

2022 Second Edition



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Supply chains drove most questions for pro AV when the novel Coronavirus first reared its ugly head and shut down Hubei province in central China. At the time, we never could have guessed

that supply chains would still be our industry's top concern two years later,, especially not driven by a historic spike in demand. But we've learned to expect the unexpected. Today, the unexpected reality is an unprecedented level of supply difficulties, above and beyond the challenges experienced throughout the pandemic.

Given this crescendo in difficulty, we now revisit our previous research on pro AV supply difficulty– published less than a year ago in the third quarter Macroeconomic Trends Analysis report–to keep you updated on causes, effects, and responses.

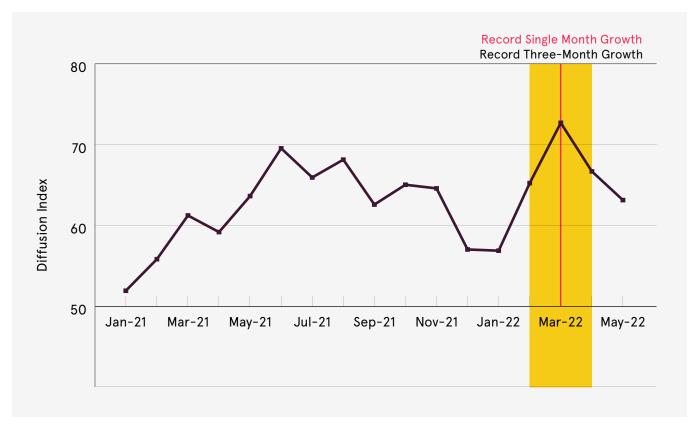
Our research reveals more change than expected. The categories of causation we highlighted previously remain the same—the pandemic, demand shift, and uncertainty—but their relative importance has changed. Effects have changed more substantially than causes. Though inflation has increased, pro AV prices appear to have stabilized. At the same time, long-lead times are more common than ever. Those shifts impact response effectiveness, deemphasizing passing along price increases in favor of investing in planning to manage limited availability. Supply is difficult, but it's manageable. AV is finding ways to grow—and grow rapidly—even as equipment is as hard to come by as at any point since the pandemic.

Context: Rapid Growth

Before getting into all the details of supply chains, one piece of the puzzle must be clear: our industry is expanding at record speed. Yes, supply chains are the top industry complaint. Almost everyone is struggling to some degree. But our industry is growing despite that.

Each month, we poll our global AV Insights Community to take a flash reading on pro AV sales growth. In 2022 so far, that index has sailed to new heights. The AV Sales Index (AVI-S) has been around since September 2016, and March of this year was the single fastest expansion ever recorded (Figure 1). Expand the window, and February/March/April was the fastest three-month period on record.

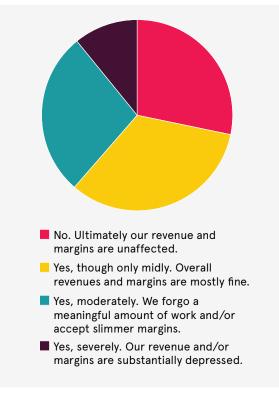
FIGURE 1. 2022 HAS SEEN RECORD PRO AV SALES GROWTH



Note: Each month is calculated as a diffusion index, where the percent reporting a >5% increase is added to 1/2 the percent reporting no change. Any score above 50 indicates increasing sales, while any score below 50 indicates decreasing sales.

To understand the apparent contradiction between the inability to get necessary supplies and the observed growth, we asked the Insights Community to translate their supply difficulties into impact on the bottom line. Their responses clarify that, while supply is a challenge to execution, its ultimate effect on the company bottom line is limited. As shown in Figure 2, 28% of respondents report revenue and margins unaffected despite difficulties, and 33% report only mild impacts. By contrast, just 11% report substantially depressed revenue/margins.

FIGURE 2. IS YOUR COMPANY'S BOTTOM LINE SUFFERING DUE TO SUPPLY PROBLEMS?



