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How Small Manufacturers Can Develop Risk Management Strategies for their Supply Chains

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Introduction

As a smaller manufacturer, you continue to be more vulnerable to global supply chain disruptions than larger companies. Having to pay more for materials, parts or shipping is a difficult dynamic as you may not be able to absorb short-term losses or even a lower margin. But cost becomes less important if you can't deliver a product, and as uncertainty has been magnified, it is now essential for you to manage risk by preparing for and adapting to unexpected disruptions in order to increase your resilience and be responsive to customers.

In many ways the disruptions show how small manufacturers are more critical than ever. Many big companies are looking for additional domestic sourcing and do not want to take on additional liabilities and capital investments from bringing more in-house. Those companies also are looking for trusted relationships in their supply chains that will work with them to provide added value from sustainable solutions and even product development.

A key aspect of being a trusted supplier and providing sustainable solutions is being resilient. Resilient manufacturers operate with situational awareness of all aspects of their business environment, from their supply chain inputs, to their in-factory processes, to their customer and market outputs. Resilience doesn't just mean reacting to catastrophic changes to remain in business. Rather, resilience means being proactive about understanding and anticipating all kinds of inevitable change and putting in place the strategies and tactics that allow a company to be both stable and agile at the same time.

Risk management is key

It starts with risk awareness that can be realized by conducting assessments of the full system of business operations: inputs, processes, and outputs. Systems-based risk awareness allows a company to understand challenges in their supply chain, in their factory, and with their customers and markets – before those challenges become pressing problems – and manage them accordingly. This includes pricing and costing.

Many small manufacturers are now looking at more than just the per unit price. They are now looking at the total cost of ownership (TCO) in their supply chains and asking how they can add value for their customers. Part of the strategic shift is from manufacturers realizing that the costs are considerable for freight, tariffs and time. Looking at the true cost via the TCO approach rather than at just the per unit purchase cost can help you better evaluate sourcing.

Many manufacturers are pursuing domestic sourcing for materials and supplies as a way to overcome supply chain disruptions. There are substantial long-term benefits to reshoring including:

1. **Reliability:** Overseas suppliers means living with tariffs, global politics and economies and natural disasters in faraway places.
2. **Trust:** It's easier to establish a relationship with common languages, cultures and proximity, and relationships become critical during disruptions. Relationships are key in understanding if a supplier can grow with your business and innovate alongside you.
3. **Business Ethics:** Concerns about overseas suppliers with intellectual property (IP), knockoffs and tooling are well documented. The U.S. has some of the strongest IP protections in the world, so working with a domestic supplier decreases the chances of IP theft.

It's difficult and time-consuming to build and maintain relationships, but growth in domestic sourcing will come from medium and larger manufacturers who invest more in smaller domestic suppliers to solve shortages and other arising issues. It's an important part of the reshoring mindset.

Responding to Impacts and Preparing For What Comes Next

The global supply chain crisis has evolved from a cascading series of events that began with the shutdown of factories in China at the onset of the COVID-19 pandemic. Subsequent changes in buying behaviors and shifting demands have led to a variety of disruptions, including shortages of materials, parts and components, which in turn created shipping backlogs and bottlenecks that have impacted almost every industry.

