



Boosting resilience: Working
with like-minded partners to
orchestrate critical supply chains

Executive summary

Supply chain disruptions from the COVID-19 pandemic and other sources have caused many governments and private sector companies to reconsider supply chain practices. COVID-19 may have been the tipping point, but it was not solely responsible for the supply chain vulnerabilities that caused problems for governments and companies alike. Decades of supply chain optimization has produced highly efficient, but fragile systems. Add in the rising strategic competition between leading trade partners and the need to rethink supply chains to reduce risk becomes increasingly clear.

Supply chains today are complex, interwoven ecosystems of suppliers, manufacturers, distributors, and consumers. Rather than small, neatly organized linear supply chains that are relatively easy to trace and understand, supply chains today are a mosaic of interdependent actors that requires complex and laborious analysis to figure out. The inability to illuminate supply chains can leave vulnerabilities hidden in the complexity. So, when a disruption, like a global pandemic, occurs, it can disturb entire supply chains from producers to consumers.

Responding to supply chain vulnerability requires removing points of weakness in the supply chain. In some instances, like with personal protective equipment, this can be helped through onshoring, or producing products and services domestically. Moving supply chains home can offer governments and companies more control and remove the volatility of foreign dependence. But onshoring isn't always possible. Some products and services, like semiconductors, either cannot be produced domestically because natural resources or expertise are not available, or because the market for those products and services isn't large enough to support multiple competing sources of supply.

For critical products and services that cannot be onshored, a pragmatic option becomes friendshoring, or the reorchestration of critical supply chains by swapping risky foreign suppliers with close allies and partners. Friendshoring reduces the limitations or costs of onshoring by balancing necessary foreign sources of supply with the trust that comes with an ally or like-minded trading partners.

Reorchestrating supply chains to enhance their resilience can mean managing a dizzying number of relationships between producers, manufacturers, distributors, and consumers. For example, because of interdependence among supply chain actors, swapping a source of supply or manufacturer can create ripples throughout the chain. This can make reorchestration a challenging task for untested practices.

Defense supply chains offer a great starting point. The nature of defense supply chains provides defense organizations a unique ability to explore supply chain reorchestration without causing unintended disruption. This is because for many defense products, like nuclear-powered submarines, defense organizations are the only customer. As such, militaries often assume responsibility for the wellbeing of certain supply chains, which means defense organizations are positioned to thoughtfully reorchestrate them. Moreover, military products are often shared among allies and close partners, so relationships and incentives necessary to friendshore are often already present.

As militaries explore supply chain reorchestration, they need to know how current supply chains are organized, where the risk is, and what partners can reduce risk. Defense organizations should:



Know their supply chains—militaries need to know the entirety of their supply chains rather than just one or two tiers. This will require a supply chain data management plan that provides an organizational view of supply chain risk across military services or programs.



Decide what supply chains are critical—militaries rely on countless products, but some are more critical than others. Militaries need to understand what products are essential and what risk the supply chains contain. Assessing risk may be military and situation specific, so assessments should remain flexible.



Make supply chain reorchestration easy—militaries rely on commercial partners for nearly everything necessary to defend a nation. Requiring trusted supply chain practices, creating trusted supplier programs, and developing supply chain talent around shared standards can all help defense organizations reorganize supply chains more quickly.

What is needed to help defense organizations (and eventually other government and commercial supply chains) reorchestrate and friendshore is a trading vehicle built within the rules based international order that allows trading partners to quickly, transparently, and with confidence coordinate new supply chains. Two guiding principles can help militaries as they explore new trade vehicles.

- 1. Organize around the problem:** Not every military has the same supply chain vulnerabilities or concern for less like-minded trading partners. As defense organizations explore new trade vehicles, sharing supply chain vulnerabilities and appreciation for strategic competitors will be important. Here military leaders can be transparent about concerns and interests to create an opportunity for change. The goal is not to create a new trading scheme for one or two supply chain issues, but one that can grow and evolve overtime.
- 2. Prove the concept:** Rather than launching into a massive overhaul of critical supply chains, defense organizations should start small to figure out what works and what doesn't. Creating a pilot trusted supplier program to house data, certify partners, and manage supply chain risk collectively can offer a productive place to start.

Reorchestrating supply chains will not be easy, but neither is responding to crisis or facing a strategic adversary without proper supplies and equipment. It's time to reorchestrate critical supply chains and militaries are in an ideal place to lead the change.