Rather than causing contraction, supply difficulties act as a brake on growth. In a world of perfect supply, the AVI-S would have hit higher records as our industry recovered even faster. Instead, we experience a more prolonged period of slower (though still record fast) growth. The combination of record growth and significant difficulty in obtaining supply reflects the changing weight of the causes, with demand becoming a more prominent factor.

What Is Causing the Current Supply Issues?

In our last report on supply issues, we encouraged readers to deemphasize focus on the chip shortage and turn their attention to three bigger drivers: uncertainty, spiking demand, and continuing COVID-19. This recommendation has aged well as it has become clearer than ever that supply problems extend far beyond microchips, and uncertainty, demand, and COVID-19 remain significant impactors. The contributions of these three factors have evolved since last year though, with spiking demand growing in importance as the pandemic has become less impactful.

Spiking Demand

Demand can increase dramatically overnight, but manufacturing and shipping cannot. Small shifts can happen rapidly, but the changes needed to substantially boost supply-expanded factories, new ships, increased port capacity, etc.-are changes measured in months at a minimum and often years.

The chip shortage actually illustrates how spiking demand can create "supply" problems. From the word "shortage," you would not guess that 2021 was actually a record year for semiconductor production, an increase of 26% from 2020, which was itself 10% higher than 2019. It's a supply shortage only in the sense that supply is short of demand. Supply is high! Demand is just higher.

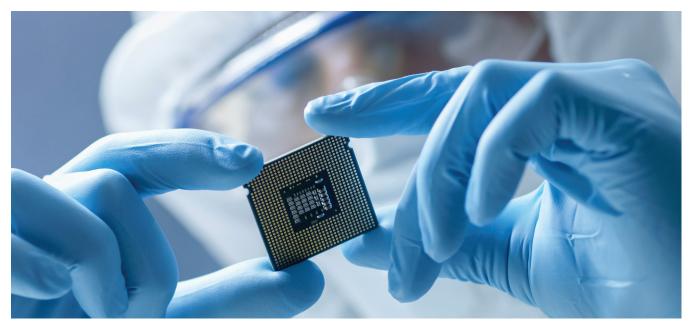


FIGURE 3. MICROCHIP MANUFACTURING ILLUSTRATES HOW SPIKING DEMAND CREATES "SUPPLY" PROBLEMS

For pro AV, we see a similar mismatch. After the Omicron wave subsided, our economy shifted dramatically. Western countries, in particular have sunset restrictions, and citizens, responding to decreasing death rates, have grown more comfortable than ever with gathering in person. So much of AV relies on in-person activity, and these sectors are finally starting to see activity resembling pre-pandemic norms. That means restored demand for products that were less needed the last two years.

The industry may have managed fine if the demand restoration happened amidst a healthy supply background. But the context was one of extensive pre-existing issues. As with chip manufacturing, the new burst of demand is beyond the supply chain's ability to meet as fast as needed, creating a deficit in available products.

The role of demand is important because it indicates which sectors of pro AV will be impacted and when. For example, live events were AV's most hurt part and the last to recover. Knowing the role of demand in supply mismatch, we can conclude that supply difficulties will peak latest and linger longest for live events.

COVID-19

With reduced restrictions around much of the world, the lockdowns and border restrictions that created slowdowns on the supply side are increasingly uncommon. The pandemic is less of a negative impactor on the quantity supplied today than at any point since it began.

That said, the impact is not completely over. China continues to pursue a COVID-zero strategy that has spurred prolonged lockdowns. If future lockdowns happen in critical manufacturing areas, the supply chain will suffer. For example, purchasers of LED displays should pay attention to the Shenzhen region. If a lockdown there shuts down manufacturing at Absen's facilities, the world will feel its effects. Businesses should identify what stages of their supply chains are vulnerable to future lockdowns, then take steps to mitigate that risk, such as holding excess reserves of the at-risk product and monitoring production-area conditions to identify when lockdown likelihood increases.

