Semiconductor Companies: Business Resilience in the Wake of COVID-19

A guide to the disruptive impacts & practical actions for semiconductor companies to take

May 2020
We’re all in this together

COVID-19 has turned into a global crisis, evolving at unprecedented speed and scale. It is creating a universal imperative for governments and organizations to take immediate action to protect their people.

It is now the biggest global event—and challenge—of our lifetimes. As such, it is changing human attitudes and behaviors today and forcing organizations to respond.

However, the need to respond won’t end when the virus’s immediate threat eventually recedes.
What this means for the semiconductor industry

COVID-19’s disruptive impacts are being felt in the near term and the full long-term impacts are still unknown. Companies are quickly needing to evaluate impacts on three fronts: supply chain, market demand and workforce.

- Global supply chains have disrupted as the virus spreads across the globe bringing uncertainty over quarantine durations
- Product demand is shifting across ASICS, memory, sensors, etc. while consumer behavior changes rapidly and with future volatility
- Workforce is affected by stay-at-home orders and the uncertainty of how long business as usual will be suspended for

No industry is immune to the impacts of COVID-19, including the semiconductor industry.

Overall, 2020 semiconductor revenue projection has been reduced by $55.0 billion, to $415.4 billion, and annual growth for 2020 has been reduced from 12.5% to 0.9%.

Impact to semiconductor revenue projections for 2020 by end-use application:
- Smartphone: -12.5%
- PC & Tablet: -5.8%
- Automotive: -24.0%
- Server: +16.7%

Resilience in semiconductors

Semiconductor companies have exhibited resilience in previous economic downturns

1. Semiconductor stocks showed resiliency, leading the recovery during the Great Recession of 2007-2009 and the subsequent year.
3. Though the causes and reactions to COVID-19 may be different, semiconductor players are showing similar market signs (e.g. correlation convergence, P/E compression) and risk-aversion mentality as in 2008.
4. Semiconductors are typically strong leading indicators of recovery, but the recovery speed and magnitude are dependent on contagion impact.
5. Recovery from COVID-19 will likely follow after several quarters of depressed results and be driven by future technology drivers, such as 5G.

Source: Bloomberg Intelligence, Yahoo Finance
# How the crisis impacts semiconductors

## Short-Term Impact

**Demand Disruption**
- Surge in demand for cloud/datacenter services, WFH products (ex: smart home devices, laptops, etc.), and medical devices
- Slowdown in production by Auto OEMs resulting in demand variation
- Reduction in demand for mobile phones and consumer electronics, driven by loss of income and stay-at-home orders

**Supply Disruption**
- Chip fabrication resilience given cleanroom environments
- Labor intensive OSAT operations disrupted given travel restrictions
- Shortages of critical components/materials given global supply chains and varying impacts and timing of COVID globally
- Logistics delays and challenges have given impact to transport

**Workforce Impact**
- Fast and massive shift to WFH required
- Rise in the need for employee and employer workforce flexibility and remote working tools
- Extended period of social distancing and “shelter in place” impacts employee morale

## Mid/Long-Term Impact

**Demand Disruption**
- Economic stimulus expected to bolster consumer spending, bringing demand levels back
- Accelerated demand for cloud and infrastructure to support distributed workforce
- Lower than expected auto sell-through in distribution channels and order push outs
- Shifting consumer priorities and buying patterns given economic uncertainty

**Supply Disruption**
- Investment in digital supply chain and control tower capabilities to improve supply network agility
- Further diversified supply chains across suppliers and locations—eliminating choke points
- Ramped up factory automation will reduce impact that labor shortages have on supply
- Product roadmap uncertainty, changes to product schedules and go-to-market strategies

**Workforce Impact**
- More robust WFH and “elastic workforce” capabilities
- Many employees will value enhanced flexibility of WFH options

## Impact

<table>
<thead>
<tr>
<th>Short-Term Impact</th>
<th>Mid/Long-Term Impact</th>
<th>Workforce Impact</th>
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<tbody>
<tr>
<td><strong>Favorable</strong></td>
<td><strong>Mixed/Neutral</strong></td>
<td><strong>Negative</strong></td>
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# Demand disruption: What to expect in each subsector

