



BUILD ELECTRONICS BETTER

THE IMPACT OF THE CORONAVIRUS (COVID-19) EPIDEMIC ON ELECTRONICS MANUFACTURERS



Results of an IPC Fast Facts Survey

February 2020

EXECUTIVE SUMMARY

A recent outbreak of the coronavirus, named COVID-19 by the World Health Organization (WHO), is raising alarms not only about the immediate human toll of the epidemic but also about the short-term and long-term effects on the global economy, including the electronics manufacturing industry.

As of February 20, 2020, COVID-19 has infected 75,748 individuals worldwide and killed 2,129 since it was first reported in Wuhan, China, on December 31, 2019. Almost all the cases have occurred in China, but the virus has spread to at least 30 other countries. ¹

Many workplaces in China have been shut down; workers have been confined to their homes; and shipping has been disrupted. Travel bans have been put in place that have inhibited workers from returning from Lunar New Year holiday travels.

IPC surveyed its members on this issue between February 11th and February 16th, 2020, and here are the highlights of what they told us.

- **The overwhelming majority (84 percent) of electronics manufacturers and suppliers said they are concerned about the impacts COVID-19 will have on their business operations.**
- **Roughly 65 percent of respondents reported being told by their suppliers that there will be delays in shipments due to COVID-19.** Companies in this situation report they are being told to expect delays of three weeks, on average.
- **Electronics manufacturers expect delays to be longer than what their suppliers are currently quoting.** On average, executives expect shipment delays to be at least five weeks. While 91 percent of companies are being told to expect shipment delays of four weeks or less, only 55 percent of respondents expect the delays to be that short. And while no companies currently report they are being quoted delays of more than six weeks, some 16 percent of respondents expect shipment delays related to COVID-19 to be longer than six weeks.

¹ For the most current update and advice to the public, please see the WHO's daily Coronavirus disease 2019 (COVID-19) Situation Report at <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports>.

Introduction

Shipping delays from any country affected by the COVID-19 virus – but especially from China, which is a major supplier to the global industry – can cause several negative impacts for manufacturers. First, many U.S. and European-based manufacturers rely on inputs from China in order to produce finished goods in their domestic factories. Delays in these inputs result in delays in production of finished goods. Second, delays also result in lower capital utilization rates, because factory downtime increases while waiting for supplies, which in turn translates into higher average costs and suboptimal financial performance. Third, while some companies will seek alternative sources, this will require the investment of significant time by manufacturers and often incur higher costs. By definition, alternative sourcing is almost always a more expensive, second-best alternative.

Fourth, delays in production in China could produce delays in design and prototyping that could hurt the introduction of new products over the next year. Finally, delayed sales are often difficult to recoup, even after supply delays and other constraints are lifted. While production does resume with the return of input supplies from China, U.S. and European-based manufacturers will be unable to take on new orders because they will be fulfilling existing orders. Because manufacturers can't operate above full capacity utilization, they can't take on new orders above what would return them to full production rates.

Already companies have indicated some degree of impacts from COVID-19, and the full impacts have yet to be felt. Apple recently announced it would not meet previously announced sales projections for the current quarter. Both Hyundai and Nissan have announced production suspension outside of China due to the delay of parts. Research by Shanghai's American Chamber of Commerce found that two-thirds of U.S. businesses operating in China expect demand to be lower as a result of COVID-19.