Uncertainty

Uncertainty has decreased since the publication of our previous research on supply chains. When that research was published last summer, we were still in an era of "Will we? Won't we? When?" Obviously, that uncertainty was well-founded, as the Delta and Omicron waves subsequently interrupted return to in person. Today, global daily deaths are far lower than at any point since spring 2020, giving confidence that we're entering a post-pandemic era. Questions are less about if and when we will return and more about how the ongoing return will play out in the long term.

The corporate office market—the subject of our first quarter META report this year—illustrates that uncertainty. That report revealed that numerous forms of data point to a hybrid future where people return to the office and work there part of the time. But many questions remain outstanding: What will conference rooms look like? Will companies demand solutions to promote hoteling rather than assigned desks? How many video-equipped conference rooms will offices need? Confidence intervals are narrowing, but uncertainty remains.

FIGURE 4. THE CORPORATE OFFICE MARKET ILLUSTRATES HOW UNCERTAINTY HAS DECLINED BUT REMAINS IMPACTFUL



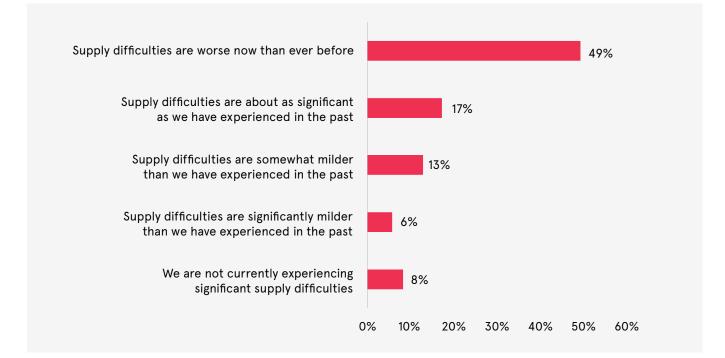
Uncertainty leads to two challenges, mismatch between what is produced and what is needed and underproduction. Mismatch happens when guesses are wrong, i.e., product B is the market's choice when producers were anticipating product A. Underproduction happens as a result of risk aversion. Seeking a surer profit, risk-averse leaders will err on the side of underproduction to avoid the loss when overproduced products are unsold. Business executives may not be cautious as the average human, but it's likely enough leaders will seek certainty to create a net underproduction. Mismatch and underproduction will both exacerbate supply problems.

Measurement of Supply Severity Reveals Shift

Just as causation has shifted since our last supply chain study, so too has the nature of the crisis. Right now, pro AV's supply difficulties are as severe as they have ever been. That said, price increases have faded as our industry shifts towards delays.

In the most expansive historical comparison, we asked respondents to compare current supply difficulties to the ones they have experienced in the past. Almost half said problems are worse than ever before, while an additional 17% said they are about as bad. In a sign of the diversity of experiences present in our global economy, despite the 2/3rds majority reporting conditions at least tied for their worst ever, 8% of respondents reported facing no difficulty at all. While it is safe to say conditions are as bad as ever, a small but not negligible minority has managed to avoid significant difficulties entirely.

FIGURE 5. FOR YOUR COMPANY, HOW DO THE CURRENT SUPPLY DIFFICULTIES COMPARE TO PAST SUPPLY DIFFICULTIES?



The current vs past comparison contextualizes present supply difficulties within the full breadth of history but lacks a bit of precision with respect to the pandemic. To clarify whether the "current" difficulties are a 2022 phenomenon or a pandemic era phenomenon, we asked respondents to identify which season since the start of the pandemic represented the most difficult time to acquire AV equipment. Their responses are clear: 2022 is the worst moment for supply difficulties.

As shown in Figure 6, 49% identified the winter of 2021/2022—the last full season before the question was asked—as the most difficult. No other season was identified by a double-digit percent, though 16% reported difficulties as equal in all periods.

