



Whitepaper

Industrial



# The perfect storm – When disruptions in the supply chain, lead times and costs come together

By Ros Kruger, Director, Technical Marketing, Sensors & Power TTI Europe

The world of electronic component distribution faces another year of transformational change. There are, however, a lot of positive developments and evolution in the electronics industry. For example, as we move from combustion engines to electrification and higher levels of autonomy for driver assistance and enhanced safety, the level of electronic content in cars continues to soar. Connectivity is also critical with Vehicle-to-Everything (V2X) infrastructure and over-the-air (OTA) update capabilities. There are also the high connectivity demands of the proliferating 5G IoT applications, such as smart homes, factories and cities, providing added security and convenience to our society as well as saving valuable energy resources.

Over the coming years, new legislation, such as the Green Deal for Europe, is boosting the use of photovoltaics for residential energy generation and the related energy management and storage solutions. Service robots, such as autonomous robotic vacuum cleaners and 'last mile' home delivery robots, will become part of our daily life. There's also automated warehousing and logistics centres and automated production facilities to consider with autonomous mobile robots (AMRs) that use the private 5G infrastructure to collaborate to optimise efficiencies in the supply chain and production while minimising cost.

These are just some of the many positive factors to consider, and we firmly believe TTI is a crucial partner for supplying technical solutions to these fast-growing application areas. However, it is good to reflect on the past couple of years and recognise the enormous pressures placed on customers, manufacturers, and distributors. It's easy to think that the last two years of disruption are solely down to the global pandemic. The reality is somewhat different.

COVID has undoubtedly left a lasting legacy of uncertainty with supply chain pressures across the electronics industry, but it is not the only reason. We have also seen that a single ship stuck in the Suez canal<sup>1</sup> can strongly impact the supply chain and lead times.

The same is true for the effects of climate change. The ice storms in Texas in early 2021<sup>2</sup> and severe flooding in Northern Europe and China<sup>3</sup> are good examples here. Additionally, the war in Ukraine that started in the first quarter of 2022 is causing further disruptions not just politically but in terms of the supply chain, costs, and impact on the electronics market. Change is a regular and frequent occurrence in distribution.

The seeds of change we're now experiencing were sown well before the havoc of the pandemic worked its way through our industry; however, COVID has accelerated their growth.

## Market changes

After many months of supply chain and manufacturing disruption, business planners have thrown the traditional rule book of market growth out of the window early on. As a leading interconnect, passive, electromechanical, and discrete component distributor, we experienced massive swings in demand, initially from medical equipment manufacturers, and then an uptick in electrification and a rebound from automotive. Sudden changes in demand for any product create ripples through the whole manufacturing and planning cycle, necessitating changes in production schedules.

During the first wave of the pandemic, we experienced a massive surge in demand for components used in medical equipment, especially sensor and power supply technologies. Medical had always been an important market for us, but the volumes associated with sudden needs were unprecedented.



*The COVID pandemic saw a massive surge in demand for components for medical equipment*

Huge variations in product prices have also been a feature of the past years. This started with a general price increase towards the end of 2020 to a steady array of price increases ranging from 5% - 15% and becoming more frequent in the last 6 months as inflation, raw material, and transportation costs took hold.

The journey we've been on is far from over. By the end of 2021, our sales were up 23% and our bookings were at 3 times that level. Additionally, we entered 2022 with double the average backlog position. However, along the way, we have identified and actioned many changes within our business to enhance our operational performance and agility further.



## Customer priority changes

The past couple of years have also been a learning experience for our customers. Those new to our industry have had a lot to learn in a short period! Those familiar with the electronics industry may have seen disruptions in the past, but nothing compares with the scale and breadth we have seen of late.

Suddenly, the priority for second sources elevated to the top of the list. Downstream, engineering teams proactively reviewed alternative components in their existing designs to ease the component shortages their production lines face.