<table>
<thead>
<tr>
<th>AUTOMOTIVE</th>
<th>COMPUTING &amp; STORAGE</th>
<th>CONSUMER</th>
<th>IOT &amp; INDUSTRIAL</th>
<th>NETWORK &amp; COMMUNICATIONS</th>
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<tbody>
<tr>
<td>Slowdown in production by Auto OEMs resulting in demand variation</td>
<td>Strong datacenter and PC demand given WFH and study from home</td>
<td>Lower demand for mobile phones and consumer electronics fueled by workforce loss of income and quarantines</td>
<td>Surge in medical devices as global supply chains pivot</td>
<td>Greater bandwidth demand and increase in data center upgrades due to growing online presence (WFH, streaming, etc.)</td>
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<td>Consumer sentiment on immediate needs given reduced mobility impacting vehicle sales</td>
<td>Decrease in demand for consumer and small business systems</td>
<td>Strong demand in certain smart home categories (security, smart speaker) and consumer health</td>
<td>Reduction in capital budgets and delays in planned projects</td>
<td>Public perception of data infrastructure as an essential utility (e.g. work from home)</td>
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<tr>
<td>Lower than expected sell-through in distribution channels and order push outs</td>
<td>Accelerated demand for cloud and infrastructure to support distributed workforce</td>
<td>Planned ramp and consumer adoption of 5G unlikely to change</td>
<td>Accelerated demand for smart manufacturing to enable more digital workforce</td>
<td>Planned ramp of 5G remains highly visible and a national priority</td>
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<tr>
<td>Consumer priorities and buying patterns given the economic uncertainty</td>
<td>Rapidly changing consumer demand patterns given immediate vs. long term needs</td>
<td>Uncertainty in post crisis buying patterns given pent up demand coupled with economic fears</td>
<td>Impact</td>
<td>Favorable</td>
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Supply disruption: Understanding the many layers

To address the effects of disruptions like COVID-19, companies should recognize the unique characteristics and capabilities of each step in the direct manufacturing process, and how their global supply bases are impacted.

Further, companies should look beyond their immediate supply base and comprehend staggered disruptions to indirect components and suppliers as COVID-19 spreads.

Finally, companies should consider the relationship between these products and services as well as the shifting customer requirements to serve their broad array of unique needs.

Semiconductor companies operate in a complex ecosystem, working across the value chain with numerous raw material, assembly, test, package and equipment suppliers and partners globally.

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<thead>
<tr>
<th>Direct</th>
<th>Customer</th>
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<tr>
<td>FAB</td>
<td>Logistics</td>
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<td>Distribution</td>
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<td>Marketing &amp; Sales</td>
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<td>Segments</td>
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<td>Critical Needs</td>
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<td>Channels</td>
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<td>OSAT</td>
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<td>Assembly</td>
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<th>Indirect</th>
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<td>Raw Silicon</td>
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<tr>
<td>Probe Cards</td>
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<tr>
<td>Reticles</td>
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<tr>
<td>Semiconductor MFG Equipment</td>
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<td>Raw Materials</td>
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<td>Substrates</td>
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<th>CUSTOMERS</th>
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<tr>
<td>DIRECT MFG</td>
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<tr>
<td>INDIRECT COMPONENTS</td>
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<tr>
<td>CUSTOMERS</td>
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</tbody>
</table>

CUSTOMERS: Direct

- OSAT
  - Assembly
  - Test
  - SBT

CUSTOMERS: Indirect

- FAB
  - Foundries
  - IDMs
  - EDS/Probe

- Raw Silicon
- Probe Cards
- Reticles
- Semiconductor MFG Equipment
- Raw Materials
- Substrates

CUSTOMERS: Customer

- Logistics
- Distribution
- Marketing & Sales
- Segments
- Critical Needs
- Channels
Workforce impact and enablement: Semiconductor companies ahead of the curve

CULTURE AND ADOPTION
Given the globality and complexity of the semiconductor supply chain, many companies already have distributed workforce tools and capabilities in place around the globe that the workforce is familiar with.

ELASTIC COLLABORATION
Rapidly deploy and scale collaboration tools across the organizations to work with customers, suppliers and partners.

VIRTUAL WORK ENVIRONMENT
Evaluate network requirements, accelerate device deployment and scale virtual environments to support increased mobile/WFH demand.

SEAMLESS NETWORKING
Enable reliable and secure remote network connectivity to employees’ homes and standardize ways of integrating this technology with customers and partners.