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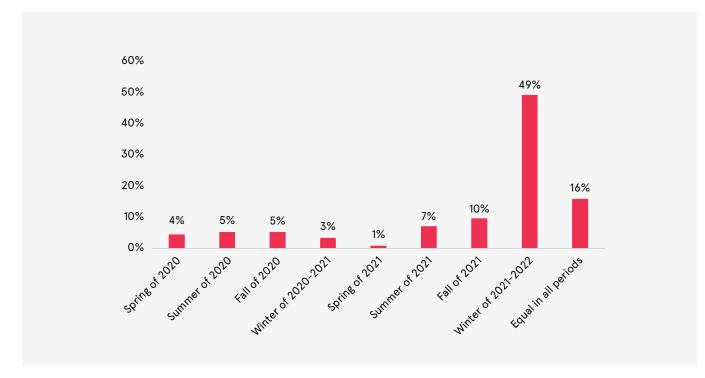
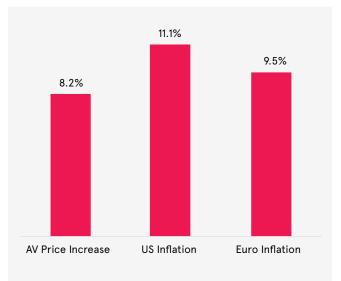


FIGURE 6. WHEN WAS IT MOST DIFFICULT TO ACQUIRE AV EQUIPMENT?

From these questions, we confidently conclude that supply is worse in 2022 than it has ever been. Yet one piece of data contradicts this conclusion—at least at first glance. When we collected data on pro AV price change last year, we found that pro AV prices had outpaced those of the wider economy. On average, the Insights Community reported increases of 5.4% in a period when U.S. inflation was 3.8% and Euro inflation was 2.7%. Since then, pro AV prices have stabilized while U.S. and Euro inflation have accelerated. As shown in Figure 7, pro AV prices are now flatter than the economy overall (though the 2.8% expansion observed in just under a year is still higher than normal).

If pro AV supply is worse now than ever before, why have AV price increases slowed since we asked last year, especially when economy-wide inflation has increased? For our industry, supply

FIGURE 7. PRO AV PRICE CHANGE COMPARED TO U.S. AND EUROZONE INFLATION



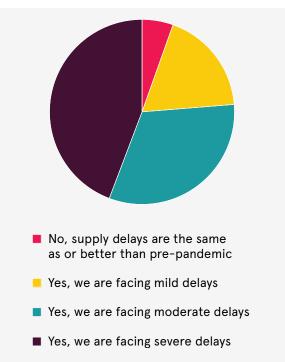
issues have changed. Last year, price increases were a big part of the equation; now, problems center on delays.

We'll cover more evidence and reasoning for this shift in our section on solutions to the current problems, but for now we show data on the current severity of delays, including how they vary by product.

As with our data on overall supply issues, the delay data confirms that things are worse than the pandemic. But unlike the question on how supply difficulties affect the bottom line, responses here center on "severe." 44% of respondents report severe delays, and an additional 32% report moderate delays. Less than a quarter report no or mild delays.

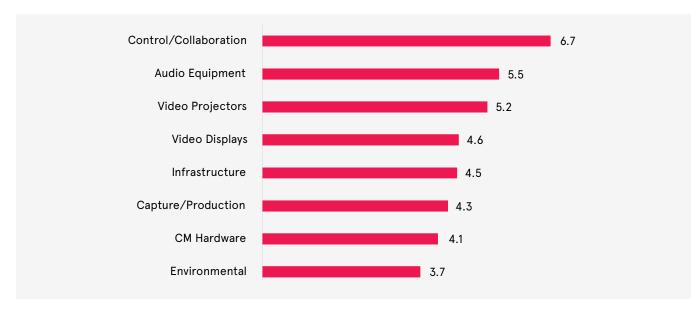
There is substantial variation across product categories. The standout is control/collaboration, with a reported average lead time of nearly seven weeks. Audio equipment—which has stood out in the end user-based *Market Opportunity Analysis Report* (MOAR) as an area of increasing

FIGURE 8. IS YOUR COMPANY FACING SUPPLY TIMELINES BEYOND PRE-PANDEMIC NORMS?



investment—is also particularly troubled at nearly six weeks. While some are better, no category is immune. Environmental products and content management hardware are in the best shape, but their lead times are still four weeks.