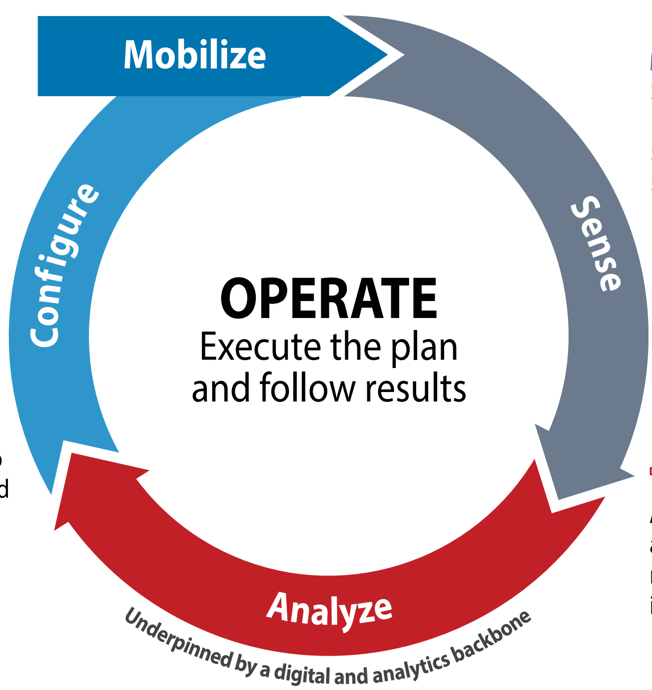
The dynamic quickly shifted from the tactical, problem-solving approach to focus on resilience and becoming more strategic. The biggest increase is in multi-sourcing, which adds redundancies as an additional source of a supply to minimize risk while increasing options. But supply chain experts also are seeing an interest in relying, long-term, on domestic supply sources.

Shifting from a reactive to proactive approach requires a continuous cycle of risk mobilizing, sensing, analysis, configuration, and operation. This will help optimize results while mitigating risks. In essence, the questions a manufacturer asks in a dire, problem-solving scenario are similar for reshoring as reactive problem solving:

- Can we go without?
- Can we substitute it?
- Can we build it?
- Can we re-tool or get someone else to re-tool to produce it?

Mobilize the command center and (initial) response plan. Establish operating rules for responses related to all supply chain interventions and contingency management

Sense and prioritize new risks and implications to your supply chain components/ services and ecosystem



Configure and tailor the network and product flows to execute the protocols. Develop balanced scorecard to track and measure the effort

Analyze what-if scenarios and protocols for source, plan, make, distribute and service implications

Source: Accenture, How to Respond to Disruption

Manufacturers should seek to improve their overall resilience and move from reactive to proactive with long-term contingency plans, multi-sourcing to build in redundancy, and rating their existing suppliers. The benefits for manufacturers who source from within the U.S. are extensive and include:

- More transparency and control of their supply chains, which can improve quality control, flexibility and time to market, while lowering supply chain risk that often comes from offshore production.
- Producing near the consumer often reduces total costs by shortening supply chains and contributing to a lean and agile strategy, with reduced waste.
- Tapping into a large network of local and regional supply chain stakeholders, from your local MEP Center, to trade, economic development and workforce development organizations and local and regional government agencies that might have timely incentives.

MEP Tips for Manufacturers

How the MEP Can Help: The Importance of Relationship Capital

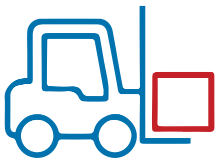
Relationship capital is the value of a manufacturer's relationships with its customers, suppliers, vendors and stakeholders in the marketplace. It is difficult and time-consuming for manufacturers to build and maintain relationships, but success in sourcing will come from manufacturers who invest in strengthening supplier relationships. Many manufacturers are now looking for more reliable domestic suppliers to solve their shortages.

Your local MEP Center has experts who can help manufacturers find new sources of supplies, which is not easy for many resource-challenged manufacturers that are occupied with their own operation and deal in relatively narrow networks associated with their specialties. Local MEP Center staff reach out to their expansive networks of manufacturers – locally and nationally, state and regional economic development organizations, and trade groups to raise the manufacturer's visibility.

Lessons Learned: Don't Fall Into the Low-Cost Trap

Many manufacturers work hard to reduce uncertainties in their operation. They often focus on cost, which is a known quantity. Costs are the reason manufacturers use overseas suppliers to begin with – materials and workforce are typically less expensive in Asia on a per unit cost basis. But "cheaper" is where innovation and value go to die. Competing on cost per unit makes you replaceable.
It is not sustainable.

