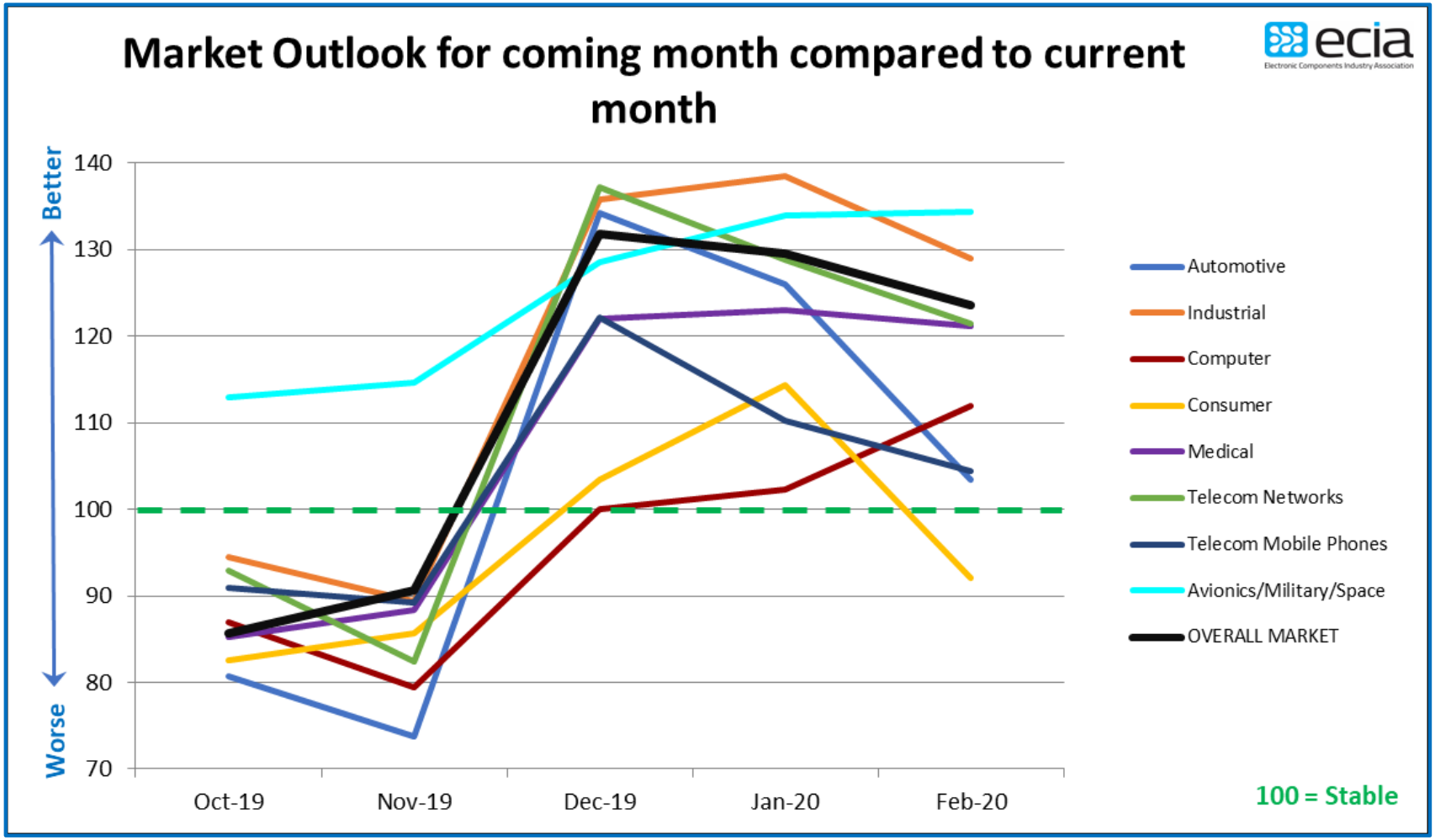
# North America Sentiment Survey Trends Turning Down