Introduction

In the early months of 2020 global supply chains were quickly destabilized: there were incredible increases in demand for consumer products all while factories ramped down production, ships, planes, and trucks remained immobile, and large portions of the supply chain workforce were forced to remain home. The shock produced by the COVID-19 pandemic strained producers, distributors, and consumers alike, exposing the fragile and complex nature of globalized supply chains.

That fragility was born of decades of over-optimizing on cost savings and efficiency gains. Global sources of supply reduced input costs and concepts such as “just in time inventory” allowed businesses to further reduce costs while still meeting aggressive timelines. But these carefully calibrated, highly efficient supply chain operations were quietly assuming a high level of risk, because like a Swiss watch, they were precise but delicate. To reconstruct supply chains in a more resilient manner requires not just focusing on cost and efficiency, but also balancing those concerns against risk.

Though COVID-19 was the event that exposed modern supply chain fragility, increasing strategic competition among countries has exacerbated the consequences of recent supply chain disruptions and ensured supply chain resilience will remain a concern long after the effects of COVID-19 have faded. Indeed, rising tensions in the Indo-Pacific region and elsewhere have turned supply chain vulnerability into strategic concerns, motivating calls to onshore products or find alternative trading schemes that don't rely on partners increasingly at odds with one another.

Rather than simply trying to reduce risk through national self-sufficiency, the solution lies in understanding which trading partners can work together to reduce supply chain risk without adding unacceptable financial cost. In this way, solving today's supply chain problems may be less about reshoring than it is about orchestrating supply chains with close partners and allies, or ‘friendshoring’.

What is required now is the next evolution in trade vehicles aligned to the rules based international order that protect critical supply chains by enabling closer supply chain coordination among allies and partners. Creating a new vehicle can be a significant undertaking but starting with a smaller scope can jumpstart the process. To this end, most defense organizations already possess existing logistical programs, supply chain coordination, and shared interests needed for trusted trader relationships, making them a great proving ground for new trade vehicles. Defense or otherwise, organizations should consider starting small, focusing on trust, and building commonality among curated trading partners that share the same strategic interests.

