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It's Time to Power-Up the Electric Vehicle (EV) Supply Chain

Introduction

The electric vehicle (EV) space is rapidly expanding, with production of EVs having gained considerable momentum in the past few years and poised to make huge leaps in the next few.

According to BloombergNEF, EVs will account for about 30% of all vehicle sales by 2030.¹

Two types of companies are locked in a fierce battle for EV market share. In one corner are the established car manufacturers—the “giants”. They’re trying to pivot to EVs and create an entirely new business, while continuing to support their core business of traditional internal combustion engine (ICE) vehicles. It’s not an easy change to make, as these companies are finding out.

In the other corner are the startups, trying to be “disruptors” to the giants by creating technology companies that moonlight as car companies. These newer entrants are discovering that while having great technology and innovation at their core is essential to breaking into this market, their staying power rests in being able to execute—actually manufacturing the vehicles people want to buy.

Both the giants and disruptors, as well as their suppliers, are at a critical juncture in this industry. And one of the biggest keys to their success will be learning how to quickly build or adjust their supply chains to create a business that can profitably capitalize on the growing preference for EVs over ICE-powered vehicles. Supply chain challenges across process/structure, organization, and technology must be addressed. The challenges are similar and different for giants and disruptors, however the companies who address these challenges quickly put themselves in position for long-term success. That’s the real battleground for EV dominance.

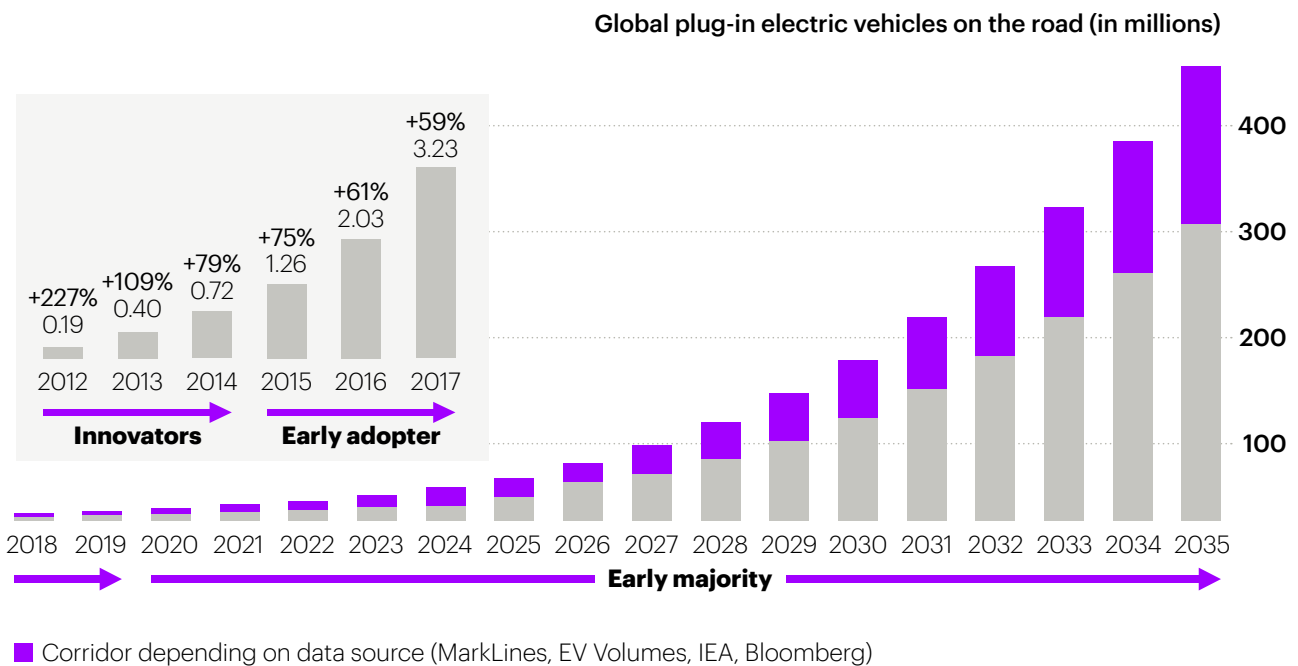
The electric vehicle market's rapid growth

As illustrated in Figure 1, and highlighted in Accenture's latest thought leadership, the EV market is projected to skyrocket in the next 10 to 15 years, with significant momentum really beginning to build within five years.