*Source: ECIA Electronic Component Sales Trends Survey*

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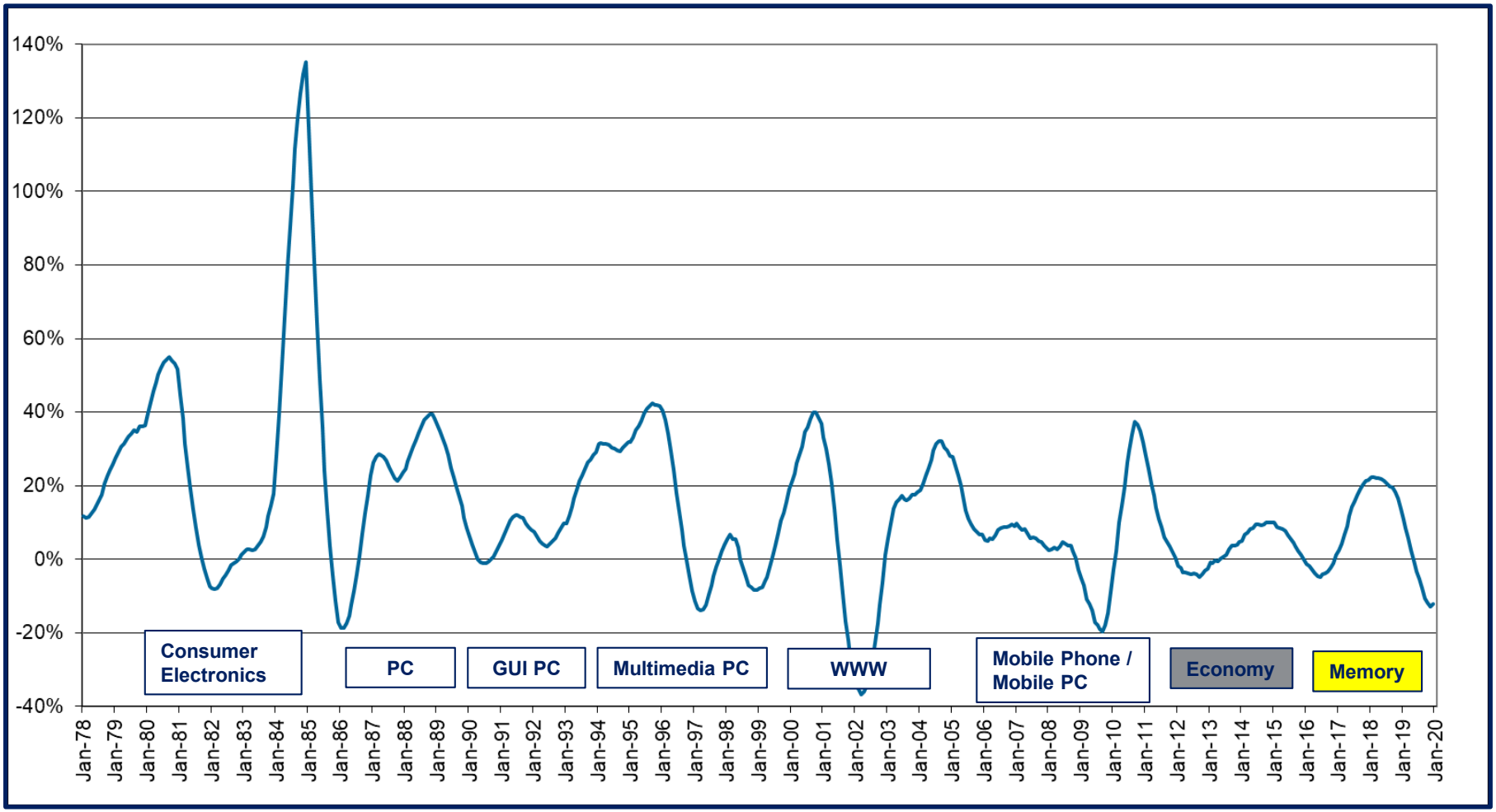
# Global Semiconductor Sales Trends