Mapping Your Supply Chain Network



Manufacturers can map their supply chain to gain better visibility into those organizations' exposures and opportunities. The most common approach to mapping is to use the "bill of materials" to drill down on the top five products by revenue, looking at component suppliers and raw material suppliers. A supply chain mapping process might look like this:

- Learn where suppliers and their suppliers are located
- Research your suppliers to understand inherent risks associated with the company and external factors
- Conduct a risk assessment

Once you have a good idea of your top-tier sites, start looking at the sites that supply to them.

Experts suggest analyzing as many tiers as possible in the supply chain, because there may be hidden critical suppliers that manufacturers are not aware of. The network map should include:

- Primary site activities performed at the supplier
- Alternative sites the supplier has that could perform the same activity
- How long it would take the supplier to begin shipping from the alternate site

Using domestic sourcing for materials and parts instead of overseas suppliers means risk mitigation begins much earlier in the entire process. The shorter distance a part or material must travel, and the fewer touchpoints involved and the less potential uncertainty.

What Supply Chain Disruptions Have Taught Us About Lean Manufacturing

"Just-in-Time" inventory is a popular concept in lean manufacturing which is meant to lower cycle times, reduce waste, and increase productivity. But that concept is not nearly as relevant now as it appeared to be years ago. The reality is that risk has always been a significant factor in supply chains. The current dynamic requires flexibility and risk management. It's not that lean principles don't apply anymore, but the right question to ask may be "what's the healthiest approach for us right now?" Continuous improvement should be the overarching mindset.

MEP Tips for Manufacturers

How MEP Can Help: Supplier Scouting

The fast-changing supply chain dynamics have led to a greater demand for supplier scouting – which is essentially identifying sources for domestic products and capabilities. The MEP National Network Supplier Scouting program works like this: a manufacturer seeking a new supplier contacts its local MEP Center, which shares the details and technical requirements of the opportunity across the MEP National Network — 51 MEP Centers located in all 50 states and Puerto Rico, with over 1,400 trusted advisors and experts at more than 385 MEP service locations.

Local MEP Center staff, through their own best practices, scout for domestic manufacturers within their state that have the capacity, capability, and interest to meet the immediate need. Results are aggregated from input provided by MEP Centers across the nation and sent to the sponsoring MEP Center so they can start a dialogue with the potential suppliers. MEP Centers facilitate company interactions.

Self Assessment Tool for Supply Chain Risk Management

Supply chain issues rarely can be viewed as black and white by smaller manufacturers because there are so many dependencies, both upstream and downstream. While cost will always be a critical factor in finding both suppliers and customers, it's no longer the main consideration. Manufacturers are now looking at how they can balance cost with risk and supply chain resilience.

This self assessment is necessary as reducing uncertainty comes at a cost. There are always tradeoffs. Supply chain issues now are being viewed in somewhat of a business insurance mindset.

An end-to-end supply chain visibility self assessment (see example below) will cross reference three stages of product flow with activities from the three lenses of a business plan.

Product flow:

- Upstream - suppliers
- Internal - production
- Downstream - channels

Business model execution:

- Strategic - yearly
- Tactical - monthly
- Operational - daily

The self assessment tool includes three questions for each aspect of the assessment. A manufacturer can quickly see if it has yet to begin addressing the area, it is a work in progress or it has an established approach or plan. This reveals a snapshot of not only the supply chain but also the value chain development, such as product lifecycle management, market and customer segmentation and distribution management.

There is no question that resource-challenged manufacturers have many choices when it comes to focus and attention for ensuring the growth and sustainability of their business. The self assessment tool is a great starting point to help them prioritize needs.