What's driving this growth isn't really a secret: Consumers around the world have become more aware of and interested in sustainability and climate change, while governments in numerous countries are pursuing ambitious environmental agendas, including heightened restrictions on fossil fuels and their associated emissions. California's governor, for example, made news recently with his executive order directing the state to require all new cars and passenger trucks sold in California by 2035 to have zero emissions.²

Another accelerant is technology—specifically ongoing advancements in battery technology to improve the driving range on a single charge and reduce costs. In fact, in the past ten years the cost per KW/H has dropped from \$1,110 down to \$137, and analysts predict it should fall below \$100 in the next few years,³ making EVs more affordable to many more people.

Figure 1: Worldwide plug-in vehicle population
OEMs have to move fast now to win the early majority of the market



Source: The EV Charging Market: Internal Knowledge Repository-Accenture

Giants, disruptors and suppliers: Strengths, weaknesses, and challenges

However, rapid industry growth and changing market dynamics are stressing EV supply chains, in turn creating both common and specific challenges for giants and disruptors (Figure 2). How these companies act in the next few years will largely determine who become leaders in the EV manufacturing, battery, and charging markets.

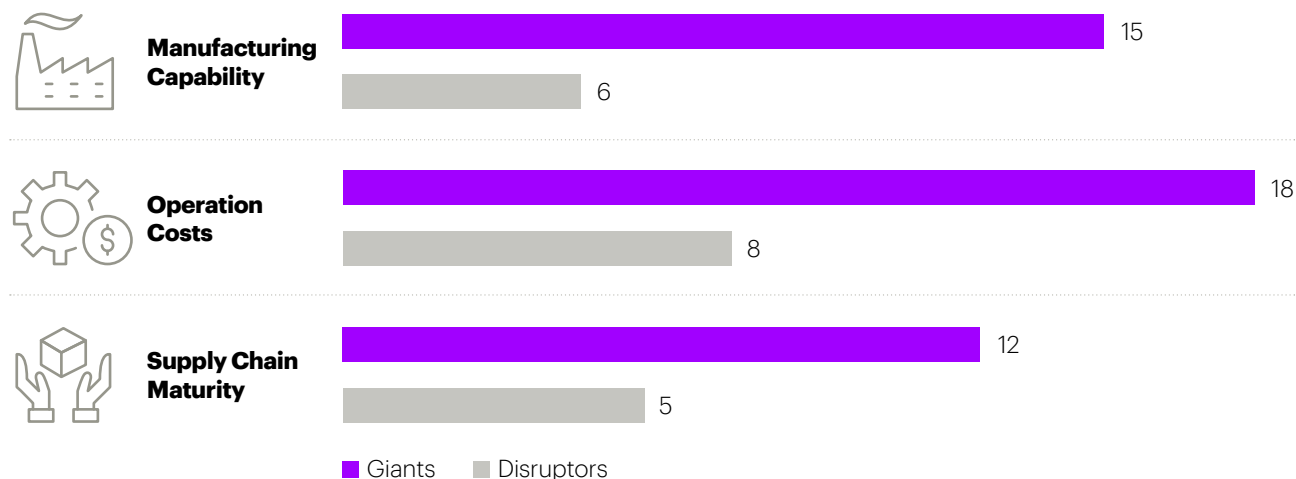


Giants, of course, have long-established, sophisticated operations in vehicle production, supply chain, and supplier management. In other words, they know how to build cars and have the supply chain to do it. But now they need to balance the simultaneous production of ICE-powered vehicles and EVs. This requires developing EV battery and powertrain partners while continuing to foster relationships with current powertrain suppliers.



Disruptors face an even more daunting task. They have the technology that's essential to EVs and a culture of innovation that enables them to continually push their thinking. However, they need to build an entirely new supply chain and supply base from scratch—something that's taken the giants decades to do—and put the structure in place to manage suppliers and their performance.