~ March 2020 ~

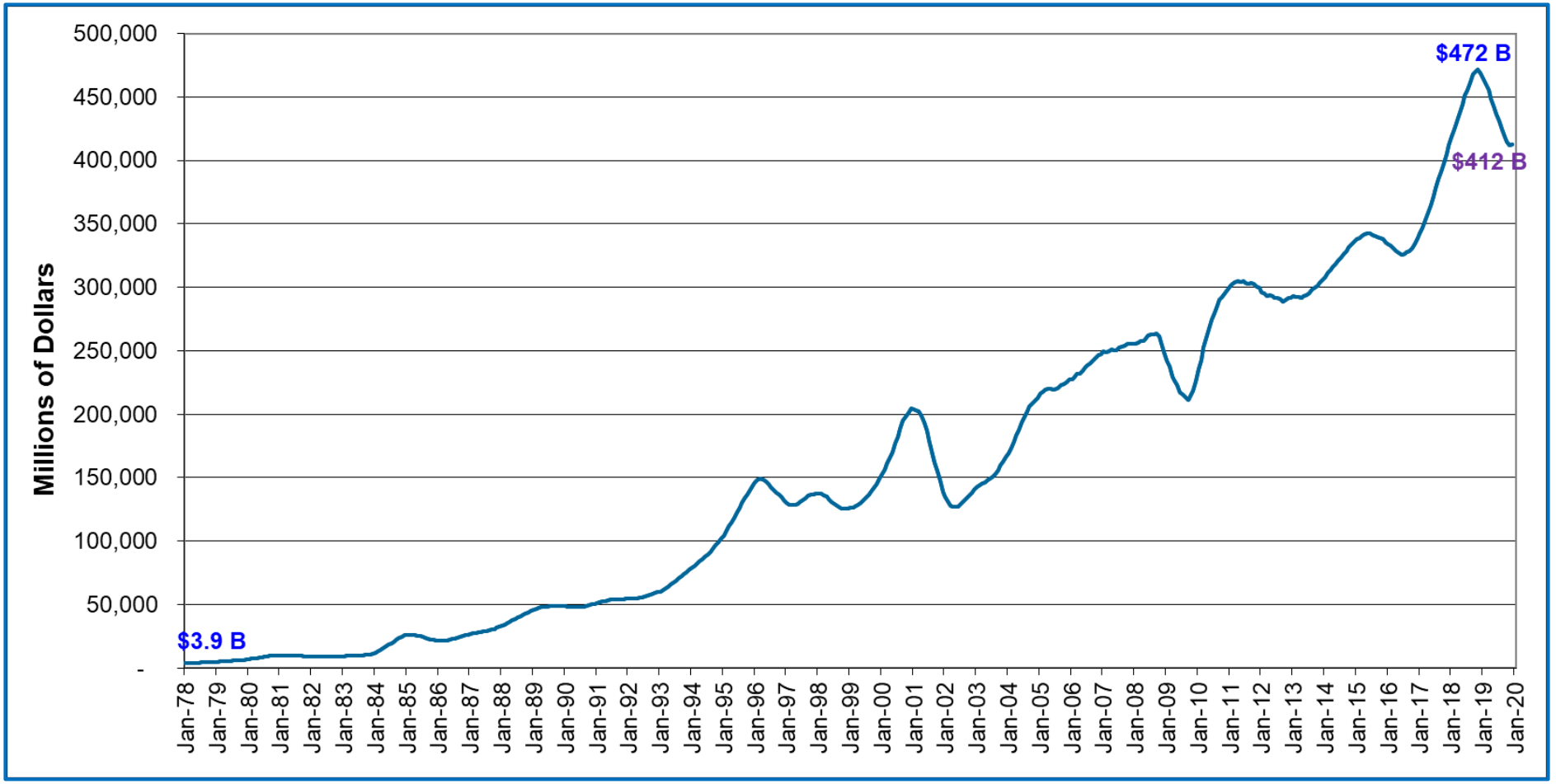
# The Annualized Semiconductor Growth Cycle