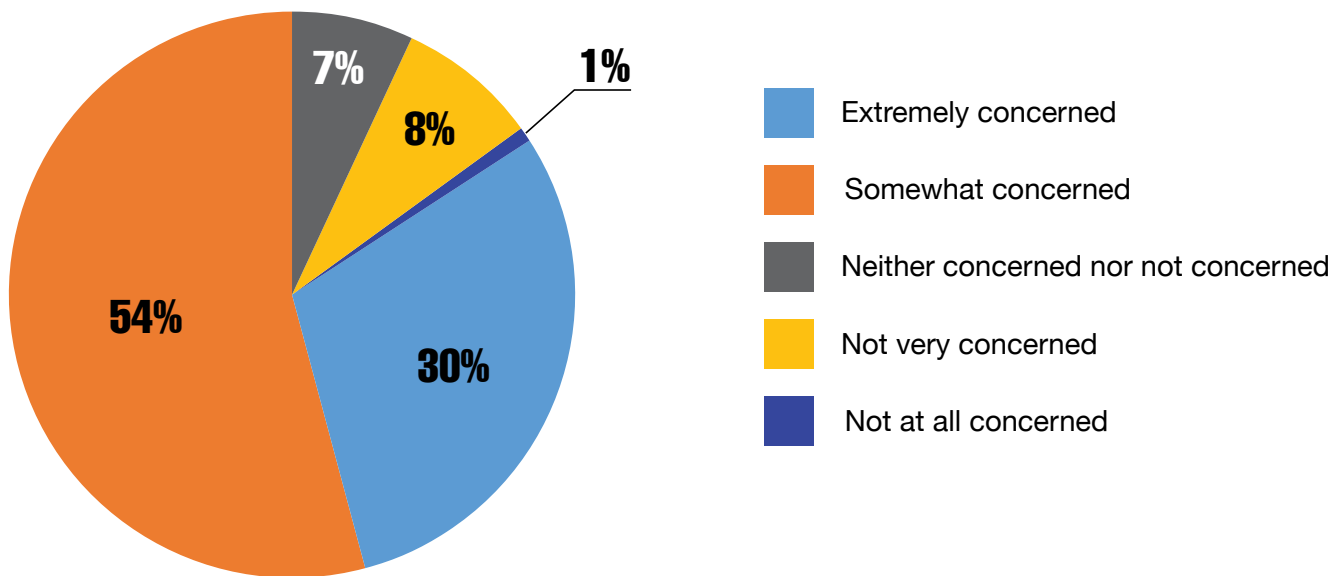
The economic impacts of COVID-19 will be pronounced. China is the world's second-largest economy and has strong ties to many parts of the globe. Economists predict the impact of COVID-19 will cut first quarter GDP growth in China significantly and shed a percent point from full-year growth. In turn, global GDP growth is now expected to be 0.5 percent slower than previously expected.

The focus of this study was to examine what electronics manufacturers were being told by their suppliers with respect to delays as a result of COVID-19; what they actually expected those delays to be; and how they were adjusting their operations as a result.

Electronics Manufacturers and Suppliers are Very Concerned About the Impacts COVID-19 Will Have on Their Businesses

The vast majority of electronics manufacturers who responded to IPC’s survey reported they are concerned about the impacts COVID-19 will have on their businesses. Some 30 percent of respondents reported they are “extremely” concerned, while 54 percent reported they are “somewhat” concerned. Only one company replying to the survey reported they are not at all concerned about the impacts on their operations.

Figure 1: Electronics Manufacturers and Suppliers are Concerned about the Impact of COVID-19



Electronics Manufacturers and Suppliers are Being Told There Will Be Shipment Delays

Companies replying to IPC’s survey reported that they are expecting delays in shipments of materials and components due to COVID-19. Roughly 65 percent of respondents reported they are being told by their suppliers to expect such delays. Twenty-four percent of companies reported their suppliers had not yet projected any shipment delays, and 11 percent weren’t sure of the status of shipments.

Electronics manufacturers take shipment times into account when they commit to downstream delivery dates, and when they place orders with upstream suppliers. Longer shipment times may cause electronics manufacturers to place a higher quantity of orders to boost long-term certainties. Longer lead times for inputs may also cause electronics manufacturers to quote longer time estimates for finished goods. Because electronics manufacturers build intermediate or finished products from raw or intermediate inputs, even the delay of a single input can cause a ripple effect of delays down the supply chain.

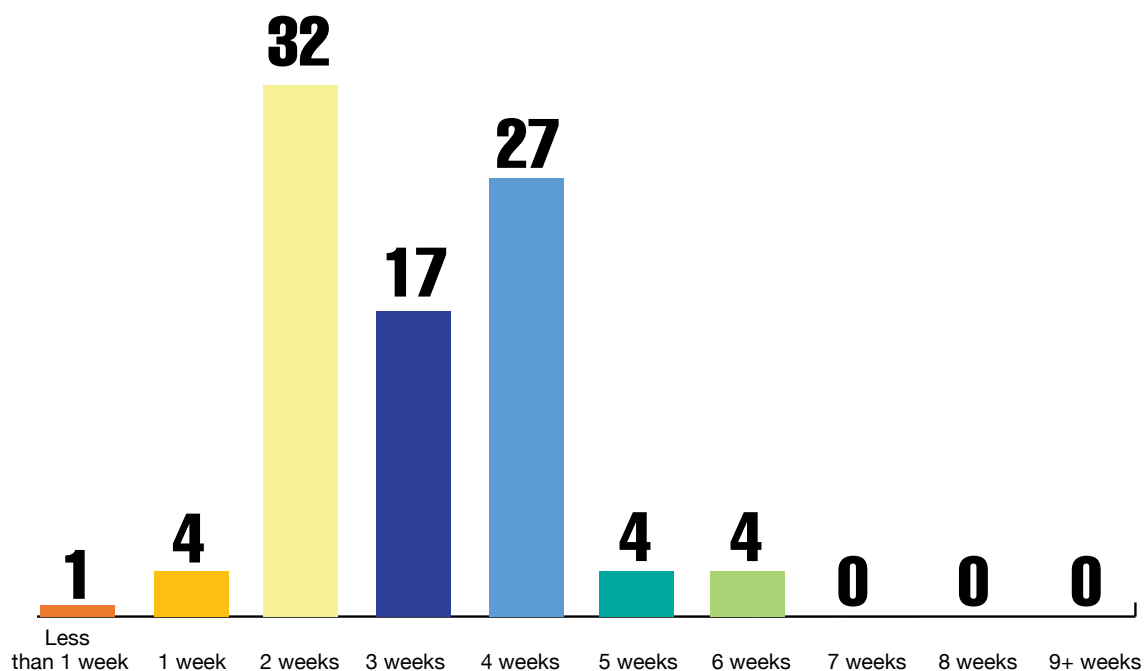
Table 1: Most Electronics Manufacturers and Suppliers are Being Told There Will Be Delays