Engaging with customers, where locating second sources is an overriding priority, opens up a completely different way of working. Our sales and technical support teams are working hard to propose product alternatives and second source options for customers quickly. This customer requirement is an approach that we have experienced a lot in the past year and one that we've been agile enough to respond to quickly. There is a possibility that some customers might have placed multiple orders in an attempt to secure component supply, although, to be fair, we haven't experienced any cancellations yet.

As consumers, when the pandemic took hold, we all changed how we shop and buy goods. Online shopping has become the norm, and this is translating across to business purchases. It is clear that customers expect to purchase online using convenient, easy to use methods. It will probably never become as frictionless as a B2C buying process, but there are similarities. The concept of placing orders with just three clicks is not the norm for B2B products and certainly not one that would generally accommodate supply chain and second sourcing complexities.

Another aspect of many people working from home is that the working hours have become more fluid and flexible to accommodate home and family life. Customers are placing orders during the evening, at night, and during the weekend, whenever is convenient. Overall, we see customers looking to simplify the purchasing process, so the underlying expectations for change are high.

Some of our new customers are not rooted in the electronics industry. These companies, often start-ups and innovation-led break-aways from established conglomerates, from the innovative and transformational organisations that herald new waves of innovation in many sectors. These customers seek our assistance and guidance, so our depth of sales expertise, logistics know-how, and technical support is in high demand. TTI is not a broad line distributor; our specialism is in interconnect, passive, electromechanical, sensors and discrete components. We have always made a conscious decision to review the number of suppliers we carry. We focus on about 60 specialist and leading suppliers, compared to the 400 - 500 most broad line distributors would carry. The depth of engagement we have with our suppliers benefits customers with specialised expertise and technical knowledge.

## Business process reengineering



*TTI European central warehouse in Maisach-Germlinden*

Within TTI, we saw first-hand the stress points within our operation as it reacted to significant change. We fast-tracked automation of some business processes and regularly examined aspects of our logistics and business continuity planning. Monitoring and investigating how our customers' purchasing behaviours changed also gave insight into how we needed to adapt to support them better. Further, TTI worked with Mouser Electronics – a member of the TTI Family of Companies (FOC) – to aid customers with sampling alternatives.

As we've seen pressure points rise and fall across our business processes, we've been keen to evaluate and implement new tools, techniques, and systems that automate and digitise aspects of our operations. For example, we introduced an extensive array of *Web Services* that allows customers to monitor their supply chain, quickly order parts, and track orders while maintaining the individual account terms and even VIP pricing structure.

The TTI European central warehouse in Maisach-Germlinden has the world's largest Autostore system with 211,000 boxes on one platform, a high-bay warehouse for 30,000 pallets, a shelf system for 30,000 storage spaces and 40 lifts. On average, about 11,000 order items per day are shipped from this warehouse, which corresponds to an average of 4800 cartons and about 120 pallets.

## Suppliers changing their go-to-market strategy

One of the transformational changes occurring is how component manufacturers structure their business. The pandemic has seen an 'all hands on deck' approach to improve efficiencies and increase capacity to meet demand. We've redeployed staff to achieve this, and seen a globalisation of specialist business development roles as a result.

With vast improvements in virtual communication and video conferencing and an acceptance to entertain new product positioning, design ideas and problem solving remotely, product and business development roles have become globalised within our supplier organisations. Some supplier sales teams have re-aligned their organisations, with those tasks increasingly directed at distribution. Likewise, we see a similar reduction in field sales and support roles, again emphasising distribution picking up the responsibility. We are well-positioned to do this with the level of customer contact we already have, and we've already been investing in adding resources to our existing support capabilities.

The voice of the customer (VOC) has become much more critical in today's rapid technological advancements. Some suppliers are moving the curve towards the customer's end application in key growth markets. Having a more in-depth understanding of the challenges faced by the customer in their design is aiding the evolution of the supplier's next-generation components.

## Suppliers rationalising their product range

Another move by suppliers is to rationalise their product offerings. We're already seeing a massive reduction in the number of stock-keeping units (SKUs) from manufacturers. End of lives (EOLs) are increasing in frequency, as are price increases for all products now. There are several factors behind these decisions. Many suppliers find themselves with too many variants in their product line-up. Simplification of the line-up creates commodity products and promotes volume manufacturing efficiencies and second sourcing opportunities.