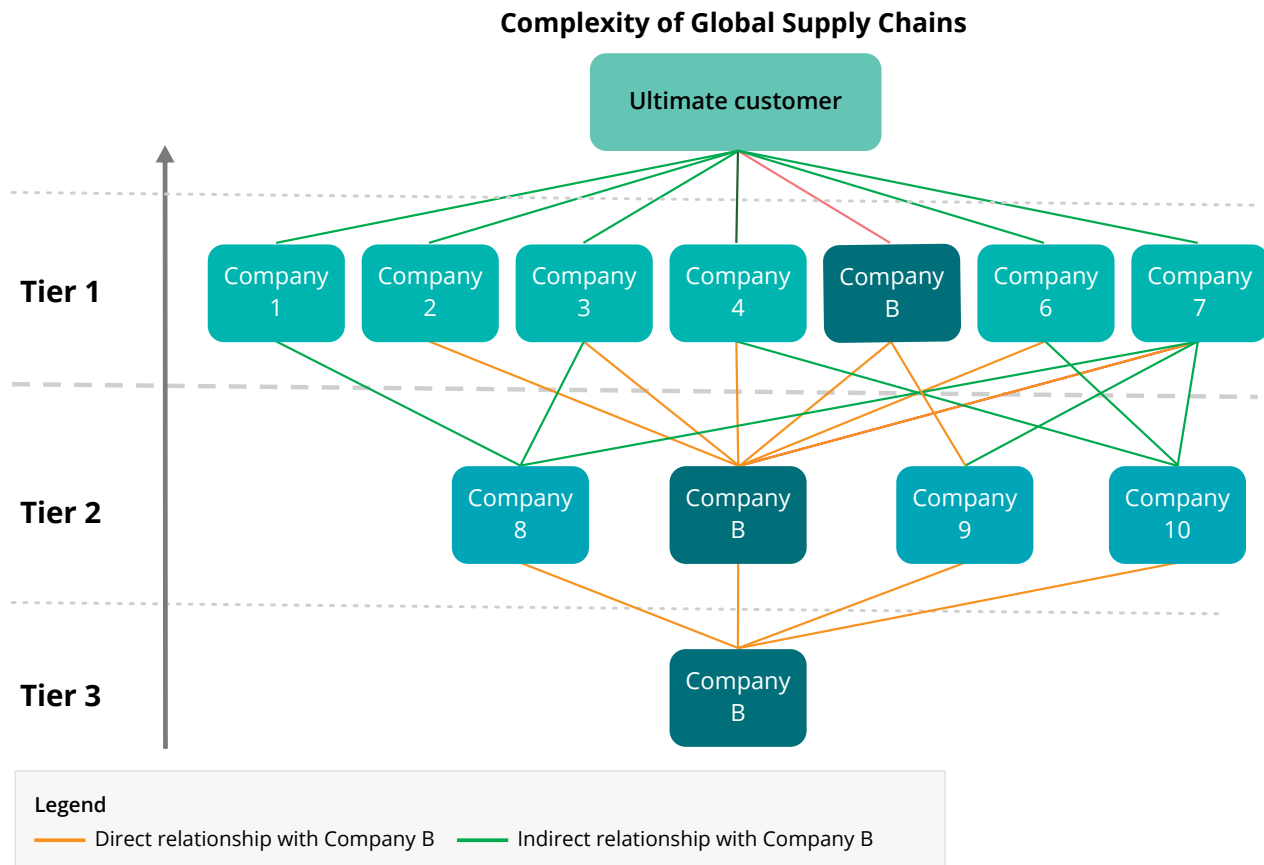
Spotlighting supply chain risk

The interwoven mosaic of actors in supply chains today can make identifying risks difficult. When government or business leaders don't have a clear understanding of where the risks lie, they can struggle to make prudent decisions necessary to ensure critical products and services arrive on time and within budget.

Risk comes in many forms, but two key issues stand out: A lack of understanding of supply chain partners and resource chokepoints, and both are tightly related. Take, for instance, a modern smart phone, which is a common product with a complex supply chain. Between sourcing raw materials, component manufacturing, and assembly, a smart phone's supply chain can include as many as 94 production lines in 43 countries across six continents.¹ Such a complex process can make it incredibly difficult to understand the full scope of the supply chain in enough detail to limit risk.

While it may be relatively straightforward for a manufacturer to possess a good sense of their first or second tier suppliers, tracking further down in the chain can take considerably more work. Even supply chains that seem to have a diverse list of suppliers can harbor hidden risk if suppliers draw from a single common sub-supplier or source of raw materials. So, more than knowing where things come from or who is assembling them, it's also important to know what relationships exist within complex supplier networks and how those relationships impose or reduce risk. As figure 1 shows, trade relationships exist directly and indirectly across supply chains. The relationship dynamic can impose risk throughout the supply chain for all partners.

Figure 1: Complexity of Global Supply Chains.