Figure 2: Two different OEMs, each with unique challenges





Trying to keep pace with both the giants and disruptors are the industry's suppliers. If they want to stay in business for the long term, traditional ICE powertrain suppliers will have to evolve to support both current and future development and production needs across ICE- and EV-related products. One way to do that is to split their business in two, with one part serving the traditional ICE market and the other focusing on the rapidly emerging EV/CASE (Connected, Autonomous, Shared, Electric) sector. Several leading suppliers have already taken steps in that direction.⁴

Adding to the disruption is the entry of companies that traditionally haven't been considered automotive suppliers—such as LG, Panasonic, and Samsung—that have found an opening in the industry via batteries and battery technology.⁵ Even traditional energy companies such as Shell and BP have entered the market as early leaders in building out the EV charging infrastructure that will be a key factor in vehicle adoption.⁶

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Digging Deeper on EV Supply Chain Challenges

It's clear that there are plenty of supply chain challenges to go around across giants, disruptors, and suppliers. Some of these are common across the three groups, while others are more specific. Let's take a closer look at where these groups are feeling the pressure in supply chain process and structure, organization, and technology.

Process and Structure

The macroeconomic challenges facing the EV industry are well documented. Many of these challenges have to do with consumer adoption, charging times, and EV charging infrastructure. However, EV supply chains for both Giants and Disruptors have specific process and structure challenges as well. Given uncertainty of supply, Giants and Disruptors both must place bets on how to best secure continued supply to build their products. This could include several strategies to consider such as producing batteries through vertical integration: development/production partnerships, joint ventures, and/or buying directly through suppliers.

Understanding the end-to-end supply chain is critical to creating value for the enterprise. How do companies make the transition from prototype manufacturing to full-scale production? Here are some of the keys, all of which have ramifications for all three groups:

Identify the new suppliers to partner with.

Certain suppliers will remain relevant as the transition from ICE to EV begins, although new suppliers will also emerge. This is especially true as traditional ICE vehicle systems such as body/frame, drive train, and electrical will be displaced to accommodate EV requirements. OEMs need a process in place to effectively vet these new companies and technologies before placing the first order to ensure they can deliver.

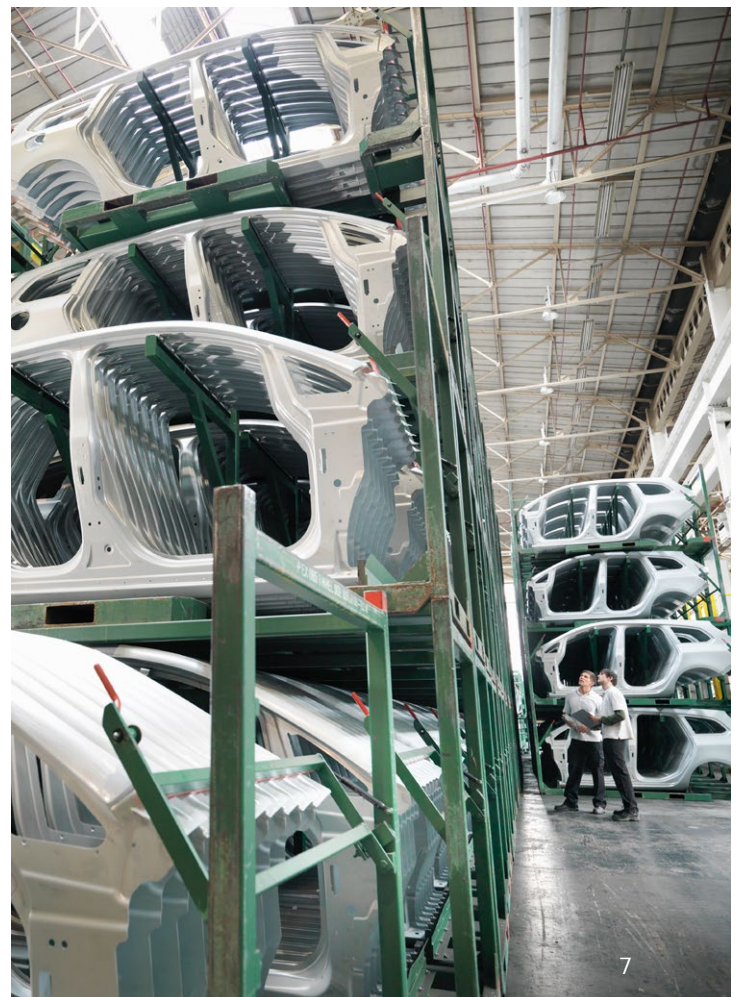
Make vs buy decisions. There are many big decisions that both the giants and disruptors will face as they transition into the EV marketplace. Disruptors making the transition from prototypes to production vehicles must decide whether to build manufacturing capabilities or buy them using a contract manufacturer, as they work to build a customer base and control operating costs.⁷ Giants face similar decisions on whether they should be converting existing ICE production lines to EV production. It seems most are considering hybrid options where existing ICE production lines are being converted and partnerships are being explored to increase and accelerate production capacity.