FIGURE 9. AVERAGE WEEKS OF LEAD TIME BY PRODUCT CATEGORY



Taken together, the data demonstrates that supply problems have reached a new peak. The nature of said problems is shifting, though. When it comes to price change, pro AV appears more stable than it was in the past and more stable than the economy overall. Instead, delays are more common, with extended lead times across all product categories. While AV sales growth is continuing—and at record rates efforts to manage the difficulties are leading to change in the distribution channel.

How the Pro AV Distribution Channel Is Faring

Supply challenges naturally lead to changes in the distribution channel. One change we predicted in last year's report was a shift towards purchasing from distributors rather than manufacturers directly. The logic here is simple: in a complex supply environment, the value proposition of distributors rises.

Distributors are an additional link in the supply chain—a middleman that can increase costs but they offer advantages that ease purchasing, such as carrying multiple manufacturers for similar products, a wide variety of products, and knowledgeable sales staff who can explain tradeoffs and offer alternatives to unavailable products. All these advantages are greater when supplies are scarce. For example, searching by manufacturer for a particular product takes much longer when most are sold out; a distributor can simply tell you which ones are in stock. It's not just buyers who may see more value from distributors. In an environment where lead times are long, manufacturers can also reap benefits by deemphasizing direct-to-consumer sales and going straight to distributors. In normal times, quantity sold is significantly impacted by a company's ability to market itself and drum up demand. With products sold out for weeks and even months in advance, quantity sold is dictated by manufacturing and shipping speed. If demand no longer factors in, why bother seeking out more buyers? Cut advertising, cut sales, and sell in bulk straight to distributors. Of course, there are reasons to continue selling direct to consumer: The supply crunch is not permanent, and future demand will be stronger if you've maintained consumer relationships; In addition, margins can be bigger on direct-toconsumer sales. Still, it's not only buyers who can benefit by switching to distributors for sales.

To test this logic, we asked our Insights Community how they've changed purchasing from distributors during the pandemic era. The change observed isn't revolutionary, but a plurality (47%) report some increase in purchasing from distributors, against just 11% who decreased purchasing from distributors (Figure 10). Most increases were only modest, and just 12.5% reported increases of at least 10%. This confirms the intuition that growing supply chain difficulties boost the value of distributors.

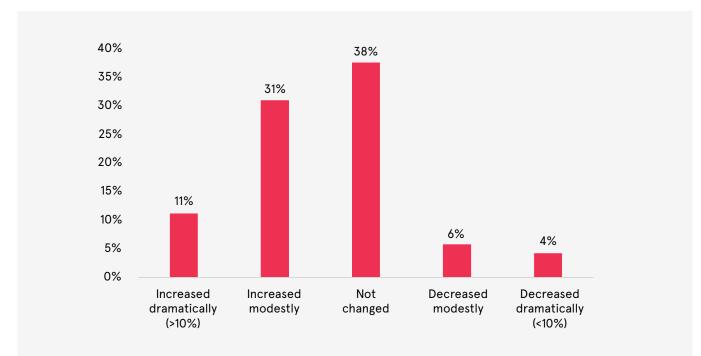
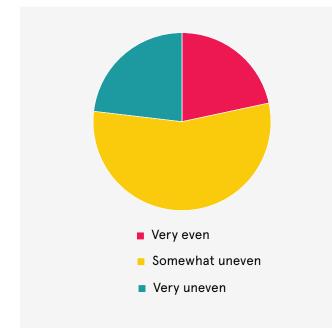


FIGURE 10. TO RESPOND TO THE PANDEMIC ERA SUPPLY ISSUES, HAS YOUR PURCHASING FROM DISTRIBUTORS INCREASED, DECREASED, OR NOT CHANGED?