Source: Deloitte analysis

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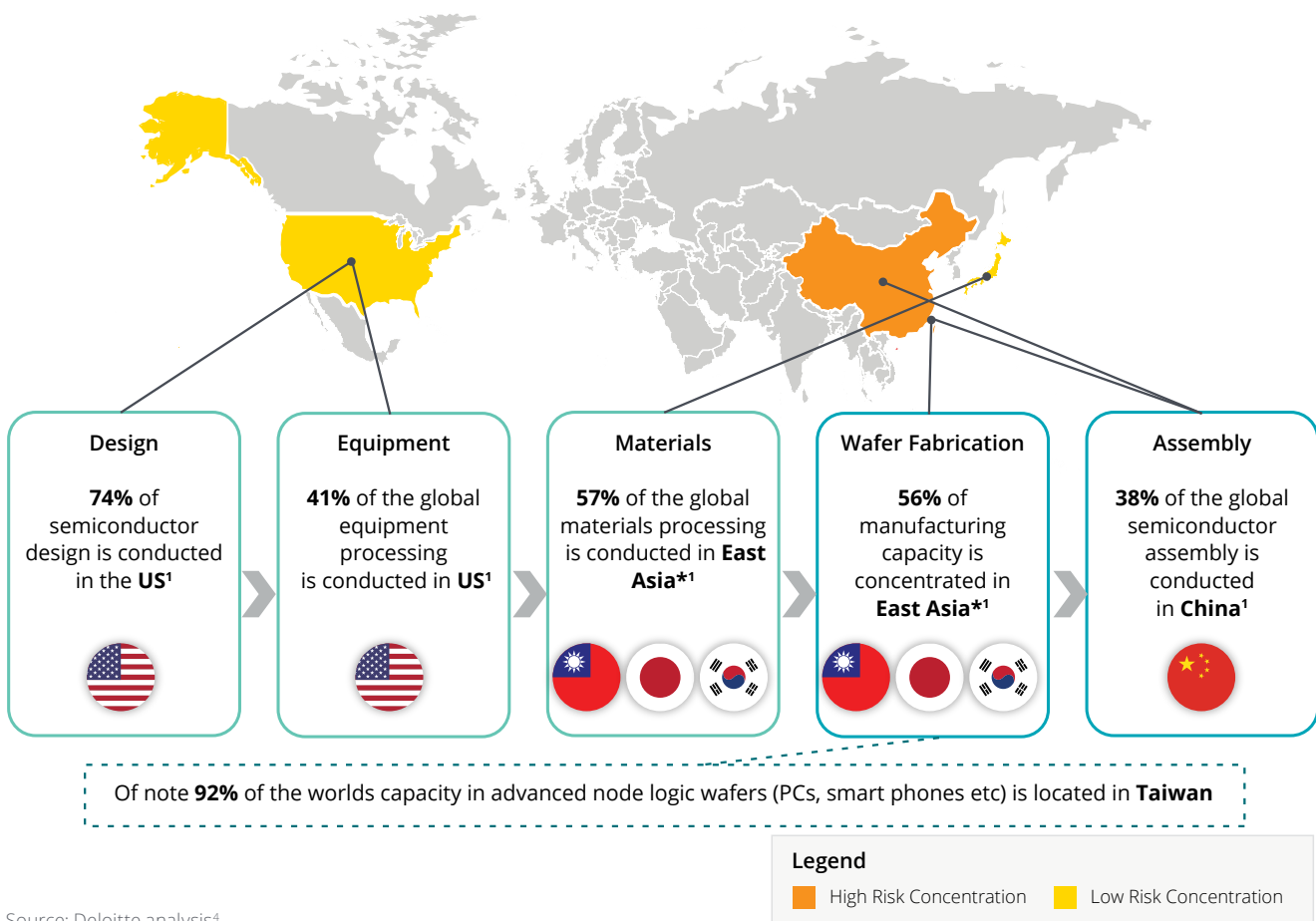
Without better insight into supply chains, reducing risk from chokepoints across supply, manufacturing, and distribution can require making suboptimal choices, like expensive stockpiling or planning for unpredictable price variations. Still in other instances, reducing risk is almost unavoidable all together. Take semiconductors for instance.

Semiconductors are a great example of critical products with numerous supply chain chokepoints. The design and manufacturing of semiconductors requires specialized knowledge and manufacturing equipment that can be difficult to acquire and expensive to produce, which has led to geographic specialization of the semiconductor supply chain. Just three countries—the US, China, and Taiwan—own roughly 70% of the market in semiconductor assembly, test, and packaging.² For the most advanced semiconductors, the specialization is even more acute with just two countries—Taiwan and South Korea—responsible for 100% of manufacturing.³

Such specialization creates chokepoints, and in turn, vulnerabilities in the supply chain.

Figure 2: Semiconductor Supply Chain risk assessment

Semiconductor Supply Chain—Value added by activity and region (%)^{1,2}



Source: Deloitte analysis⁴

Importantly, supply chain disruption doesn't stay localized to a single product or industry. It can spread and evolve, just like the virus that caused the latest shock. The interdependent nature of modern supply chains allows issues to ripple across industries, trading partners, and consumers. The inability to produce just one product, semiconductors, has affected the production of everything from computers to vehicles. This can create a domino effect: chokepoints in one industry create chokepoints for other industries.