End-to-End Supply Chain Visibility Assessment 1.0 (Supply Chain Media, February 2020)

	Upstream / Suppliers			Internal			Downstream/ Channels		
	Aspect	Qualifier	Y/N	Aspect	Qualifier	Y/N	Aspect	Qualifier	Y/N
Strategic (yearly)	Supplier Risk Management	Supplier Financial Risk Reporting		Supply Chain Network Optimization	Supply Chain Network Sensitivity Analysis		Customer/Distributor Risk Management	Customer/Distributor Financial Risk Reporting	
		Supplier Risk Tiering			Dynamic Network Scenario Modelling			Customer/Distributor Risk Tiering	
		Supplier Dependence Monitoring			Supply Chain Network Visualization			Customer/Distributor Dependence Monitoring	
	Supplier Product Segmentation	Value Contribution per Article Group on Part Level		Supply Chain Segmentation	Supply Chain Strategy per SKU & Region		Market & Customer Segmentation	Profit & Loss Calculation per Region on SKU level	
		Value Contribution per Supplier Site on Part Level			Supply Chain Strategy per SKU & Channel			Profit & Loss Calculation per Channel on SKU level	
		Value Contribution per Supplier on part level			Supply Chain Strategy per SKU & Customer Segment			Profit & Loss Calculation per Customer Segment on SKU level	
	Supplier Product Compliancy	Product Classification & Admissibility Review		Product Lifecycle Management	Configuration & Recipe Management per Product		Omni-channel Customer Management	Price Optimization per SKU & Channel	
		Restricted/Denied Party Screening			Product Performance Analysis			Trade Promotion Optimization per SKU	
		Duty Management			Product Master Data Management			Product Group Performance per Channel	
	Aspect	Qualifier	Y/N	Aspect	Qualifier	Y/N	Aspect	Qualifier	Y/N
Tactical (monthly)	Total Landed Cost Optimization	Total Net Purchasing Prices per part/material		Cost to-Serve Optimization	Delivered Margin Calculation per SKU		Total Delivered Cost Optimization	Total Net Sales Prices per SKU	
		Total Net Transportation Costs per part/material			Activity Based Costing per SKU			Total Net Transportation Costs per SKU	
		Total Net Taxes & Duties per part/material			Supply Chain Cost Comparison per Site			Total Net Taxes & Duties per SKU	
	Supplier Production Planning	Supplier Capacity Availability		Multi Echelon Supply Chain Planning	Multi-Site Bottleneck Optimization		Forecasting & Demand Sensing	Optimal Demand Steering per SKU	
		Supplier Lead-Time Variability			Multi-Site Production Planning			POS Data Collection per SKU & Channel	
		Supplier Production Reliability Performance			Multi-Site Capacity Management			Statistical Demand Pattern Recognition per SKU	
	Supply Capacity Planning	Supplier Lead-Time Capability		Sales & Operations Planning	Rough-Cut Capacity Planning		Demand & Promotion Planning	Customer Orders & Forecasts per Category & Channel	
		Supplier Capacity Availability			Materials Requirement & Production Planning			Promotion Planning per Category & Channel	
		Supplier Quality Assurance			Supply Chain Gaps & Resolutions			Demand Capture per Category & Channel	
	Aspect	Qualifier	Y/N	Aspect	Qualifier	Y/N	Aspect	Qualifier	Y/N
Operational (weekly/daily)	Order Acknowledgement	Risk Analysis & Response Management		Supply Chain Order Management	Automated Global Order Promising per SKU		Distributed Order Management	Multi-Location Fulfilment Capability	
		Root Cause Analysis			Automated Capable to Promise per SKU			Global View of Available Inventory	
		Simulations & What-if Scenarios			Automated Available to Promise per SKU			Multiple Order Capturing per Channel	
	Collaborative Inventory Management	Multi-tier Supplier Inventory Overview		Inventory Control & Management	Multi-Echelon Inventory Optimization		On-shelf Availability Management	On-shelf Availability per SKU & Channel	
		Supplier Vendor Managed Inventory			Inventory Auditing & Digital Cycle-counting			Stock-outs per SKU & Channel	
		Excess & Obsolete (E&O) Inventory Resolution			Automated Inventory Re-ordering per SKU			Replenishment Recommendation per SKU & Channel	
	Inbound Transport Management	Inbound Freight Bill Auditing		Warehouse Management & Fulfillment	Fulfillment Cost Calculation per shipment		Outbound Transport Management	Outbound Freight Bill Auditing	
		Dynamic Estimated Time of Arrival (ETA's)			E-fulfillment Capacity Planning			Predictions Estimated Time of Arrival (ETA's)	
		Inbound Transport Planning			Order Pick Wave Planning			Outbound Transport Planning	
	Shipment in Transit	Real-time Alerts for Traffic Jams & Technical Breaks		Order Status Management	Daily Status Report per Order		Delivery Management	Real-time Alerts for Traffic & Technical Breaks	
		Geofencing for Inbound Deliveries			Warning Report of Potential Delays			GPS Tracking of Shipments	
		Slotbooking for Inbound Transport			Paperless Order Picking Process			Digital Proof of Delivery	
	Inbound			Processing			Outbound		