## Regional production

As the pandemic took hold across the globe, supply chains became fragmented. Some manufacturers took previously unheard-of actions such as chartering cargo planes so customers could get products. In many cases, this was for government-appointed OEMs to get the components they urgently needed to build ventilators. With commercial shipping routes weakened while others were at maximum capacity, it was inevitable that costs would rise.

With most electronic components manufactured in the far east, shipping to Europe and North America takes time and is costly. It is possible that some manufacturers will set up regional manufacturing operations closer to their customers in the future. The recently announced European Union's 'Chips Act'<sup>4</sup> supports this way of thinking. Also, automation is less dependent on labour costs, which makes suppliers re-evaluate their approach. Such a step would yield a competitive edge and differentiate them from other suppliers.

Reliance on a single manufacturing site is risky, given recent environmental disasters caused by floods, fires, and earthquakes. Water and energy shortages, and price increases in terms of transportation also need consideration, so creating a regional manufacturing strategy is prudent. Suppliers are also re-evaluating their whole supply chain. There is growing awareness that components or wafers may go around the world several times before they become a final product.

Overall, as a leading interconnect, passive, electromechanical, sensors and discrete component distributor, we're well-versed in the complexities of sourcing products globally. Customer orders become assembled from a comprehensive list of regions and countries, from China and South Korea to North America and Europe.

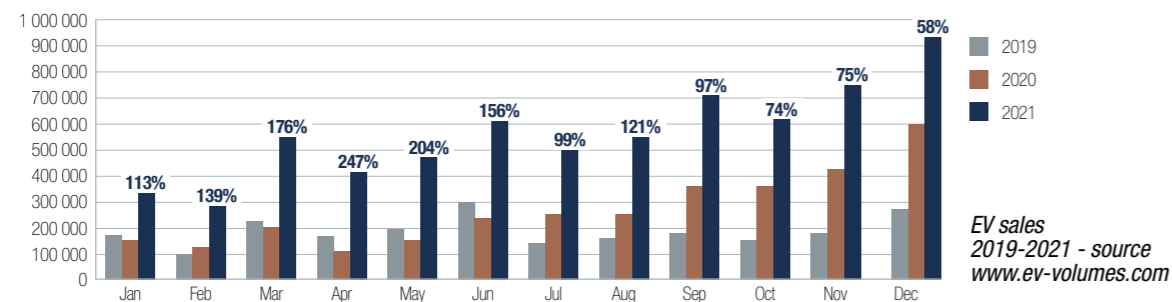
## A never-ending source of new applications

We constantly face new challenges presented by technology innovation, application opportunities, and new markets. From a global perspective, we're in a race against time to improve the Earth's climate. For example, the German government recently introduced legislation to switch all utility meters to smart meters by 2032.

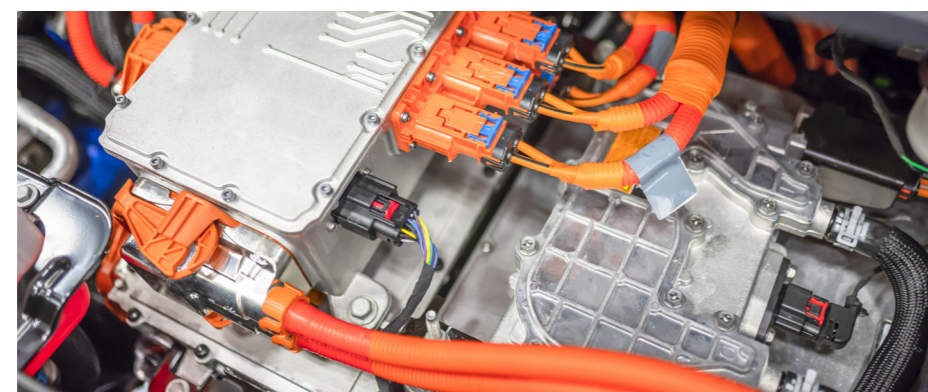
During the pandemic, consumers appeared to become more aware of their local environment and, for a while, nature had a break from vehicle pollution and noise. Electric cars typically have a higher proportion of electronic components than traditional fuel-based vehicles, increasing demand further.