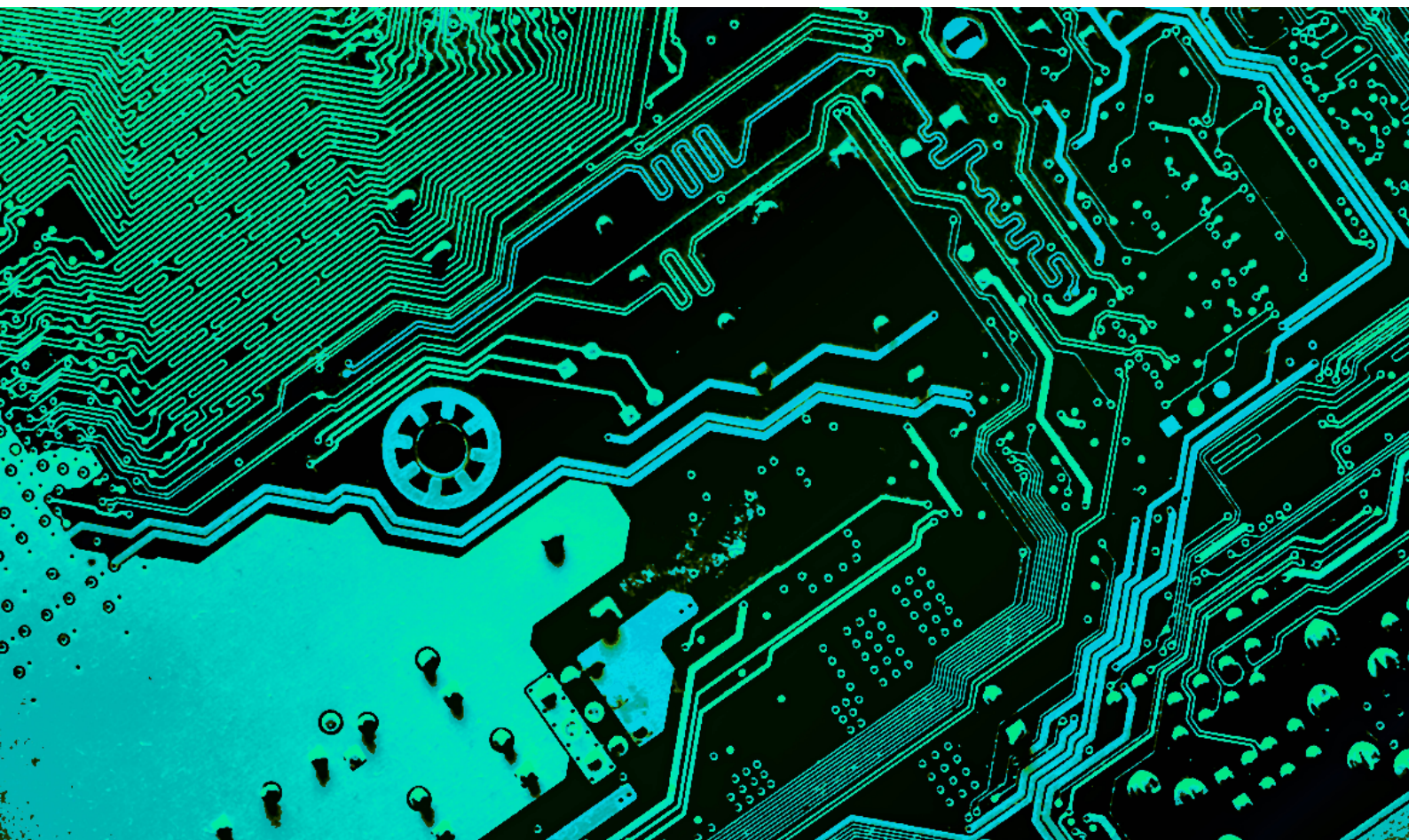
In all, the tightly woven global system of production, distribution, and consumption has obscured the thousands of individual actors, processes, and steps making fragile supply chains challenging to understand. And with ignorance comes risk. The realization that risk from supply chains can outweigh cost savings is influencing the decision calculus for what products should be produced through complex, but efficient international supply chains. Add in the fact that rising competition between nations can encourage using trade dependences as leverage or for disruption⁵, and the need to rethink supply chains becomes increasingly clear.

Sovereign supply chains as an imperfect plan

In the early months of the pandemic, most countries were scrambling to acquire personal protective equipment and other products necessary to save lives. But most countries had relied on foreign sources of production. As the pandemic intensified, foreign sources of production stopped exporting products, leaving countries desperately short of critical medical supplies. Overreliance on a foreign provider for life saving products and services can be a strong motivation for increasing domestic production. In theory, it's the surest way to mitigate supply chain risk generally, but especially in turbulent times. The theory falls short, however, when considering the economics of onshoring. Not every country possesses the resources or means to onshore production of what they need. In short, not all products can, or should, be onshored.