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Reimagine metrics for supplier management and risk. Giants already have well-established supplier performance programs in place, but these may be foreign to disruptors. As they think about creating a supplier performance program, disruptors should resist the temptation to do a “copy and paste” from legacy OEMs. This is an opportunity to think creatively and change the conversation with strategic suppliers and how OEMs manage them. Giants, for their part, could also take a page from that book and think about new ways to partner with suppliers that are more relevant to the EV supply chain.

Develop a localization strategy for battery pack assembly and other key components. EV battery manufacturing is segmented into three main areas: battery cells, modules, and battery packs. Cell manufacturing mostly occurs in Asia, primarily because of reduced production costs (which is significant, given cell production accounts for 75% of the overall EV battery cost),⁸ but because the largest markets for EVs are in Asia. Pack manufacturing, on the other hand, tends to happen closer to OEM assembly facilities because the pack’s final assembly weight and hazardous materials composition make it expensive and potentially dangerous to ship packs long distances. In an ideal world, cell through to pack production would be as close as possible to the OEM assembly plant. But that’s unlikely to change, at least in the near term, so both giants and disruptors need to figure out the most cost-effective way to source, ship, and assemble batteries.

Secure supply for critical materials. This would include materials with supply challenges such as conflict minerals (for example, cobalt) which are not widely available and can have important ethical procurement considerations.⁹ Blockchain applications can help bring transparency to the proper sourcing of such materials, while new or creative sourcing strategies such as “take or pay” arrangements can help ensure continuity of supply for materials OEMs can’t do without. These agreements are often used when market demand greatly outpaces supply (think frac sand during the most recent oil boom). These agreements essentially involve buyers taking on risk by agreeing to buy a set volume of the materials at a discounted price over a given time period. If the buyer doesn’t keep its commitment, the supplier simply invoices the buyer for the full amount contractually allowed. These agreements obviously have a high risk/reward structure, but they highlight the fact that in a new market companies need to consider new strategies to maintain supply chain continuity.



The natural components of the lithium ion battery are only found in certain parts of the world. With the demand for EV's only seen as increasing so will demand for these rare materials. This presents challenges to both Giants and Disruptors in terms of supply, cost, and long-term availability. Similar to the argument against fossil fuels, mining and extracting the components for lithium ion batteries not only harms the earth but also raises the real concern over replenishment or completely wiping out our supply. An additional component to consider is the inherent location of these materials. There is not wide-spread access to these materials, they are largely located in Africa and China where geo-political instability will likely cause supply disruption or extremely high entry/acquisition costs levied by these countries. A trending toward Giants and Disruptors looking at near-shoring opportunities to reduce risk due to supply chain distance and help manage transportation costs.

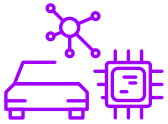
This all points to the fact the lithium ion battery is not the long-term solution for the electric vehicle market. Giants and Disruptors need to have both long- and short-term strategies in place to manage these critical components. The short-term solution will be anchored on the fact that lithium ion batteries will be the primary power source for these vehicles. How each company plans to acquire these materials, ship, assemble, and retire the batteries need to be defined and operationalized. The long-term strategies need to be a cohesive effort between supply chain and engineering to source, design, and acquire their future state power source. Whether it's developing a solid-state battery or an alternative, both groups will need to work together to ensure their solution is both performance neutral and cost effective to the lithium ion batteries in use today. The strategies deployed by these companies will be a key component into their long-term viability in this market.

Environmental Factors (Sustainability).

The other challenge both Giants and Disruptors are facing with lithium-ion batteries is dealing with them as they come to the end of life. EV enthusiasts love them because of their minimal pollution and use of fossil fuels, however, EV's could create a new environmental issue if the batteries are not consistently and safely recycled or disposed of. Today, auto manufacturers are taking steps in that direction by dedicating space within their own factories to recycle batteries, they are also developing partnerships with third parties to support the effort. The challenge here isn't just about making recycling / disposing a priority, it's mainly about the process itself. Today, much of this process is manual and time intensive. As more and more EV's hit the road, the need for automation will be key in scaling up this capability and keeping it cost effective. Both Giants and Disruptors need to see this as a priority moving forward. A choice to ignore this problem will likely affect the public's perception of how "green" a company is and could impact the overall market's impression of electric vehicles.