Industry Segment	Yes	No	Don't know
Contract electronics manufacturing services (EMS)	28%	3%	2%
Suppliers of equipment for board fabrication, assembly, test, etc.	6%	3%	3%
PCB fabricators/suppliers	8%	2%	1%
Original Equipment Manufacturers (OEMs)	8%	2%	0%
Suppliers of materials (e.g., laminate, chemicals, finishes, solder)	5%	4%	1%
Wire harness and cable assembly manufacturers	3%	2%	1%
Suppliers of components	3%	1%	1%
All Others	3%	5%	3%

Q: Are you being told by your suppliers that there will be a delay as a result of coronavirus (COVID-19)?

At the time of the survey, companies reporting delays said that on average they were being told by their suppliers to expect a three-week delay in shipments. Some 36 percent of companies reported they were being told to expect a two-week delay, while 30 percent were being told to expect a four-week delay. Some 42 percent of companies (37 companies) reported they were being told to expect a one- or two-week delay, while 49 percent (44 companies) were being told to expect a three- or four-week delay. No companies were being told to expect a delay longer than six weeks.

Figure 2: On Average Companies are Being Told to Expect a 3-Week Delay



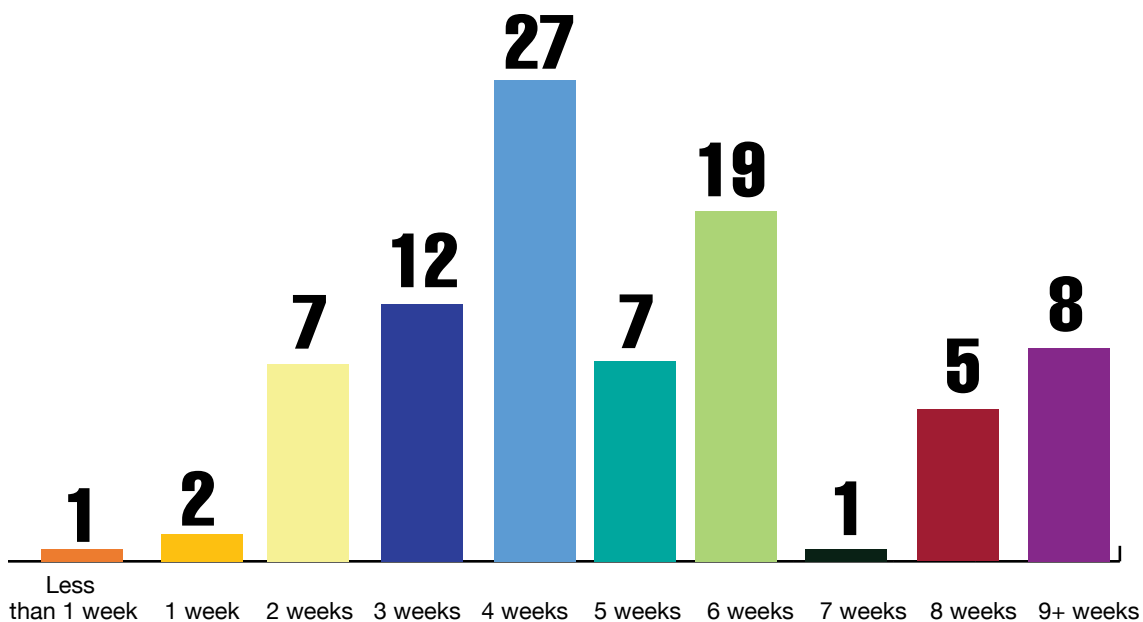
Q: What additional delay are you being quoted by your suppliers as a result of coronavirus (COVID-19)? (Shown: Number of respondents)

Electronics Manufacturers Expect Actual Delays to Be Longer

IPC members were also asked what they believed the actual delay in shipments from their suppliers would be. On average, respondents expected shipment delays to be just over five weeks. Only 11 percent (10 companies) of respondents expected the delays to be two weeks or less, and just over half (55% or 49 companies) expected shipment delays to be four weeks or less. More than a third (37 percent or 33 companies) of respondents expected shipment delays related to COVID-19 to be six weeks or longer.