End result End to-End Supply Chain Visibility Assessment:	
0 Yes-answers out of 3 qualifying questions	White Spot (0% colored)
1 or 2 Yes-answers out of 3 qualifying questions	In progress (50% colored)
3 Yes-answers out of 3 qualifying questions	Established (100% colored)

MEP Tips for Manufacturers

How the MEP Can Help: Build A Balanced KPI Scorecard

Key performance indicators (KPIs) used to be an afterthought for supply chains as securing materials or parts was the emphasis. But one imbalance in a supply chain can make everything else irrelevant. Keep in mind that a balanced scorecard is a mix of quantitative and qualitative data. Your KPIs should measure 2-3 key metrics such as supply chain risk and quality performance. Your KPIs should use industry standards where relevant including responsiveness, on-time delivery (OTD), etc. and should be tailored by vendor. Visibility and clarity in communication is a must both internally and externally. It's essential to properly weight KPIs in a dynamic nature as they provide insight but are lagging indicators.

Key uses for a supplier scorecard include:

- Measuring performance and driving improvements
- Justifying which suppliers to keep in your supplier base
- Strengthening a negotiating position
- Developing suppliers into better partners
- Rewarding good performers based on objective data
- Gaining consensus on strategic relationships

Your local MEP Center experts can help you with all aspects of supply chain management and show you how to proactively operate with situational awareness of potential backlogs, the economy, and the state of your market.

The Many Approaches To A Risk Management Plan

Small and medium-sized manufacturers often only have a continuity plan if they have experienced a major disaster. For many, the current disruptions have been that disaster, forcing them to shut down a product line or worse. A risk management plan can be as simple as a SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats), provided it takes into account a wide swath of the business, such as people, parts and supplies, IT and cybersecurity, operations, competitors, etc.

Supply Chain Risk Management To-Do List

Mapping your supply chain and assessing your risks and opportunities will provide you with a mountain of information but not necessarily a roadmap for what to do next to increase your flexibility and readiness. The MIT Sloan Management Review suggests an action list for small manufacturers based on these seven areas:

- **Increase capacity**
  - Focus on low-cost, decentralized capacity for predictable demand
  - Build centralized capacity for unpredictable demand
  - Increase decentralization as cost of capacity decreases
- **Transition to redundant suppliers**
  - Utilize redundant suppliers for high-volume parts, less redundancy for lower-volume parts
  - Centralize redundancy for low-volume products with a few flexible suppliers
- **Increase responsiveness**
  - Prioritize costs over responsiveness for commodity products
  - Prioritize responsiveness over cost for short life cycle products
- **Increase inventory**
  - Decentralize inventory of predictable, lower-valued parts
  - Centralize inventory of less predictable, high-valued parts
- **Increase flexibility**
  - Prioritize cost over flexibility for predictable, high-volume parts
  - Prioritize flexibility for low-volume parts with uneven demand
  - Centralize flexibility in a few locations if it is expensive to operate locations
- **Aggregate demand**
  - Increase aggregation as unpredictability grows
- **Increase capabilities**
  - Prefer capability over cost for high-value, high-risk parts
  - Prioritize cost over capability for low-volume commodities
  - Centralize high capability in flexible sourcing if possible

MEP Tips for Manufacturers

How the MEP Can Help: Linking Supply Chain To Business Strategy

Your local MEP Center has experts who can help you align your supply chain with desired business outcomes:

- **Have you aligned your supply chain with business goals?** Manufacturers should integrate their sales, inventory and operations planning (SIOP) programs with their budget and forecasting effort. This is a cycle of forecasting, demand planning and capacity planning. The demand plan begins with a forecast from sales, how it fits into company goals and capacity issues. This impacts material requirements. Knowing what is in the pipeline every month helps decision makers share knowledge about risks and what risks may be tolerable. The operations side uses the demand plan to create a supply plan that considers both the capacity and resources available. They may go back to sales and ask to validate the forecast, which is confirmed or adjusted.
- **Can your suppliers grow with your business?** Does the supplier have the capacity to meet your current needs and would they be able to accommodate an increase in your business? Is the supplier financially stable? Some external indicators of financial risk include losing customers, lawsuits, or the loss of key personnel. You should also consider if a supplier is a good fit for your company. If you place smaller orders, would your supplier prioritize other orders ahead of yours – possibly leading to production delays?
- **Can your suppliers innovate alongside you to meet new designs?** Finding suppliers who understand their role in the product life cycle is critical to supply chain integration and strategy. Meeting production standards at the right price doesn't necessarily equal long-term value. The competitive advantage in the supply chain is the ability to respond to changing customer demands.

Thinking Outside The Box For Possible Solutions

Smaller manufacturers are increasingly using unconventional approaches to solve problems. The "think outside of the box" mindset was born out of necessity but now is prevalent for some companies. Some examples:

- **Consider capabilities of other manufacturers outside of (but near) your industry** - A small manufacturer that was challenged with packaging yarn found a supplier that worked with cables and wiring.
- **Take stock of other local manufacturers and their needs or capacity** - A manufacturer found success by approaching the largest manufacturer in the region to ask about their supply needs.
- **Explore funding mechanisms that could help you retool or pivot to meet demand** - Incentive programs often are available to help manufacturers invest in technology to ensure job retention or growth. Possibilities include direct subsidies from big companies to state grants and tax-exempt bonds.

Supply Chain Management: A Component of Manufacturer Resilience

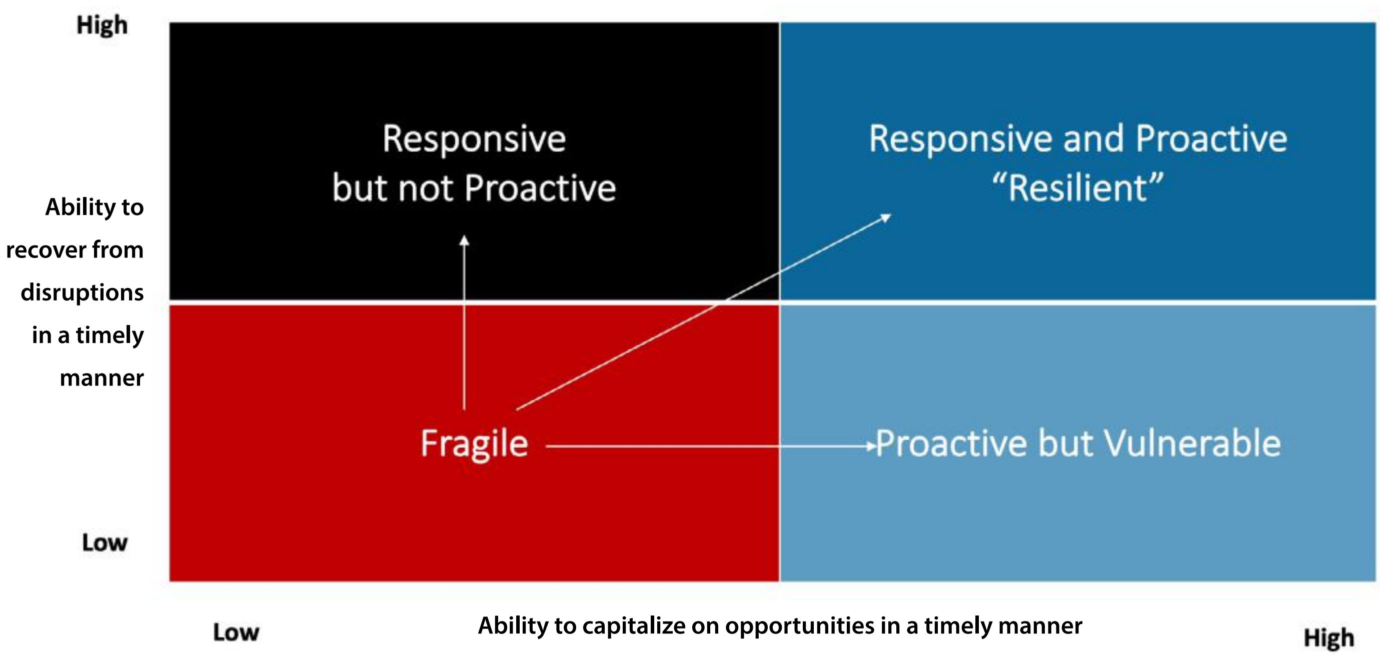
As previously introduced, improving a manufacturer's resilience positions them to be situationally aware of potential changes to all aspects of their business environment including their supply chain, in-factory operations, and customer and market demand. Smaller manufacturers can take a series of strategic steps to both reduce exposure to disruptions and increase capabilities to achieve growth without negatively affecting profitability.