Another piece of the story on the AV channel's supply issues is how difficulties compare across manufacturers. While variation across products might be substantial, we would not expect extensive variation within product, since supply issues are contagious. If a product from one manufacturer becomes unavailable, demand concentrates on its close alternatives, leading to shortages for those products. That won't eliminate variation, but it would help keep difficulties similar. The data we collected on how supply difficulties for similar products vary by manufacturer reflect our intuition, though perhaps with higher variability than expected. As shown in Figure 11, most respondents report that difficulties are somewhat uneven across manufacturers (55%). Those reporting problems as very uneven slightly outnumber those reporting them as very even (23% to 22%). This observed variability further supports why we see movement towards distributors, as their cross-manufacturer position can guide purchasers to producers who are faring best in the challenged environment.

FIGURE 11. HOW EVEN ARE SUPPLY ISSUES ACROSS SIMILAR PRODUCTS FROM DIFFERENT MANUFACTURERS?



This section reveals one part of the answer to supply difficulties: purchasing from distributors rather than manufacturers. There are numerous other responses, though, many of which have proven even more effective than a supplier switch—especially in the last six months. In the next section, we reveal what's working right now.

How Businesses Are Successfully Responding to Supply Problems

Supply problems have intensified, and responses have changed. In last year's report, we collected data on a suite of responses, including how frequently they were used and how effective they were. This year, asking the same sequence (with expanded options) reveals a major shift from price increases to planning.

Last year, we were surprised to see that the top solution to supply difficulties—both in frequency and success—was passing price increases along to consumers. Given that finding, we listed price increases as a firm recommendation, though not our top one. Instead, our top recommendation was to plan ahead. That prioritization aged well, as planning ahead stands out starkly as both the most frequently used and most effective response to supply problems.

"Planning ahead" comes in many forms of course. Early purchasing is one, a logical step given growing lead times. Unsurprisingly, this is the top response (Figure 12). In a similar thought-centric vein, working around scarce/ expensive products and spending extra time planning were the second and third most frequently used. Notably, workarounds were more used and more effective than deploying cheaper alternatives. One form of planning that was not so frequently used was early involvement of technical staff, which was third from the bottom. The next logical step from frequency is, of course effectiveness. In Figure 13, we show how effective each response was. Again, the various forms of planning ahead stand out as highly effective. Early purchases remained at the top position, followed by the use of workarounds. Interestingly, the infrequently used involvement of technical staff in planning was the third most effective response. This should be a point of emphasis for companies, since its infrequency and effectiveness mean it will be a differentiator for those who do it. Companies that boost technical staff involved in planning will stand out in the crowd.

FIGURE 12. IN THE LAST SIX MONTHS, WHAT APPROACHES HAS YOUR COMPANY TAKEN TO DEAL WITH SUPPLY ISSUES? SELECT ALL THAT APPLY.



FIGURE 13. WHICH STRATEGY WAS MOST EFFECTIVE AS A PERCENT OF THOSE WHO USED EACH STRATEGY



Note: Each percent is calculated as the number who identified the strategy as most effective divided by the number who reported using the strategy.

The fading value of price increases was apparent in the frequency data in Figure 12, which showed it as the fifth most frequent, down from first in last year's research. The effectiveness data makes the declining value stand out even more, as price increases faded from first last year all the way to eighth. That's not to say it's time to throw this out entirely; it's just to emphasize that this tool should be less frequently deployed now.

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Onshoring? Nearshoring? Maybe Not...

Supply difficulties since the pandemic have put the spotlight on the remarkable length of our supply lines and spurred talk of onshoring and nearshoring. This idea has simple and appealing tuition: a shorter supply chain has fewer places where something could go wrong. Moving manufacturing from China may have particular appeal due to the enduring risk from the COVID-zero policy lockdowns. While these motivations are genuine and impactful, a closer look at nearshoring and onshoring reveals two major barriers.