There are several reasons why electronics manufacturers and their suppliers might expect delays to be longer than what they are being told by their suppliers. Manufacturing capacity and utilization are two factors that work in tandem. When suppliers have low manufacturing utilization rates, there is significant short-term pain even though they generally have the potential – over time – to boost production and shorten shipment times. COVID-19 has curtailed utilization rates significantly – first as a result of forced factory closures in China that drove utilization rates to zero, and then as travel bans kept many workers from returning to work after the Lunar New Year holiday. As a result, while some Chinese factories have resumed production, many are below previous utilization rates because of labor shortages.

Figure 3: On Average, Companies Expect Just Over a 5-Week Delay in Shipments



Q: In actuality, what do you believe the additional delay will be from coronavirus (COVID-19)? (Shown: Number of respondents)

COVID-19 is Already Impacting Electronics Manufacturers, and this Impact will Reverberate Down the Supply Chain to Businesses and Consumers

In some instances, companies are reporting that COVID-19 has already caused delays in manufacturing products. Electronics manufacturers have begun communicating these delays to their customers further down the supply chain. The primary cause is delayed shipments in key inputs like bare boards and other components. As one respondent noted, “delays of some components are delaying system shipments,” or the finished products that manufacturers produce.

Shipment delays are likely to have more severe impacts on small businesses, which have less influence over suppliers and less flexibility to adapt. Large companies will likely use their relative size and market power to obtain supplies as they become available to the detriment of smaller businesses with less market power.

Electronics Manufacturers are Already Responding to the Effects of COVID-19

Companies are responding in several ways to the impact of COVID-19-related supply disruptions.

First, companies are trying to access currently available stock. Companies report they have tried to get available stock, including stock in non-traditional “grey” markets. Secondly, companies report they are seeking alternative sourcing, including looking outside of China to places like South Korea, India, and domestically in both the United States and Europe. This echoes the results of other research by groups like the American Chamber of Commerce which found firms accelerating plans to shift production outside of China. Finally, in some instances electronics manufacturers and suppliers are offering their customers alternative materials and inputs.

In many instances, companies are doing little more than monitoring new developments and staying in constant contact with their suppliers. Some companies have told IPC that they have inputs in inventory on hand and can weather supply delays of up to two or three months. Delays that last longer than two or three months may trigger delays in their manufacturing operations and have detrimental effects on overall production.

Delays in shipments of inputs and finished goods may be tolerable if the entire supply chain can wait for operations to come back to normal. However, some delays may result in revenue shortfalls that will never be recouped, especially for time-based services such as transportation (airlines) and hospitality (hotel rooms). But even for durable goods, forgone purchases can be difficult to recoup in later periods. For example, North American holiday order commitments are typically made in the April-to-May time frame. Delays beyond April and May could lead to missed sales opportunities during the 2020 holiday shopping season.

In many cases, it isn't possible for manufacturers to change suppliers quickly or easily. First, companies need to qualify any new inputs to their own satisfaction and their customers'. Qualifying new inputs can take weeks, months, or in some cases more than a year. Secondly, most electronics manufacturers will have long-term contracts for inputs, which may be difficult or expensive to break; and changing to more expensive sources might not be feasible.

Specific examples of how electronics manufacturing companies are affected by and responding to the COVID-19 epidemic are reflected in their verbatim responses to the open-ended question in IPC's survey (see Appendix 2).

Manufacturers Will Contend with More than Just Delayed Supplier Shipments

Delays in transportation networks will further impact supplier shipments. Transportation networks are finite, with a limited amount of international shipping capacity. As manufacturing ramps back up to full production, transportation bottlenecks are likely to arise.

Already transportation networks are out of balance. Empty cargo containers are piling up at U.S. West Coast ports, waiting to go back to Asia. Limited commercial air travel between China and the rest of the world is also limiting air freight capacity. Major shipping companies like Maersk, Hapag-Lloyd, MSC Mediterranean Shipping, and CMA-CGM have all said that they've reduced the vessel capacity on seaborne trade routes between China and other countries like the United States.