Drawing on the previous semiconductor example, few countries possess the natural resources or know-how to contribute significantly to the production of semiconductors. Even if resources and know-how were more abundant, the financial costs of creating semiconductor manufacturing can be prohibitively high for most countries. The cost to develop semiconductor manufacturing capacity equal to the US, Korea, and Taiwan could cost more than \$50 billion a year for a decade for technologically advanced countries; the price would grow for countries further behind in the technology race.⁶ Yet the entire global semiconductor market in 2020 was roughly \$426 billion. Even if the money was available, the market for semiconductors—even with growth—likely wouldn't support the semiconductor demand necessary to cover the costs of widespread national semiconductor independence. Short of rapid exponential growth in the semiconductor market, onshoring semiconductor supply chains doesn't make fiscal sense. The same limitations exist for other important products, like batteries or military specific products and systems.

So how do you decide what to onshore and what to rely on trusted producers for?



Learning through defense

Commercial supply chains for everyday products are made up of a multitude of actors all with varying degrees of influence and interdependence. In commercial supply chains changes made by one company can directly or indirectly affect another. For this reason, knowing where to adjust commercial supply chains can require accounting for a dizzying number of variables—assuming one even understands the complete supply chain in the first place! The complex set of relationships can make it difficult for any individual actor to influence the market and reduce risk through reorganization.

However, there are a few areas where the nature of the market gives some players greater ability to influence supply chain behavior. Take defense supply chains for example. When defense organizations are the only consumer of certain products, like nuclear powered submarines, militaries assume considerable responsibility for the welfare of suppliers, manufacturers, and other elements of those unique supply chains. These features provide defense organizations unique influence through which they can more effectively reorchestrate certain defense supply chains. In addition to the prerequisite influence, the essential nature of many military products and services provides defense organizations with ample incentive to make changes necessary to limit supply chain risk, even if that means assuming a marginally higher cost.

Militaries are also uniquely suited to approach change through allies and partners. For militaries, when done selectively, foreign reliance can improve military resilience.⁷ For instance, in a time of war, diversifying aspects of defense supply chains through allies or partners can reduce risk by making it more challenging for an adversary to affect critical supplies. Depending on trusted producers from other aligned countries can also increase production and [provide additional sources of supply](#) closer to the warfighting front, as well as drawing allies closer. There is also value in sharing certain military capabilities because it can improve necessary [military interoperability](#). For these reasons, foreign supply dependence is a familiar concept to defense organizations.⁸

The unique ability to influence defense supply chains with allies and partners combined with the necessity of change for national security, makes defense organizations ideally suited to chart a path toward more resilient supply chains practices in and outside of government. Defense organizations would likely need to make a few changes to be a supply chain pathfinder.

Reorchestrating supply chains

Reorchestration requires knowing how current supply chains are organized, where the risk is, and which allies or partners can reduce risk.

1. Know your supply chain

When it comes to producing complex military capabilities like a 5th generation aircraft or nuclear-powered submarines, it can take countless materials to create parts and thousands of steps to assemble them into a single platform. Tracking each piece, part, and manufacturing step along the way is a daunting task requiring data from numerous sources and aggregated into a coherent picture. Unfortunately, defense organizations too often collect too little supply chain data (i.e., 1 or 2 tiers vs the whole supply chain picture) and silo supply chain data within services or acquisition programs, which makes evaluating supply chain risk coherently as a military nearly impossible.

Collecting defense supply chain data requires less reliance on commercial suppliers and more due diligence on behalf of the military. Often, defense organizations assess supply chain risk through the information provided by first tier prime contractors and the second-tier vendors the prime contractor uses. But that simply isn't enough information. Who is supplying the second-tier vendors? What is the relationship between vendors? What other vendors can do the job? Defense organizations need to make it a point to understand their supply chains on their terms.

Luckily, defense organizations don't need to rush out and develop their own supply chain illumination tools. Industry partners have the tools and expertise to collect the right data today.

Making sense of supply chain data can be aided by a data management plan that organizes and integrates information for multiple products or services and from multiple sources, including industry, other government organizations, and foreign partners. Such a plan should not reside in a single service, but at a joint military level to ensure the full supply chain picture is understood and to provide more continuity about what information needs to be shared with allies or partners. A plan would benefit from an executive level leader and staff trained to operate and understand the system.