## 40 Years of History




Source – WSTS

# Long-term Semiconductor Growth Trends




Source – WSTS

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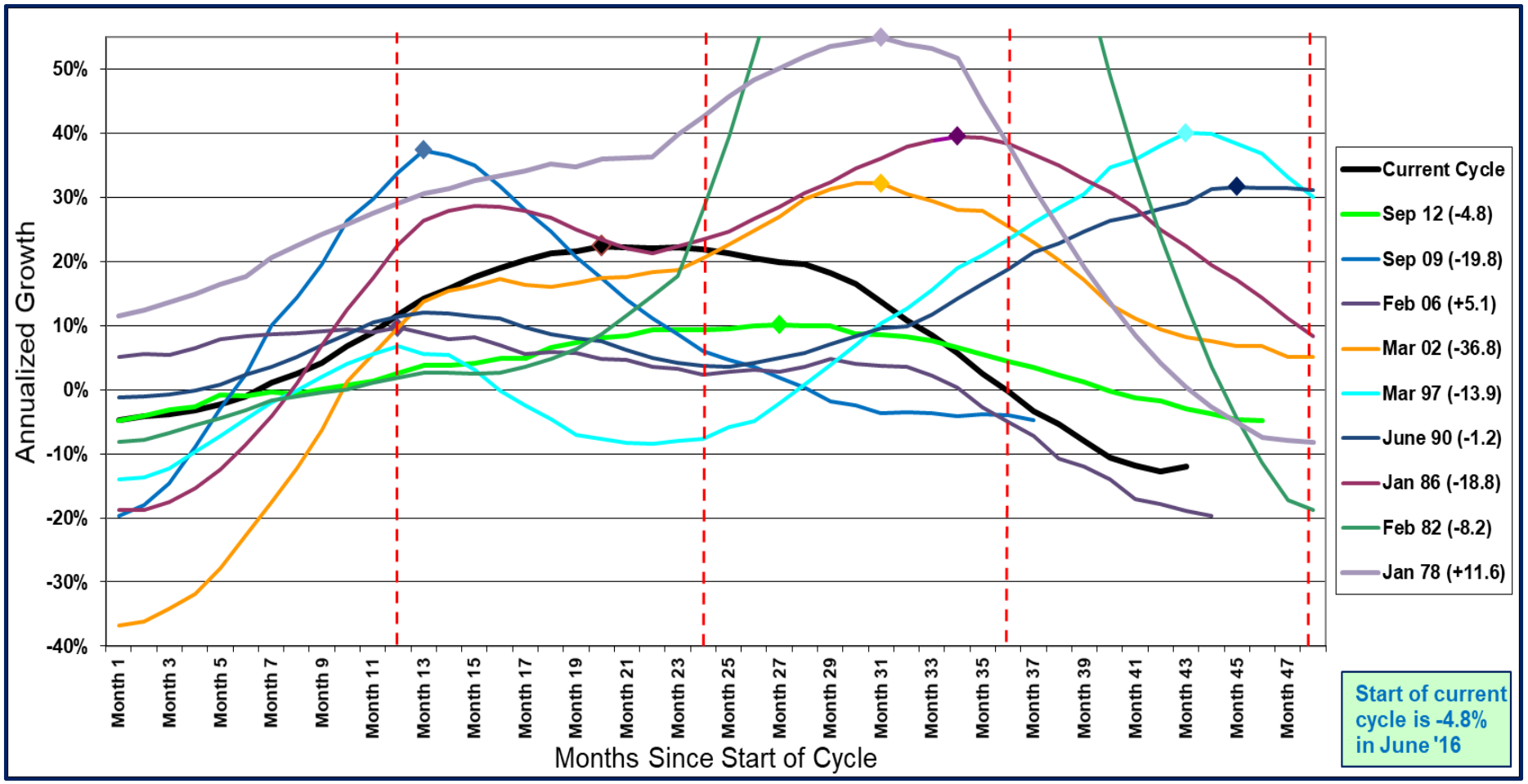
# June 2016 – Start of the tenth semiconductor cycle