Economic Impacts Will Be Pronounced

Global oil demand has been hit hard by COVID-19. The International Energy Agency now expects demand to fall by 435,000 barrels per day (kb/d) year-over-year in the first quarter of 2020, which would mark the first quarterly contraction in more than 10 years.

After the 2002-2003 epidemic of severe acute respiratory syndrome (SARS), which also arose in China, that country suffered months of economic contractions before rebounding. There is reason to believe the same or worse could happen after COVID-19. The Chinese economy is growing more slowly now, at around 6 percent annual growth, compared to 10 percent annual growth in 2003. Moreover, China is twice as indebted now as it was in 2003.

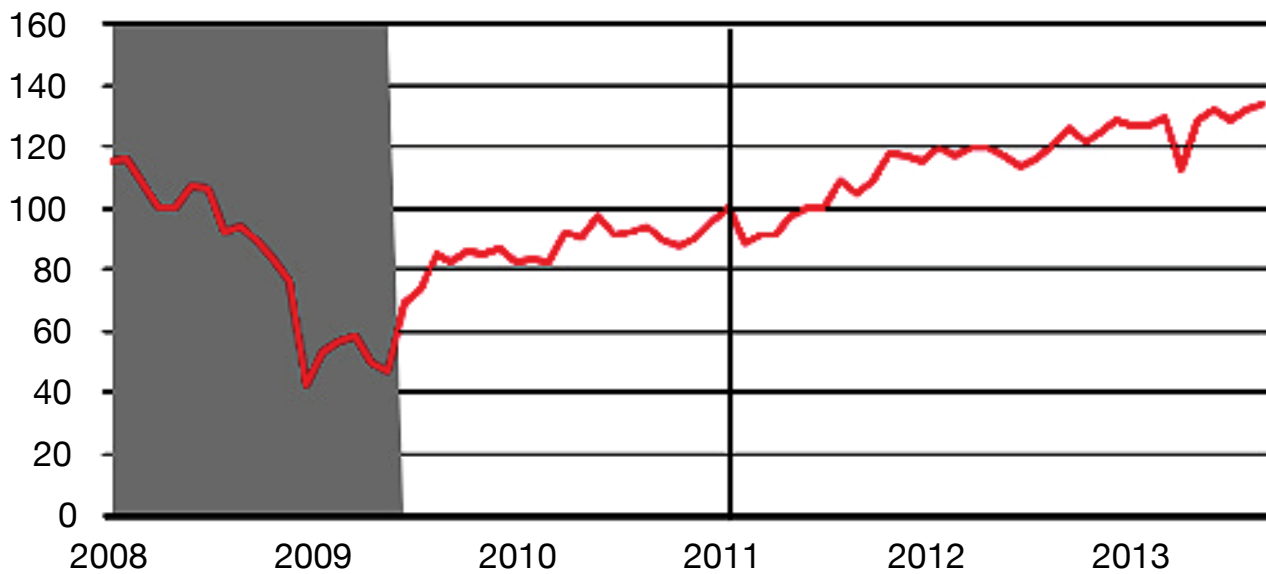
The risk of economic contagion is also high. Japan recently reported that its economy shrank by an annualized rate of 6.3 percent in the fourth quarter of 2019, the worst contraction since mid-2014 and many experts believe the current quarter will be equally challenged. As Japan's manufacturing sector is highly interconnected with China's, another negative influence could contribute to further contraction.

Interconnected industry sectors will also be impacted. For example, while manufacturing inventory levels appear relatively strong now, spot shortages could impact production. After the 2011 Tohoku earthquake and subsequent tsunami that hit Japan, industrial production and transportation networks were severely affected for months, triggering a ripple effect in North America, where U.S. motor vehicle assemblies declined and didn't recover to pre-earthquake levels for five months.