The newly elected German government also set ambitious goals in 2021: At least 15 million fully electric passenger cars are to be on German roads by 2030. Furthermore, the new coalition agreement sets out to have one million publicly accessible charging stations installed by 2030, most of which will be high-speed charging stations.

The good news is that electric vehicle (EV) sales continue to grow, despite the pandemic, during which overall sales plummeted. Research by EV-Volumes, an EV consultancy company, highlights that global EV sales were back on track in 2021.



As EV manufacturers become more informed on consumer buying preferences and experience first-hand EV adoption challenges, some significant trends are bubbling upwards. One of these has been the move to 48 V systems in place of the traditional 12 V approach to power auxiliary electric motors and equipment. Following the lead from commercial EVs, such as buses and delivery vans, the family vehicle brands are quickly stepping up to embrace the benefits of higher battery pack voltages. Component suppliers are already responding quickly to the changing market demand for higher voltage and higher current passives and an equally diverse range of sensors.



Electric cars typically have a higher proportion of electronic components than traditional fuel-based vehicles

A forecast by IHS Markit estimates new light-vehicle sales of nearly 82.4 million globally in 2022, up 3.7%.<sup>6</sup> However, sales in Western and Central Europe was estimated at 13.9 million units, just scraping into growth territory, up 0.2% y/y. For 2022, demand is set at 15.0m units (+7.8%). However, with the Ukraine-Russia crisis, it is hard to tell if these figures can be met.<sup>7</sup>

## Peaks and troughs to become the norm?

Inventory shortages and bubbles of allocations may likely be a feature across our industry for the foreseeable future. Some components may experience these for longer. We hope the backlog will be fulfilled during the next six months and lead times challenges ease.

The peaks and troughs have certainly been more dramatic than in pre-COVID times. Order automation may cause some of this, but overall, the supply chain will become more difficult to manage. The log jam in global shipping will continue for some time. Demand is still high, so the order backlog and extended shipping times will continue to work their way through the supply chain for a while yet. We proactively update lead time trend charts on our website so customers can quickly see changes in the average times by component category. We also provide [quarterly market research reports that highlight trends](#).

Moving forward further, the whole supply chain will require significant reengineering and increased management. On the bright side, change is a constant aspect of electronics distribution, and this is not the first time the industry has encountered challenging times.

At TTI, we firmly believe our people have the expertise, knowledge, and depth of relationships with suppliers. Our people are a key differentiator for us. They are loyal and hardworking, and we sincerely care about them.

## TTI: Your agile, responsive, and people-centric electronic components distributor

### Product knowledge and inventory at the ready

As a company, we have over 50 years of experience in distribution and our technical marketing team has a wide knowledge about each market we operate in. Our team is dedicated to supporting customer design and consistently helps customers find the best fitting products for their requirements. All TTI employees benefit from a company-wide training process, and the sales team is a customer-respected knowledgeable resource. We engage with leading manufacturers and become intimately aware of their product offerings and complexities.

Passives and connectors represent the vast majority of components used on a typical PCB today, up to 85% in most cases. From a buyer's perspective, that also means that these components also potentially represent most of the sourcing challenges. TTI responds to this need by stocking up on passive and connector products. TTI Europe has 550,000 active part numbers and, in 2021, shipped over 45 billion components from our recently expanded European Distribution Centre. Testament to the diligence of the TTI Europe logistics organisation is that shipping errors are below 0.01 %.

### Certification and compliance

TTI celebrated 50 years as a specialist electronic components distributor in 2021, so customers can rest assured that they are in safe hands when dealing with us. We comply with globally recognised quality management and process management standards, including ISO9001:2008, ISO14001:2015, IECQ-CECC, and EN9120/9100. In addition, every TTI operation and warehouse facility operates according to a single global documentation system.