## Most cycles last roughly four years




Source – WSTS

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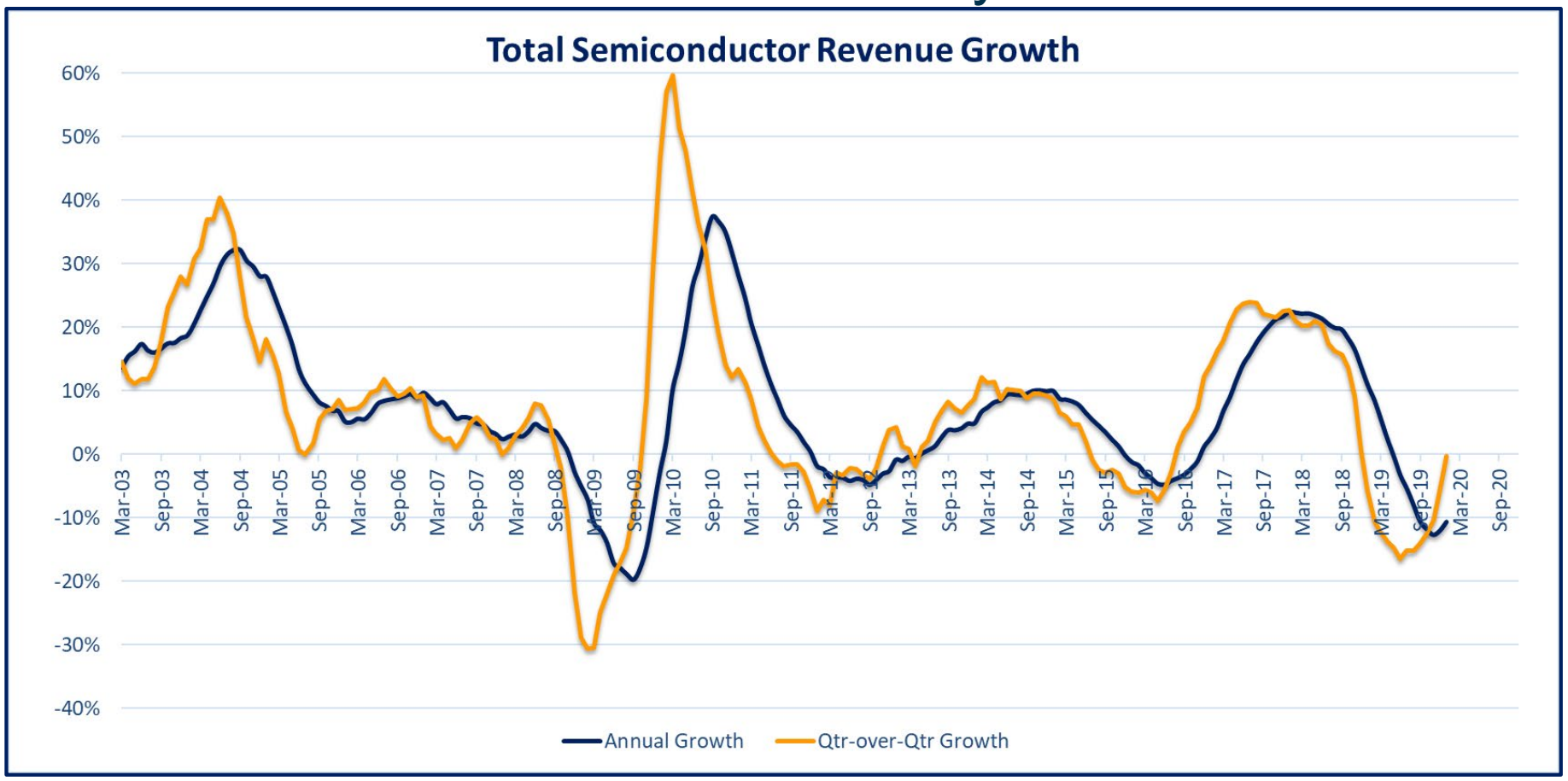
# Semiconductor Revenue Growth Cycle




- Strong annual market downturn started 26 months ago
- Quarter-over-Quarter trend solid indicator of recovery
- Positive Q-over-Q growth trending toward Q1 2020
- But then Coronavirus hits