Figure 4: U.S. Motor Vehicle Assemblies Fell after Tohoku Earthquake

U.S. Motor Vehicle Assemblies

Index 100=March 2011, Tohoku Earthquake March 112, 2011



Source: Board of Governors of the Federal Reserve System

Appendix I: Methodology

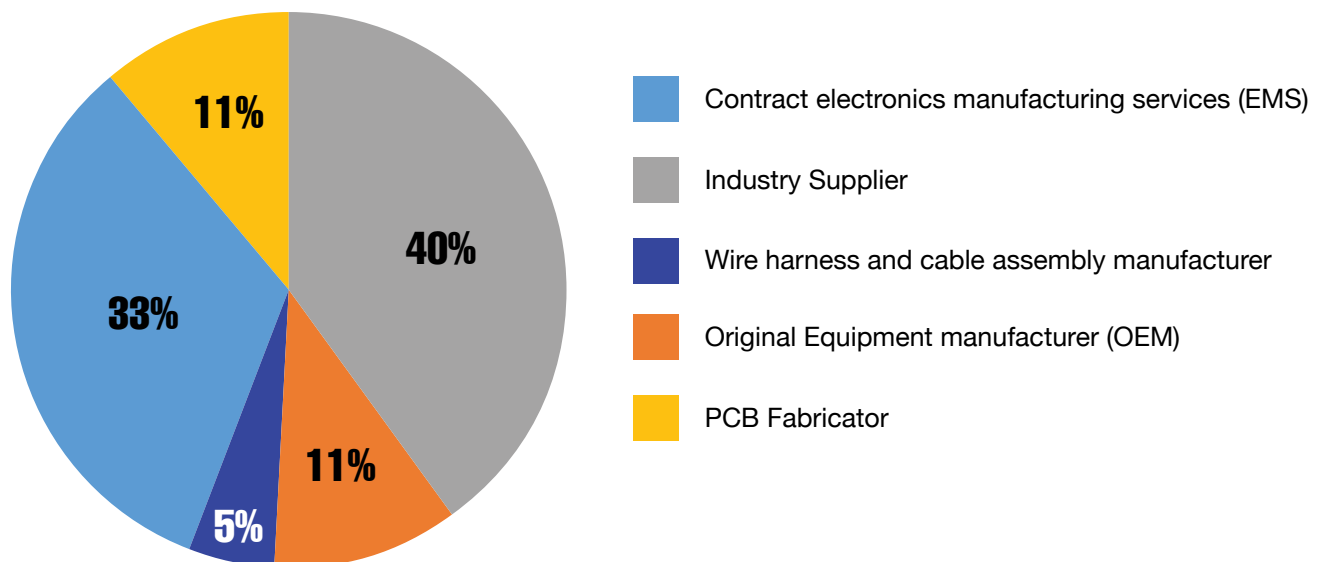
Study Objective

The mission of IPC is to support companies and individuals in the electronics industry worldwide through standards, education, advocacy and solutions that enhance their competitive excellence and financial success. Currently, the impact of COVID-19 on company operations and global supply chains is of concern for the industry. IPC seeks to understand the impact of COVID-19 on electronics manufacturers and how companies are responding to this new challenge.

About the Survey and Respondents

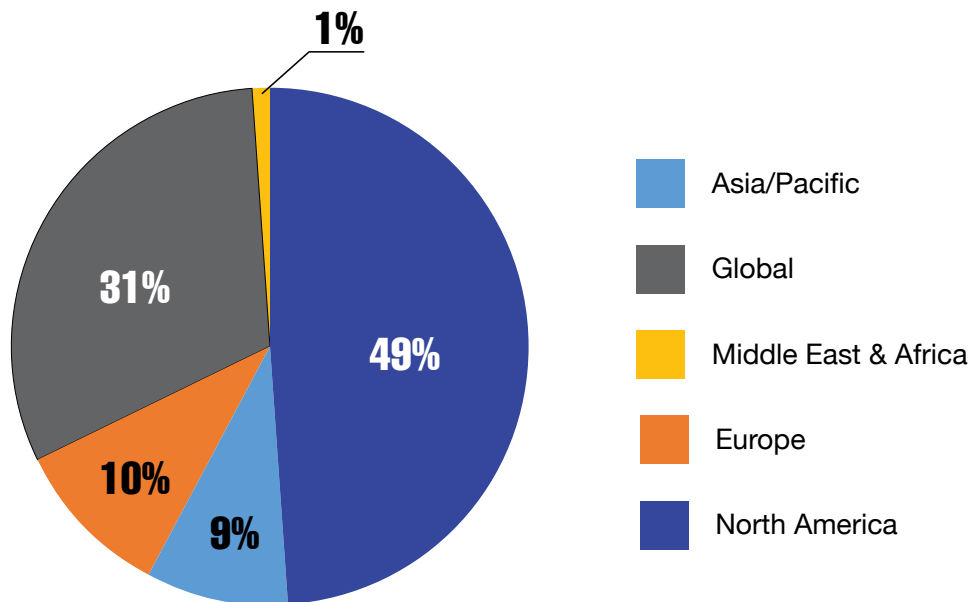
The aggregate data in this report is based on responses provided by 150 electronics manufacturing companies and suppliers who participated in IPC’s “Fast Facts” COVID-19 Survey between February 11 and February 16, 2020. The survey was sent to contacts in middle and upper management at electronics manufacturing companies, including original equipment manufacturers (OEMs), electronics manufacturing services (EMS) companies, printed circuit board (PCB) fabricators, and industry suppliers.