1. Think lanes, not distance. Distance is a factor, but volume is a major advantage. The Transpacific Eastbound from China to the U.S. is the biggest shipping lane in the world. That means the infrastructure along it is incredibly developed, from trucking to rail to ports to ships. In addition, while there are key nodes, the sheer volume also creates alternatives. For example, though Shanghai is the world's biggest port by shipping volume, China also offers the third, fourth, and fifth largest ports (Ningbo-Zhoushan, Shenzhen, and Guangzhou Harbor). Redundancy extends to companies as well, as numerous companies are constantly sending ships.

Compare that to, for example, Guatemala. Shipping Guatemala-U.S. is certainly shorter, but it involves problems that shipping China-U.S. does not. For one, its ports are smaller and can handle less volume. Outside of the ports, rail and other transport infrastructure is a major limiter. The lack of shipping volume poses a problem as well. Suppose one ship has a problem; the next ship with sufficient available space may be weeks away.

2. There is a network effect to supply

chains. Most supply chain diagrams are simple, with one icon for raw materials, one for component manufacturing, one for final manufacturing, and then additional single icons for steps like distributor, retailer, and consumer. They look like what we show in Figure 14. It makes sense: the name itself is supply "chain" as in a single line of individual links. But it's an oversimplification, a lie even.

In reality, supply is a network. It looks like what we show in Figure 15: a suite of raw materials sources feeding a suite of component manufacturers that feed a suite of manufacturers and so on. Say you want to move manufacturing from China to Guatemala. Will this actually shorten your supply chain? In China, the network effect of the volume of existing manufacturing means the natural resources and component manufacturers are all present in massive volumes, often in fairly localized areas (i.e. Shenzhen). In Guatemala, you may need to ship numerous components and resources from China. Instead of shortening the supply chain, you've added another step and increased the number of items you need to send along the Transpacific Eastbound lane.

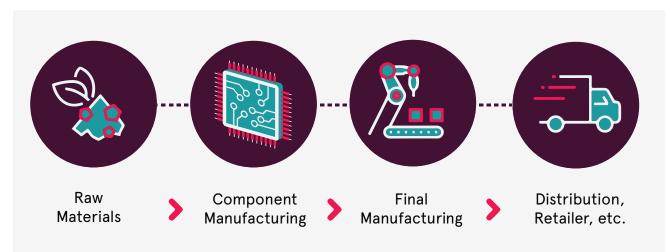
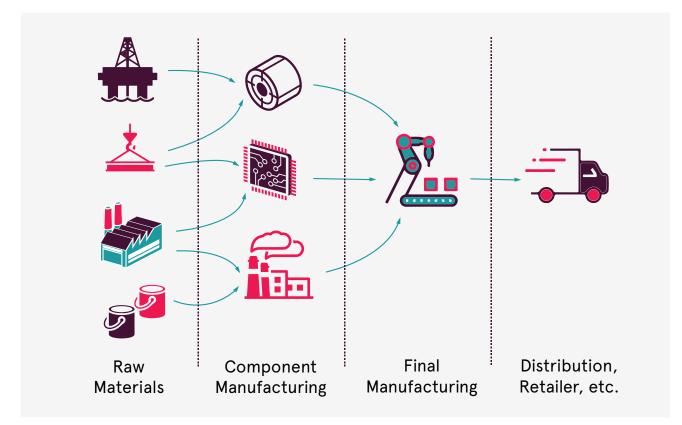


FIGURE 14. A TYPICAL SUPPLY CHAIN DIAGRAM, WHICH OVERSIMPLIFIES.