Source – WSTS

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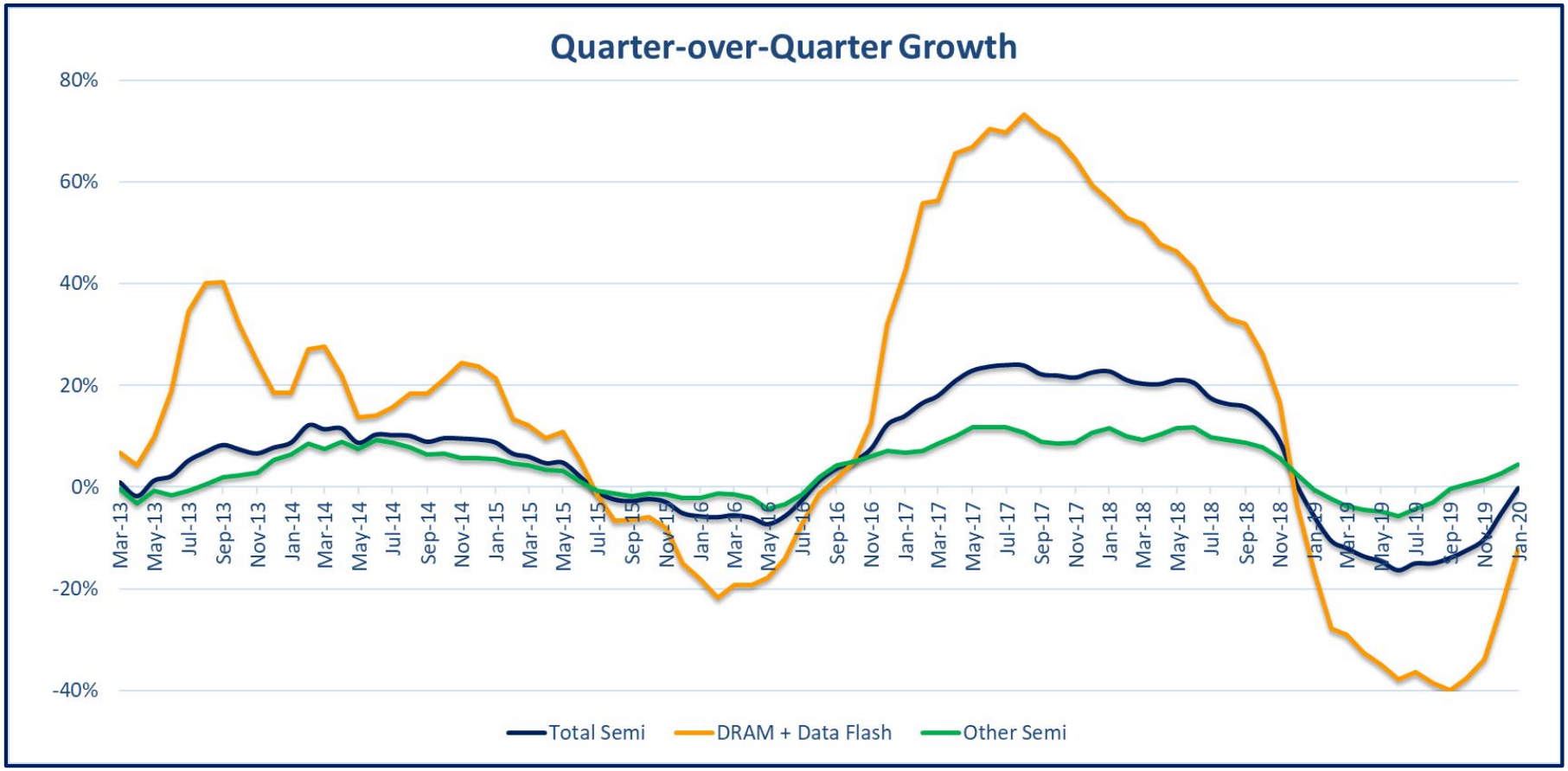
# Overall Semiconductor Growth Cycle Aligned