Figure 5: Industry Representation



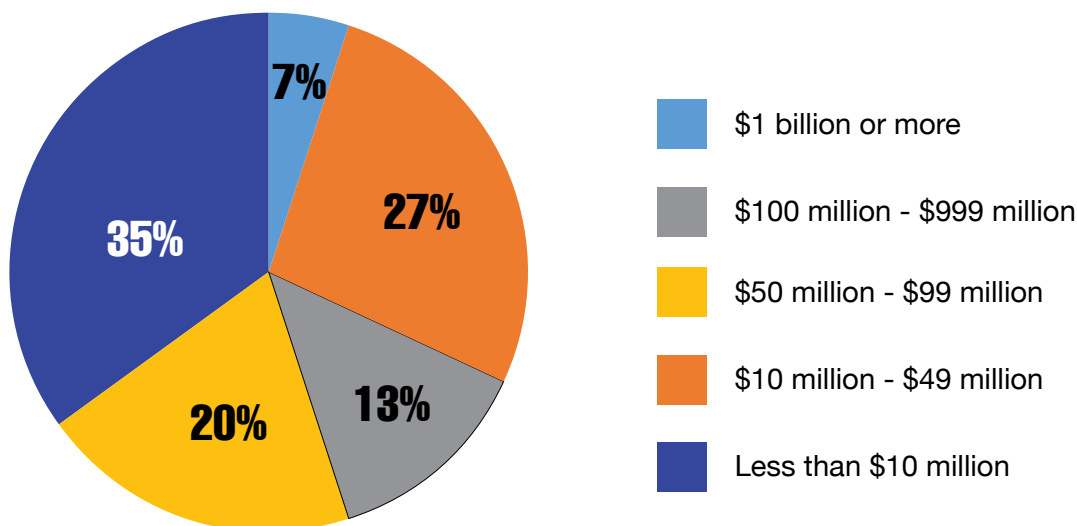
Q: Which of the following best describes your company’s primary industry segment?

Figure 6: Region for which Company is Reporting in this Survey



Q: Please select the primary region on which you are reporting for your company. Please select "Global" if your response covers operations worldwide or in several regions with none being the primary region.

Figure 7: Size of Company (Annual Sales USD)



Q: Please indicate the size of your company based on annual sales (in US dollars).

Appendix II: Verbatim Responses

Respondents offered the following verbatim comments about the various actions they are taking in response to the tariffs. (Some responses have been edited for length and/or grammar.)

Q: How is the coronavirus (COVID-19) affecting your business and what steps are you taking in response?

Verbatim Comments	Industry Segment
Look for North American sources to build custom mechanics as well as explore distribution of materials in the grey market.	Contract electronics manufacturing services (EMS)
Delay in deliveries; countermeasure: import from other (EU/US) suppliers, but more expensive!	Contract electronics manufacturing services (EMS)
COVID-19 is affecting our business seriously. About 10% of our suppliers have confirmed delayed start of their operations. So far, we have 50% of our factory workers returning to work after CNY and the balance are trickling in slowly. This is forcing us to run the factory at 50% capacity and affecting box-build operations seriously. Step 1: Trying to find alternate suppliers who can help to feed the raw material supply chain while our Preferred Suppliers start working at full speed. Step 2. Finding additional labor locally which is not easy when everyone is looking for the same. Step 3. All workers are being screened for fever and coughing before going into the factory. Step 4. All new workers travelling from other China province are quarantined in dormitories for 2 weeks.	Contract electronics manufacturing services (EMS)
Deliveries are being delayed, there are notices of suppliers stopping production for an indefinite period. Tried to haul all the components from suppliers' stock asap. Some successful, some not. Seems like the pipeline will empty and will experience line stops in 4-5 weeks	Contract electronics manufacturing services (EMS)
PCB made in China. Moving our short-term requirements to other countries	Contract electronics manufacturing services (EMS)
Alternating supply chains, constant communication, insource, leveraging size to get priority.	Contract electronics manufacturing services (EMS)
Very minor effect. We have a contingency plan for disruption to parts coming out of China which was activated 3 weeks ago, so almost all effects/risks have already been mitigated.	Contract electronics manufacturing services (EMS)
Offering customers alternate materials	Contract electronics manufacturing services (EMS)
Causing delays in manufacturing product	Contract electronics manufacturing services (EMS)
Notifying customers of likely shipping delays	Contract electronics manufacturing services (EMS)
moving orders from china to India	Contract electronics manufacturing services (EMS)
Supply change disruption - spot domestic sourcing to assure raw material supply	Contract electronics manufacturing services (EMS)