### Value-added services

To assist customers in efficiently managing their connector procurement process, we offer a kitting, de-reeling, cable re-spooling, and connector assembly service. Connector design focuses on understanding the customer's application requirements and proposing a recommended solution. Our re-spooling service takes larger reels and offers smaller lengths to suit the customer's needs. Compliance with relevant commercial or military standards can be specified, saving considerable time for the customer's engineering team. TTI can deliver prototype assembled connector solutions in 48 hours.

## 2022: another year of challenges for component distribution?

The outlook for 2022 looks bright. After more than two years of COVID, TTI is well prepared for any challenges ahead. The pandemic has undoubtedly amplified the cycles of change already surging through the electronics industry, but many positives exist. A tidal wave of technology innovation happened during the pandemic, with engineers having time to work on new projects and product ideas. Such growth is set against a backdrop of IoT enablement, the dramatic increase in electric vehicle sales, and continued industrial automation implementations.

Whatever the obstacles facing your engineering and procurement teams, the [TTI Europe team](#) is ready to help.



### About TTI, Inc. – Europe:

TTI, Inc., a Berkshire Hathaway company, is an authorized, specialty distributor of electronic components. Founded in 1971, the emphasis on a broad and deep product portfolio, available-to-sell inventory and sophisticated supply chain programs have established TTI as a distributor of choice to manufacturers in the industrial, defense, aerospace, transportation, medical, and communications sectors worldwide. TTI and its wholly owned subsidiaries, the TTI Family of Companies, Mouser Electronics, Sager Electronics and Exponential Technology Group employ over 8,000 people in more than 148 locations throughout North America, South America, Europe, Asia and Africa. Globally, the company maintains about 288,000 square meters of dedicated warehouse space housing over 850,000 component part numbers.

For more information about TTI, visit [www.ttieurope.com](http://www.ttieurope.com).

### European Headquarters:

TTI, Inc.  
Ganghoferstr. 34  
82216 Maisach-Gernlinden  
Germany  
Tel.: +49 (0)8142 6680 – 0  
Fax: +49 (0)8142 6680 – 490  
Email: [sales@de.ttiinc.com](mailto:sales@de.ttiinc.com)  
[www.ttieurope.com](http://www.ttieurope.com)

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<sup>1</sup> <https://www.bbc.com/news/business-56559073>

<sup>2</sup> <https://www.forbes.com/sites/willyshih/2021/02/19/severe-winter-weather-in-texas-will-impact-many-supply-chains-beyond-chips/?sh=38f7caa8358a>

<sup>3</sup> <https://www.cnn.com/2021/08/03/shipping-crisis-strikes-black-friday-shopping-amid-europe-china-floods.html>

<sup>4</sup> <https://getdigitaltech.com/the-european-unions-chips-act-goals-to-resolve-part-shortages-convey-tech-to-native-companies/>

<sup>5</sup> <https://www.thesmartere.de/neuigkeiten/jeder-dritte-stromer-europas-faehrt-auf-deutschen-strassen>

<sup>6</sup> [https://insmarket.com/research-analysis/fuel-for-thought-auto-demand-levels-remain-depressed-on-chip-famine.html?utm\\_campaign=CL\\_PC9808%20kwc%20pc%20Global%20Auto%20Monthly%20New\\_PC9808\\_e-production\\_E-122138\\_PC\\_1216\\_1054&utm\\_medium=email&utm\\_source=Eloqua](https://insmarket.com/research-analysis/fuel-for-thought-auto-demand-levels-remain-depressed-on-chip-famine.html?utm_campaign=CL_PC9808%20kwc%20pc%20Global%20Auto%20Monthly%20New_PC9808_e-production_E-122138_PC_1216_1054&utm_medium=email&utm_source=Eloqua)

<sup>7</sup> <https://www.electrichybridvehicletechnology.com/news/industry-news/russias-war-could-stall-production-and-development-of-electric-vehicles.html>