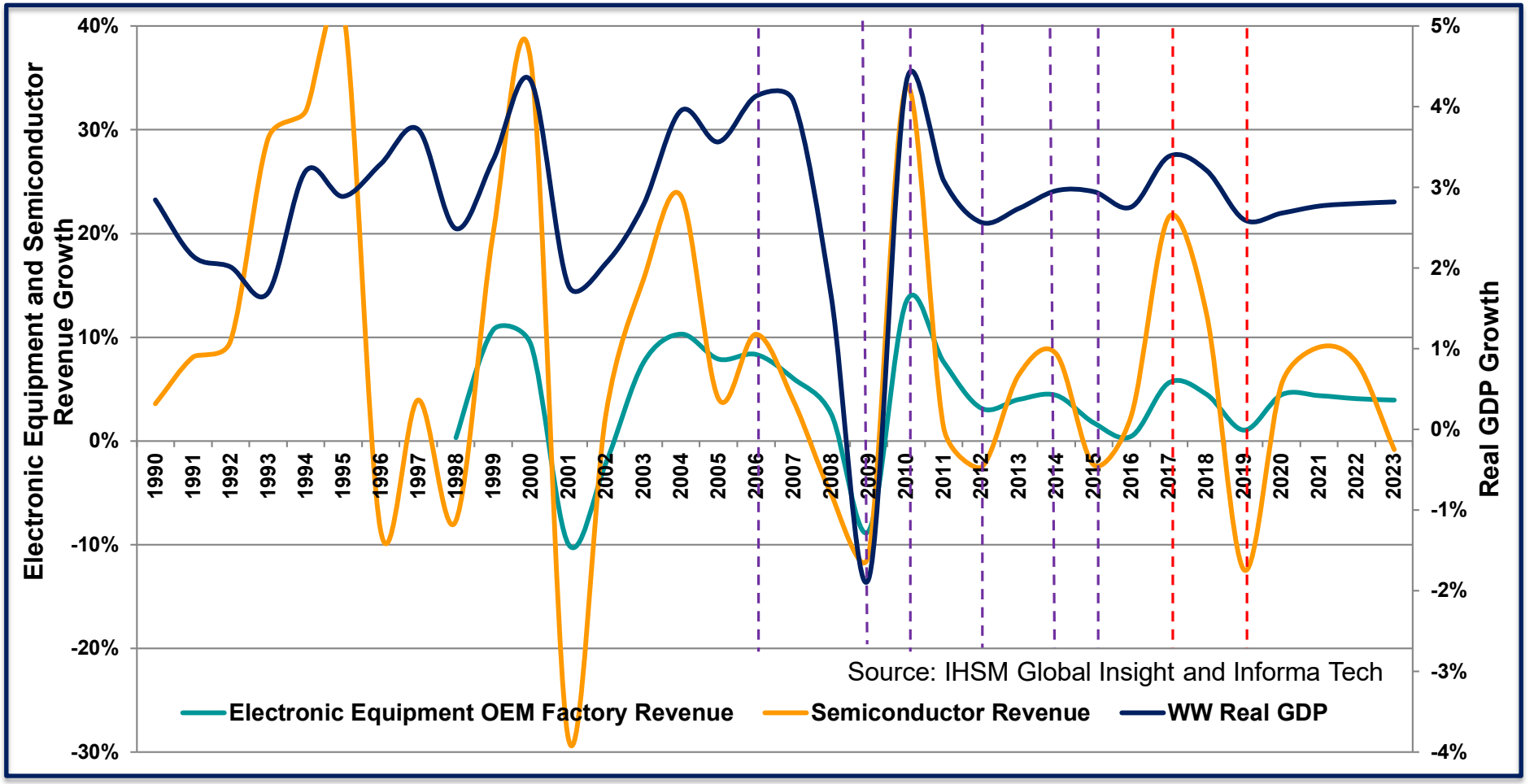



Source – WSTS

- Memory ICs pull out of their steep dive
- Other Semiconductors break into positive growth by end of 2019
- Likely dip/pause in Q1 with potential to resume growth by summer

# Semiconductor Revenue Growth Cycle

## GDP Relationship




- Current Cycle – Continues 20-year pattern of alignment with GDP
- Technology/Market forces aligning to support growth in 2020+

Connect. Influence. Optimize.

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# Semiconductor Market Outlook