Verbatim Comments	Industry Segment
delivery delays and we shut down product lines	Contract electronics manufacturing services (EMS)
The factory can't get workers, and there's a threat of a 2-week quarantine if even one of them gets sick. With such a shortage and risk of shutdowns, we really have no idea when product can ship, and we don't know if we can get components to fill new orders.	Contract electronics manufacturing services (EMS)
creating significant shipping delays waiting for PC boards and parts. purchasing from US PC board manufacturers where increased cost is allowable.	Contract electronics manufacturing services (EMS)
Delay in bare boards	Contract electronics manufacturing services (EMS)
causing delays in deliveries to customers. We're doing nothing that I'm aware of in response.	Contract electronics manufacturing services (EMS)
Plants unable to get back up to speed. We are in constant contact. Our concern is that others that supply OEMs will fall down effecting OEM ability to produce - therefore effecting our revenues	Contract electronics manufacturing services (EMS)
Delay in receiving materials that are sourced from the region that will impact our abilities to complete orders for our customers. We are in constant touch with our suppliers and are comminucating this information with our customers. Daily / weekly communication from both supplier and end customer are key	Contract electronics manufacturing services (EMS)
Our problem is bare circuit boards...we are trying to re-source domestically	Contract electronics manufacturing services (EMS)
There is not much we can do. We placed orders in anticipation of Chinese New Years but when this happened during Chinese New Years, there wasn't too many steps we can take. We may have to lay off a few employees until we can have product being shipped again.	Contract electronics manufacturing services (EMS)
Finding alternate sources where possible. Staying in contact with suppliers from affected regions.	Original Equipment Manufacturer (OEM)
Delays in new project development. Delays in production and shipment. We are gathering information from as many sources as possible and staying in close contact with all our suppliers, in order to try to get the highest priority as they resume the activities.	Original Equipment Manufacturer (OEM)
Delays in delivery that are affecting our production processes.	Original Equipment Manufacturer (OEM)
Longer lead times for PCBs, transformers, magnetic cores, etc. Will need to use higher cost, longer lead time, alternate vendors. Lead times to our customers will be extended.	Original Equipment Manufacturer (OEM)
I belive the worst is yet to come. The Chinese local government is fully overwhelmed with this process and could take weeks to get flushed out for factory production starting. Even when the factory gets started, we are very concerned about being able to get product to customers based on the air transportation situation. Meaning commercial aircraft belly space is gone. We are reliant on logistic carriers which are fully backed up. This is also impacting our US production as we are dependent on Chinese suppliers.	Original Equipment Manufacturer (OEM)
additional cost and income delay, additional credit lines	PCB Fabricator
Product and material lead time concerns. Looking at alternate sourcing.	PCB Fabricator
Maintaining high level of communication and utilizing suppliers outside of China	PCB Fabricator
Temporarily limited workforce availability due to logistic limitation	PCB Fabricator

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Verbatim Comments	Industry Segment
As of today it is not affecting the business but we are proactively identifying the risk to the business on a part number basis.	PCB Fabricator
essential parts are being delayed. safety stock is being used.	Industry Supplier
We were affected since most of our suppliers are located in China. outsourcing now from Japan, Korea, Taiwan, India, Asia	Industry Supplier
Certain components are delayed that delay system shipments.	Industry Supplier
We have customers in China who have a purchase order with us which has been on hold for weeks. Their company has been partially shut down.	Industry Supplier
Concerned about incoming supply of China sourced components used in our products. Mitigating through second sourcing from other locations (ex. MX). Concerned about outgoing shipments, primarily as it relates to available air freight capacity to China	Industry Supplier
Equipment not arriving in time. Needs to find another location to get equipment built.	Industry Supplier
Unavailability of component parts delaying ability to support existing product and prepare new product for sale.	Industry Supplier
Paying more for inventory in the short term to maintain customer support.	Industry Supplier
Shortage of raw materials and reduction of our sales.	Industry Supplier
Coordinating alternate logistics and raw material sources	Industry Supplier
Creating alternate options	Industry Supplier
Longer downtime than expected at our production facility in China due to the government order. Started operating at 10% of its production capacity, and is expected to increase up to 60% in two weeks.	Industry Supplier
longer lead times	Wire harness and cable assembly manufacturer
Waiting to evaluate actual impact. Alternate supply options are being considered.	Wire harness and cable assembly manufacturer



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IPC is the global association that helps OEMs, EMS, PCB manufacturers, cable and wiring harness manufacturers and electronics industry suppliers build electronics better. IPC members strengthen their bottom line and build more reliable, high quality products through proven standards, certification, education and training, thought leadership, advocacy, innovative solutions and industry intelligence.