Comprehensive situational awareness of the full range of business components allows a manufacturer to plan and put in place integrated strategies and tactics that provide proactive protections and responsiveness through appropriate risk awareness and management. Resilience improves competitiveness, while simultaneously enabling sustainability of business operations.

For manufacturers to be resilient, they need to be proactive and responsive. Supply chain disruptions will likely continue well into the future. From our experience, about 80 percent of small to medium-sized manufacturers are reactive, but they see the need to be more proactive and are taking steps to find long-term solutions that reduce their supply chain risks.

- **Fragile, needing to recover:** Short-term actions to address crises as they occur, with little planning and strategy setting. For example, dealing with recurring staffing problems, health and safety issues, factory disruptions, supply chain gaps, and immediate financial needs.
- **Responsive, but not proactive:** Short- and middle-term actions that protect against recent problems, but lack strategies and planning to create stability and long-term competitive advantage and sustainability.
- **Proactive, but vulnerable:** Short- and middle-term actions to target and capitalize on opportunities, but lack strategies and planning to create stability and long-term competitive advantage and sustainability.
- **Responsive and proactive, resilient:** Ongoing and long-term actions with situational awareness to implement integrated strategies and tactics that enable sustained agility of operations with a competitive advantage.

Manufacturing Resilience Grid



Your Trusted Advisors For Supply Chain Management

For many smaller manufacturers, sourcing supplies from Asia is not adding enough value to warrant the risks. Among the many uncertainties facing smaller manufacturers is when, or even if, the supply chain will return to its previous level of stability. Having few alternatives to ocean freight is just one of many reasons that experts are predicting supply chain issues may last into 2023. Even then, higher ocean freight costs may be here to stay.

The efforts to find domestic sourcing are shedding light on the many benefits that small and medium-sized manufacturers might not have considered in the past, such as total cost of ownership and innovating alongside their suppliers. Supply chain management experts at your local MEP center can help you with supply chain challenges and find domestic suppliers and capabilities, not just locally but at a national level. They are trusted advisors who understand the challenges that smaller manufacturers face when it comes to supply chain management.

Contact CONNSTEP

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The MEP National Network is a unique public-private partnership that delivers comprehensive, proven solutions to U.S. manufacturers, fueling growth and advancing U.S. manufacturing.

Focused on helping small and medium-sized manufacturers generate business results and thrive in today's technology-driven economy, the MEP National Network comprises the National Institute of Standards and Technology's Manufacturing Extension Partnership (NIST MEP) and 51 MEP Centers located in all 50 states and Puerto Rico.

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