2. Decide what supply chains are critical

Once supply chain data is in hand and organized to provide a clear picture, the next step is to understand what products, services, or resources are most critical so defense organizations can assess risk. A country's strategic situation (e.g., rising tensions with a major trading partner or limited ability to produce necessary products like food) will dictate which supply chains require a higher or lower prioritization. Understanding the ecosystem of trusted allies and trading partners will also be important for making thoughtful decisions. For instance, switching to a trusted partner may incur a cost increase for a good or service but significantly reduce risk. In any case, to make the most informed decisions about which supply chains are most critical, defense organizations should first decide what they cannot go without and where there are other sources of supply to draw from.

Among like-minded defense organizations, there is already some shared appreciation for certain critical supplies. These include semiconductors and critical electronic components, rare earth elements, and energetic materials (i.e., propellants and explosives), active pharmaceutical ingredients among others.⁹ But which parts of the supply chain each defense organization must prioritize could differ based on their unique situations. Defense organizations should also remain flexible with what they deem most critical. Natural disasters, global pandemics, terrorist attacks, and other unexpected events could rapidly change defense needs. While shoring up supply chains for every possible contingency may be too large of an ask, developing an agile decision-making process for evaluating critical supply chain needs can offer a pragmatic solution for an uncertain future.

3. Make supply chain orchestration easy

Defense organizations rely on industry to produce most of what a military requires, meaning defense organizations can find their supply chain risk tightly correlated with the private sector's. Mitigating risk born from those relationships may require incentivizing industry to adopt responsible supply chain practices in exchange for the ability to compete for defense procurement programs and join trusted supplier networks.

A first step is to encourage responsible supply chain practices from companies bidding for defense work. For example, federal contracts could require industry partners to include supply chain illumination analysis for the products and services being offered to the government or information about the practices the industry partner employs to protect their own supply chains. Supply chain illumination efforts will come with upfront costs but these costs will likely be minimal compared to the cost of defense organizations operating without critical supplies due to supply chain disruptions. Whatever the requirements are, they should be a standard requirement across government procurement, but especially for the products and services deemed critical.

More than just imposing more requirements, defense organizations should also make it easier for industry partners to tap into diverse networks of trusted suppliers. A trusted supplier program would be akin to national Trusted Trader programs designed to reduce red tape for international trade, but for military supply chains.¹⁰ Military specific programs would organize suppliers, manufacturers, and militaries around specific military capabilities to centralize the flow of information for military goods and services and manage supply chain risk. The goal would not be to limit the number of available suppliers but encourage them to adopt practices that allow them to be trusted.

The second piece is developing shared talent. Even with shared tools the military or industry personnel managing supply chains may have different risk thresholds, plans to mitigate risk, or plans for what to do during a crisis. When supply chain talent works from different playbooks, effective cooperation can be difficult. Developing supply chain talent through joint programs should leverage a common curriculum around supply chain risk, reporting, and response among other areas. Joint courses can help share lessons learned, standardize processes, and ultimately improve supply chain resilience between military allies and partners joined through supply chains.

Despite the improvements that should be considered, defense organizations are well suited to create the new supply chain tools and practices necessary for reorchestration. Moreover, there is growing support from government leaders for new supply chain orchestration among like-minded and friendly partners, like the UK's call for a 'network of liberty' for supply chains or the Quad's¹¹ recent agreement to work together to secure semiconductor supply chains.¹² The opportunity and government support is present, but what is missing is a new trade vehicle that can cohere supply chain data, trust, and talent to help countries find new trading partners and create new supply chains considerate of risk.