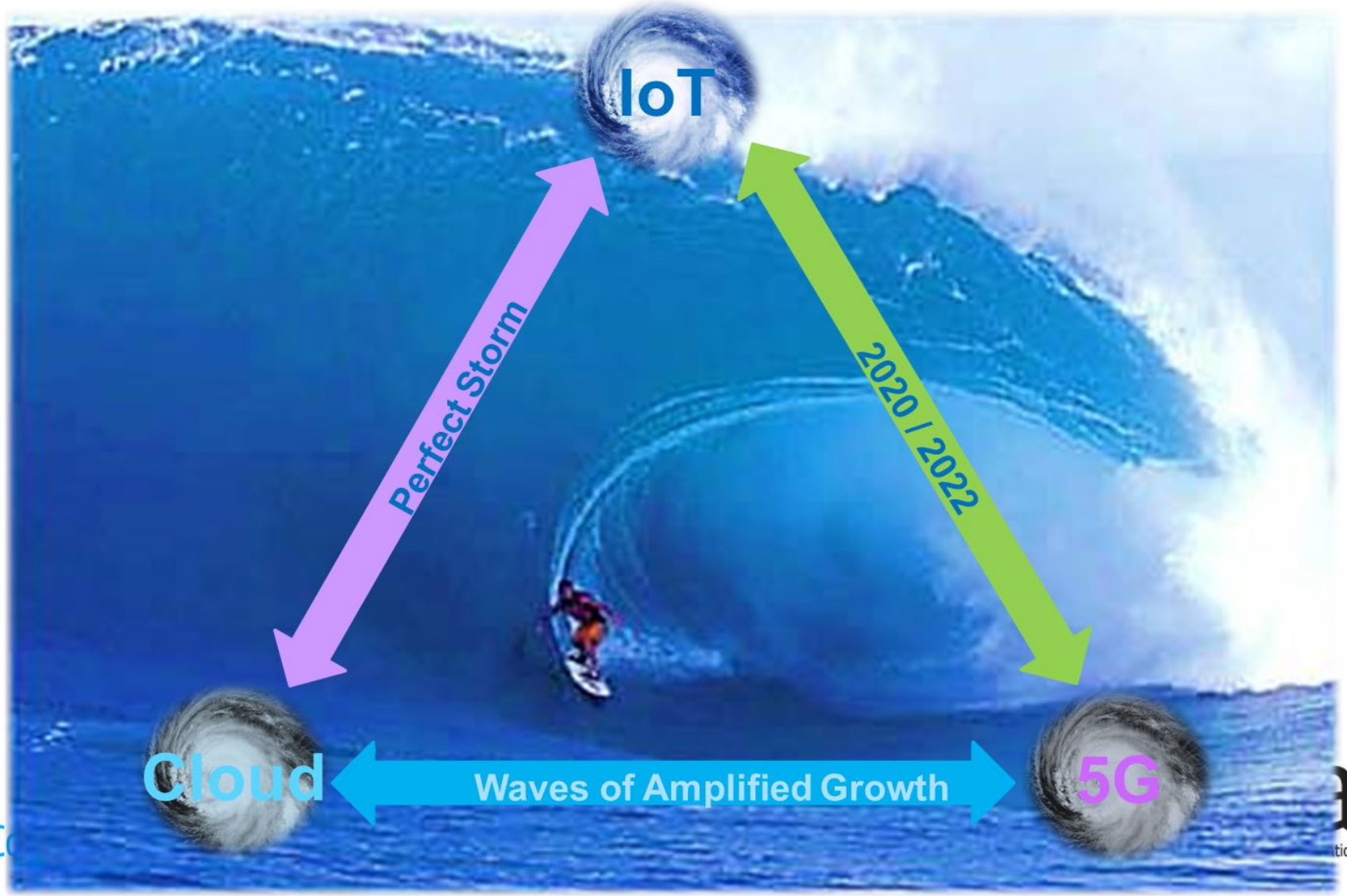
# Semiconductor / Electronics Components Market Outlook – Near-Term

Multiple potential scenarios:

- "Containment" of virus by March / April
  - Market dip through H1
  - Market snapback in H2 that could drive revenue growth up to 3% to 5%
- Large, regionally focused outbreaks extend into Q3
  - Market will not recover in 2020 and potential for revenue collapse by 20%
- Global pandemic continues into Q4
  - Global economic decline could suppress semiconductor market for multiple years
  - Potential for multiple company failures and market consolidation

# Market Outlook – Long Term Future Still Bright!

## The Developing Technology Triumverate



# Qualcomm Describes a Revolution

"5G mobile technology will, like electricity or the automobile, benefit entire economies and benefit entire societies. This is because the global 5G standard (5G New Radio) will advance mobile from largely a set of technologies connecting people-to-people and people-to-information to a unified connectivity fabric connecting people to everything."

# Opportunities Go Beyond 5G

## MIT Technology Review

Annual list of technological advances that we believe will make a real difference in solving important problems. How do we pick? We avoid the one-off tricks, the overhyped new gadgets. Instead we look for those breakthroughs that will truly change how we live and work.

1. Unhackable Internet
2. Hyper-personalized medicine
3. Digital Money
4. Anti-aging Drugs
5. AI-discovered Molecules
6. Satellite Mega-Constellations
7. Quantum Supremacy
8. Tiny AI
9. Differential Privacy
10. Climate Change Attribution


# Thank you!