Organization

Switching from building prototype vehicles to full production has created massive hiring swings and made companies question which skillsets are relevant in an EV manufacturer that may not be in legacy automotive companies. Disruptors and giants have some concerns unique to their own operations and a few that are common to both.

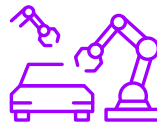


Disruptors need to:

Shape and build an effective procurement organization. Logic would say disruptors could benefit from hiring procurement people from legacy ICE OEMs or suppliers. While this may be true in some areas, looking outside the automotive industry could be a way to inject new life and different perspectives into the industry. Having a procurement talent strategy that thinks outside the box could pay dividends as the EV industry grows.

Prioritize which functions to build. Disruptors typically begin with engineers and designers, but quickly shift to creating important business functions to support their growth. As they do, disruptors need to think carefully about where they start and question whether functions and practices in the legacy automotive industry are still necessary in the EV industry.

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Giants need to:

Determine how to modify their existing supply chain to support EV production. This is one of the most important things giants need to get right to be successful in EV. Most have already begun developing transition strategies for EV production, but the extent to which these are well developed varies. As part of the transition, giants need to understand what's necessary to retrain their people and where they can find the relevant learning paths and talent strategies to successfully reskill their workforce.

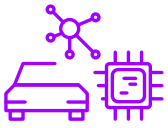
Both groups should:

Determine the unique skill sets valued in the EV supply chain. Certain skills and backgrounds are table stakes as giants and disruptors build an EV supply chain organization. However, opportunities also exist for companies to differentiate, such as reducing the need for some skills by automating parts of back-office functions; identifying the category management expertise that's most critical; and looking to other industries, whose logistics models mirror what's evolving in the EV space, for guidance on the most important skills.

Develop a formal plan for transitioning legacy ICE suppliers to new critical parts for EVs. The procurement and supply chain teams will have to shift their focus to a supply chain dynamic in the early phases of producing and shipping new technologies. Procurement and supply chain teams will need to have an improved command of vehicle module-based Just-in-Time (JIT) execution, hazardous material management, and global and local supplier management practices.

Technology

Technology is a key element of the EV strategy and should play a central role in the design of new EV supply chains—especially for disruptors.



Disruptors should:

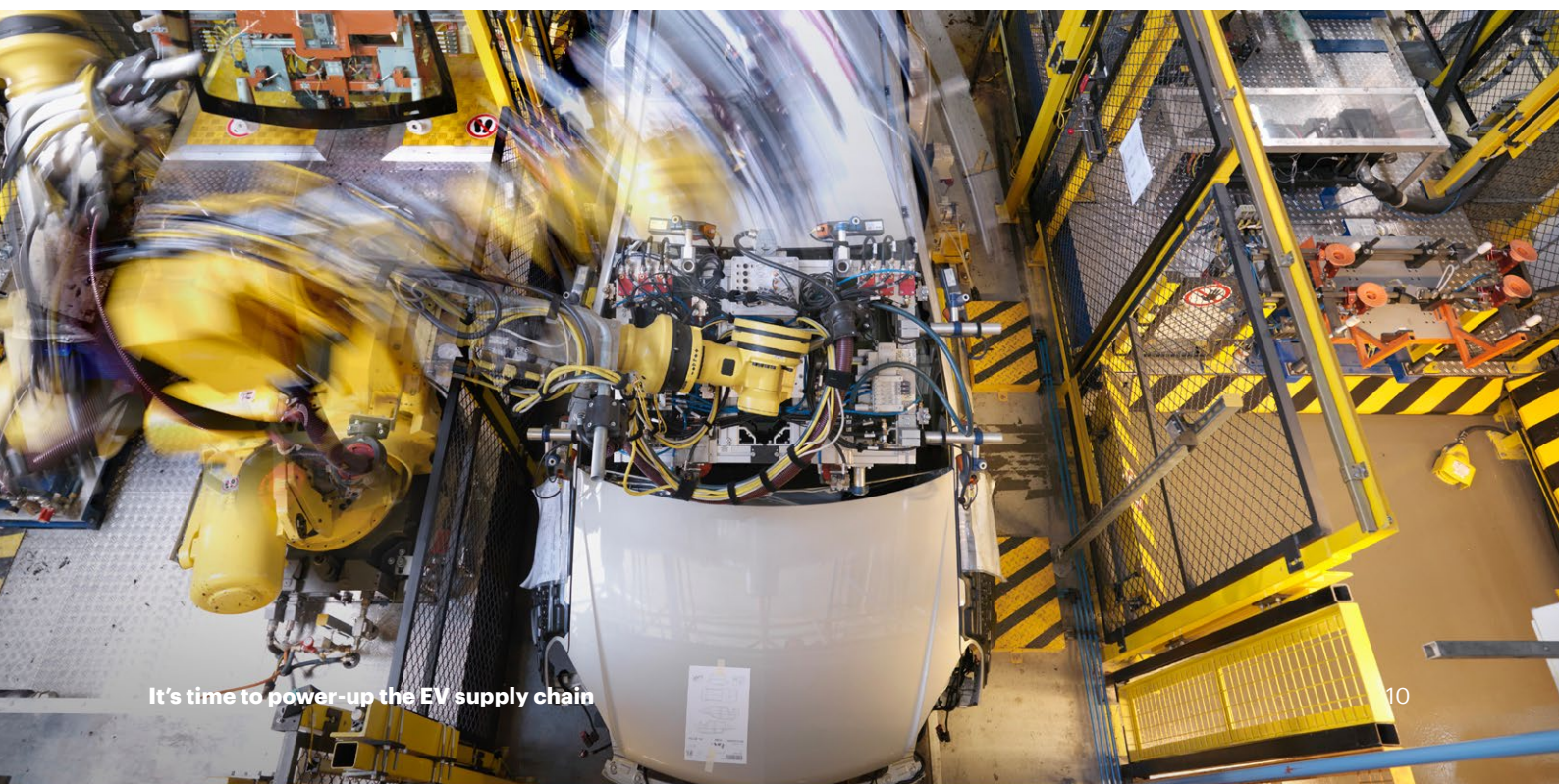
Explore how to apply process automation to back-office functions. Companies automating the back office have dramatically driven greater efficiencies and fostered scalability through the organization. With significant flexibility in developing their organization, essentially from scratch, disruptors should think about how they can use automation and whether it should be central to their story from day one.

Create a comprehensive vision of their procurement and supply chain technology stack. Data and data management are at the heart of the EV industry and central to its development. Similarly, supply chain data is just as valuable to disruptors' operations. Building a supply chain technology ecosystem that marries upstream and downstream activities and includes advanced analytics for operational transparency and decision making, should be a priority.

All three groups need to:

Consider how blockchain can improve supplier Tier visibility. Integrating supply chains has been a challenge for legacy OEMs for years. By working closely with Tier 1, 2, 3 and beyond suppliers to introduce blockchain concepts into new EV supply chains, giants and disruptors can create full visibility and transparency of supplier quality, cost, and delivery performance. Blockchain can also enable OEMs to keep tabs on suppliers' ESG practices—such as ensuring materials are sourced as sustainably and ethically—which stakeholders of all kinds increasingly expect.¹⁰

Certainly, many other challenges compete for OEMs' and suppliers' attention. But the ones discussed are arguably the most critical supply chain issues that companies need to address as the EV market gains steam.



Conclusion

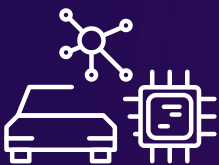
Moving ahead... quickly

There's no doubt the EV industry is in extreme growth mode. In fact, the eye-popping growth projections we've highlighted may be conservative, as momentum for EVs continues to build and new developments accelerate broader adoption.

That's why the companies with aspirations to be major players in the EV market need to pick up the pace in building a supply chain that can help them achieve their goals.



Giants need to quickly determine which of their legacy ICE suppliers can make the transition to EV suppliers and find replacements for those that can't, while determining which of their traditional supply chain practices aren't necessarily relevant to EVs.



Disruptors need to put in place all the supply chain capabilities necessary to create order from the chaos in which they're operating today—working from a clean sheet to define the mix of traditional and innovative practices, and internal and third-party resources, they need to go from website hype to scalable production.



And both **legacy suppliers and newcomers** must figure out what their role is in the expanding EV market—a challenge that's magnified for legacy suppliers that also need to continue to support their ICE-focused business.

The fact is, challenges abound in the EV market, but so are the opportunities. The companies that move swiftly to address the former and capitalize on the latter are the ones that will have staying power and grow in concert with an incredibly dynamic market.

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