RELIABLE SECURITY
With IP protection top-of-mind, enable appropriate security measures for virtual work environments. Automate with endpoint management detection and response, and deploy supporting business processes.
### Key actions: A holistic plan

<table>
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<tr>
<th>PHASES</th>
<th>TRIAGE &amp; PRIORITIZE</th>
<th>SENSE &amp; RECONFIGURE</th>
<th>SCALE &amp; MAINTAIN</th>
</tr>
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<tbody>
<tr>
<td><strong>SUPPLY CHAIN</strong></td>
<td>• “War room” mindset &lt;br&gt; • Understand and quantify exposure—push and pull in manufacturing accordingly &lt;br&gt; • Understand direct and indirect supply networks and conduct scenario-modeling</td>
<td>• Enable multi-source strategy with geographic diversity &lt;br&gt; • Leverage past supply disruptions to enable business continuity plans (earthquakes, tsunami)</td>
<td>• Diversify supply chain to mitigate dependencies on specific countries &lt;br&gt; • Update and maintain business continuity planning &lt;br&gt; • Invest in smart manufacturing capabilities and expand remote access capabilities, particularly in OSATs</td>
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<tr>
<td><strong>DEMAND</strong></td>
<td>• Analyze shifts in product demand volumes and revise product schedules to meet immediate needs &lt;br&gt; • Prioritize supply and sales efforts to high priority/value/critical demand</td>
<td>• AI-supported cash and working capital management &lt;br&gt; • Improve demand planning and scenario modelling capabilities &lt;br&gt; • Data-driven demand segmentation—understand customer shifts as a result of COVID-19</td>
<td>• Explore alternative revenue streams (aaS, subscription) &lt;br&gt; • Expand into ecosystem solutions to bring demand planning and technology portfolio planning together</td>
</tr>
<tr>
<td><strong>ELASTIC WORKFORCE</strong></td>
<td>• Assess current collaboration/WFH technology and ability to scale &lt;br&gt; • Create technology, communications, and change plan to deploy at speed</td>
<td>• Deploy current and new technologies to support elastic workforce &lt;br&gt; • Execute new ways of working and collaboration at all levels of company</td>
<td>• Permanently change ways of collaborating and working &lt;br&gt; • Create a more elastic workforce, especially in field services and customer support</td>
</tr>
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Perspectives from industry leaders

**Qualcomm**

“There is significant uncertainty around the impact from the coronavirus on handset demand and supply chain. Based on the information we have at this time, we are widening and reducing the low end of our guidance range. We remain in active contact with our employees, customers and suppliers as we continue to monitor the situation.” – Akash Palkhiwala, CFO - Qualcomm Q1 Earnings Transcript, February 5

**Intel**

“We have significant manufacturing operations in the U.S., Ireland, Israel, China, Malaysia, and Vietnam... There is considerable uncertainty regarding such measures and potential future measures, and restrictions or disruptions of transportation could limit our capacity to meet customer demand and have a material adverse effect on our financial condition and results of operations.” - Intel SEC Filing 424B5 Prospectus, March 20

**Broadcom**

“Broadcom’s supply chain was not impacted to any “meaningful level” due to the outbreak, but there was a slowdown in demand. There is no doubt COVID-19 has created a high level of uncertainty, which we can’t help but think is going to have an impact on our semiconductor business, in particular, in the second half of the fiscal year,” Hok Tan, CEO - Reuters, March 12

**Samsung**

“Samsung Austin Semiconductor currently has no plans to close its Austin fabrication plant. The health and safety of our employees are the highest priority. In technology, fabrication is a part of the computer chip manufacturing process. Because the process requires facilities to be completely uncontaminated, employees who work inside the fabrication plant will have protection from infection,” said company spokeswoman Michele Glaze. – Statesman News, March 18

**ASML**

“Our second-half revenue is about flattish or may decline slightly,” CFO Wendell Huang, citing what the company saw as a "temporary" impact on demand from the coronavirus, which TSMC expects to be stabilized by June. Huang said the coronavirus was expected to hit demand for electronics, including smartphones, but it would be balanced by continued fifth generation (5G) mobile communication technology deployment and strong demand for faster chips.” - Reuters, April 16

“Until now the COVID-19 outbreak has had a limited impact on ASML’s manufacturing capability. Also, from a customer point of view, we have not seen a reduction in the demand for our systems this year. However, three COVID-19 related effects have impacted our Q1 financial results. We expect the revenue that we were not able to recognize for Q1 as a result of the issues listed above, to shift to Q2 and Q3 of this year.” - Peter Wennink, President and CEO - Press Release, March 30
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Further reading

COVID-19: Mitigating the impact in the High Tech industry

Human resilience: What your people need during COVID-19
COVID-19: Navigating the human and business impact
COVID-19: Responsive customer service in times of change
Productivity in uncertain times through the Elastic Digital Workplace
Building supply chain resilience: What to do now and next during COVID-19
To help our clients navigate both the human and business impact of COVID-19, we’ve created a hub of all of our latest thinking on a variety of topics.

Each topic highlights specific actions which can be taken **now**, and what to consider **next** as industries move towards a new normal.

From leadership essentials to ensuring productivity for your employees and customer service groups to building supply chain resilience and much more, our hub will be constantly updated. Check back regularly for more insights.

**VISIT OUR HUB HERE**
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