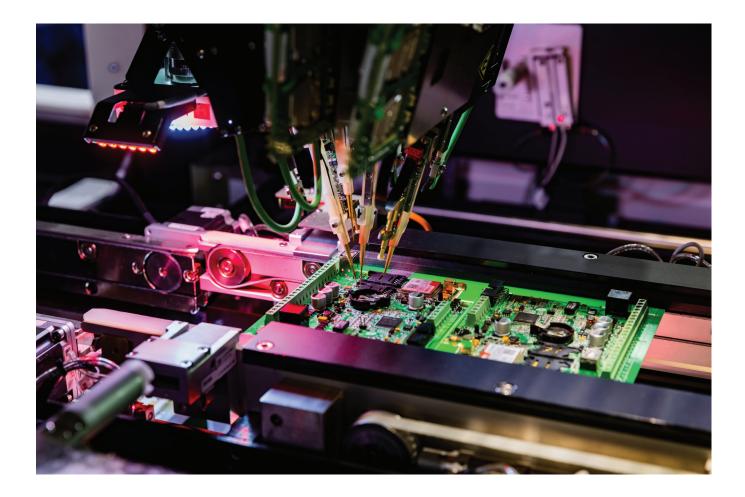
FIGURE 15. A MORE REALISTIC SUPPLY CHAIN DIAGRAM, WHICH REFLECTS THE COMPLEXITY OF SUPPLY NETWORKS FEEDING A SINGLE MANUFACTURER



Note: We simplified everything from the single manufacturer on to focus on the manufacturer perspective. In reality, each step is a complex network: numerous manufacturers, numerous distributors, numerous retailers, etc.

All this is not to say that onshoring and nearshoring are impossible or will not happen. We do expect companies to seek simpler supply chains, especially if lockdowns in China create continuing problems. But we expect that it will happen in smaller, more individualized cases where raw materials are already close, component needs are more limited, etc. The logistical robustness stemming from massive volume and the network effect of co-location of raw material suppliers and component manufacturers will prevent a major wave of onshoring or nearshoring.

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The Bottomline on Responses

Last year, we ran through a top ten list of responses, explaining how to deploy each most effectively. If your business is struggling extensively with supply issues right now, we recommend a quick review of those. Instead of redundantly repeating that information, here we highlight four top takeaways.

- Planners are winners. We listed this at the top last year, and we do so even more decisively this year. With lead times increasing and price changes declining in frequency and effectiveness, planning is the top response.
- 2. Planning has so many aspects. As covered in Figures 12 and 13, early purchases, developing workarounds, and getting technical staff into the planning phase are all critical. Communication is another vital component. Talk to your suppliers to understand what is available and when. Talk to your clients to establish timeline expectations and help them identify their needs early. Contracts are yet another aspect, as they should be updated to reflect that lead times are uncertain and price fluctuations remain higher than prepandemic times.
- 3. Price sensitivity is higher. Last year, our data suggested companies were happy to pay a bit extra to get the equipment they needed. Perhaps pressured by inflation-based price increases on other products, companies are now more hesitant to spend extra. Instead, our data shows they prefer to invest in planning and accept longer timelines to avoid

extra costs. While passing price increases along to customers remains a viable option—it was the most effective response for 15% of our Insights Community—it should be used more carefully now.

4. Stay agile. The first part of this is narrow and directly in the data: staying agile across product sources is useful. Shifting from manufacturers to distributors as a source has been an aid during the pandemic, and many respondents reported changing from like to like (i.e. distributor to distributor) has been effective in recent months.

The second part of this agility advice is perhaps more important, though. In less than a year since we last studied AV supply challenges, so much has changed. Some developments we predicted, such as the increased importance of demand as a driver when in-person activity increased. Others we did not, such as the shift away from price increases. Certain fundamentals will hold true-planning will always be helpful-but the relative effectiveness of responses can shift quickly. Pay attention to your suppliers, your end users, and what research is showing. Substantial changes can happen suddenly, and those who respond first generally come out best.

In Conclusion

The start of 2022 has been a special period for pro AV, with sales growth soaring to record highs. It's so good to see demand coming back! But spiking demand comes with challenges, and the supply chain is struggling to keep up. Supply has been troublesome since the start of the pandemic, but difficulties have intensified this year.

Yet, as proven by the record growth, pro AV is finding ways to respond. Demand has shifted towards distributors as their cross-manufacturer position increases their value proposition. Price increases were a key response last year, but thinking and planning now take center stage and are a competitive differentiator. Early purchases, workarounds, and involvement of technical staff in planning stand out as most effective. Focusing on these strategies—while maintaining agility to shift when needed—will help your business maximize its growth in these exciting months of rapid growth and difficult supply.



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