Building the right trade vehicle

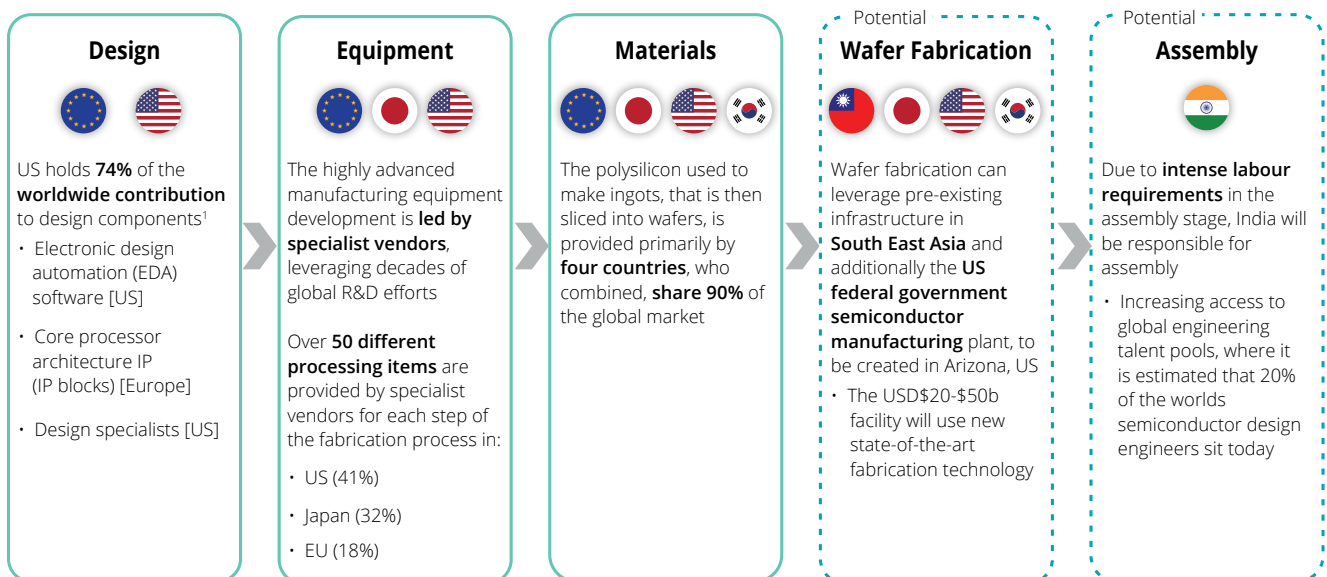
Reorchestrating defense supply chains (and eventually other government and commercial supply chains) requires the right trade vehicle built with the rules based international order in mind. There is a lot of unfamiliar territory to navigate when trying to develop a new approach to supply chain orchestration. Taking stock of political tensions between leading trading partners and the individual or shared needs of militaries can require a lot of diplomatic work, let alone aligning those needs to reduce risk in a fiscally responsible way. While the exact plan for creating a new supply chain vehicle is undefined, with greater control of defense supply chains, militaries are the ideal candidate to explore new trade schemes. Not only are militaries often the only consumer of many of the products and services they buy—which can mean adjusting defense supply chains can cause fewer unintended consequences than similar change in other sectors¹³—but, among allies or close military partners, there is existing appreciation for sharing technology and services and reducing risk.

Two guiding principles can help militaries as they explore new supply chain vehicles.

- 1. Organize around the problem:** The need for a new trade vehicle that accounts for increasing strategic competition while limiting risk from international partners is not just a problem for a single defense organization, it's a problem for many of them. Not every military will prioritize each defense supply chain as equally critical, but among allies and close partners, there is plenty of overlap.

What leaders can do today: Defense organizations should identify what issues and supply chains are of shared concern between countries and therefore represent a good opportunity for change. The goal is not to create a one-off approach for a single or few supply chains or countries, but a scheme that can grow in partnership and the supply chains organized through it. For example, a notional reorganizations of semiconductor supply chains could resemble figure 3 below.

Figure 3: Notional reorchestration of the semiconductor supply chain among countries organized around the problem.



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In the notional example from figure 3, agreements among countries with shared strategic and supply chain concerns for semiconductors could create an economically viable and more resilient alternative supply chain. By diversifying fabrication away from nations where political tensions increase risk, the alternative supply chain limits choke points and expands the number of participants in the supply chain.

- 2. Prove the concept:** A popular quote observes “big things have small beginnings”.¹⁴ The same can be true for a new supply chain orchestration vehicle. Defense organizations do not need to launch into a massive overhaul of critical supply chains all at once, but instead, prove the concept with a small-scale pilot program.

What leaders can do today: Defense organizations should create a pilot program that includes a pilot trusted supplier program to house data, certify industry partners, and manage supply chain risk collectively. The pilot program should also be the test bed for the new vehicle because fine tuning is easier at a smaller scale, especially with something as complex as supply chains.

Shoring up supply chains, defense or otherwise, is a continuous process. But the first step is creating the means to make change, and that comes in the form of a new trade vehicle that helps organize trading partners around shared concerns to reduce supply chain risk. To be sure, creating a new vehicle will be no small ask, but neither is dealing with the consequences of supply chain failure. The writing is on the wall; it's time for change.



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