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SUPPLY CHAIN BRAIN

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2023 SUPPLY CHAIN MANAGEMENT RESOURCE GUIDE

PACKING FOR A DIFFICULT YEAR

TOP ANALYSTS' OUTLOOK FOR THE YEAR AHEAD

SPECIAL REPORTS & TOP 5 LISTS FROM INDUSTRY EXPERTS

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Packing for a Difficult Year

Robert J. Bowman
Editor-in-Chief
SupplyChainBrain

Those who enjoy hiking into deep wilderness wouldn't take a single step without first equipping themselves against all anticipated hazards. They pack food, warm clothing, sleeping bags, tent, tools, flashlight: the usual list of items to ensure comfort and survival in rough conditions. But how stuffed must the backpack be, to prepare for every eventuality — especially when the nature of the threat to be encountered is completely unknown?

Having weathered three years of unprecedented adversity, supply chain planners don't know what to pack anymore. Should they beef up inventories, build more warehouses, shift sourcing, double down on technology investment, hire or fire more people? The trail leading to the future is poorly marked, if at all. And the destination is obscured by clouds of uncertainty.

It's not all bad. Most would agree that we're in a somewhat better place than a year ago, when fewer people were vaccinated against COVID-19, fuel prices were soaring, Russia's invasion of Ukraine was shutting down access to critical raw materials, hundreds of containerships were stalled outside Southern California ports due to bottlenecks in the supply chain, freight rates were spiking, and inventories of essential consumer goods were seesawing between shortage and glut.

We're not out of those particular woods yet — while containers have mostly resumed their normal flow, inflation remains a concern, and labor shortages continue to hamper the efficient distribution of goods, even as nervous tech companies shed thousands of workers. Economists can't agree on when or whether we're due for a recession (or, for that matter, whether we're already in one), and the Russia-Ukraine war, along with other geopolitical tensions, continues to threaten the stability of global supply chains.

So which ideas, strategies and tools do companies need to navigate through the coming year and beyond? We're here to help. In this, our annual Supply Chain Management Resource Guide, we feature the contributions of experts from all corners of the industry. They run the gamut from planning to execution, from procurement to final delivery to the end user. And while none of them can lay claim to a crystal ball, their insights into the current plight of supply chain executives, and range of options for making it through this year, are invaluable. Topics include trends in trucking, procurement strategy, the coming of electric vehicles, the role of artificial intelligence and machine learning in decision-making, the correct handling of hazardous materials, modern-day warehouse management, the future of logistics outsourcing, trade regulation and compliance, enterprise software applications, omnichannel retailing, supply chain visibility, and much more.

To be sure, we've covered all of these topics many times before, and expect to follow their progress as the year goes on. But we see a difference now in the way that global businesses are approaching the discipline of supply chain management. In the past, to prepare for any unforeseen disruption, they would be looking to stuff that metaphorical backpack with every imaginable tool. And that makes for one heavy and expensive hike. Instead, the shift in thinking today is toward becoming agile enough to cope with whatever obstacle might lie in the path ahead. No strategy is set in stone — we've seen planning horizons shrink steadily in recent years, to the point where there's barely any space between demand planning and execution anymore. And when it comes to sourcing, manufacturers that placed all of their proverbial eggs in the China basket aren't contemplating a wholesale abandonment of that country's low-cost infrastructure. Instead, they're looking to mitigate risk by diversifying their supplier base among multiple regions of the world (and in some cases, bringing them back to the U.S.). For supply chain executives on the long hike to success, the mantra today is: Pack light, and be ready for anything.

2023 SUPPLY CHAIN MANAGEMENT

RESOURCE GUIDE

PACKING FOR A DIFFICULT YEAR

How AI and Machine Learning are Transforming the Supply Chain

Amit Prasad Chief Data Science Officer, Transportation Insight & Nolan Transportation Group

Analyst Insight: With recent disruptions such as the pandemic and hurricanes accounting for billions of dollars in damages, the need for creating a more resilient supply chain network with greater visibility and connectivity has increased. Artificial intelligence (AI), machine learning (ML) and data analytics have proved to be innovative solutions to these challenges and have the potential to transform supply chains.

AI-based solutions can optimize the overall supply chain process by predicting problems in advance and proactively prescribing solutions to manage such disruptions. They can also eliminate inefficiencies through intelligent automation and provide visibility and insights that enable effective decision-making and planning.

There are various applications of AI and ML, and differing ways they can be operationalized throughout the supply chain. Some of the key areas where they can have the potential to make a transformational impact include:

Supply chain automation and digitization. A lot of information in the supply chain is transacted through documents such as BOL, POD, contracts etc., which can be easily digitized using AI, thereby reducing human error, and enhancing the customer experience. AI can also intelligently automate a lot of repetitive and manual processes in various areas of the supply chain, driving further efficiencies.

Real-time visibility & predictive analytics. Businesses can harvest big data generated by a typical supply chain into valuable insights that can be used for strategic and tactical decision-making. While access to the real-time data and information can help businesses respond quickly and inform the supply chain, AI and ML can analyze and model historical data to optimize the modern supply chain through better forecasting, planning, prediction and process automation. For example, AI-based solutions can help predict service failures in advance, and mitigate risk.

Supply chain connectivity. COVID-19 showed us how important it is to have visibility and connectivity across each node in your supply chain, in order to manage uncertainty and unpredictability. While one of the most important steps to connectivity is supply chain digitalization, AI, combined with blockchain technology, can strengthen the end-to-end integrations and connect key activities in the supply chain. These include planning, booking, shipment tracking, and invoicing and payments, across multiple vendors, customers and supply chain partners.

Sustainability. AI and data analytics play an important role in making supply chain operations greener and more sustainable. Utilizing ML and data analytics can optimize vehicle routes to minimize miles driven and reduce fuel consumption. AI can empower businesses to reduce waste in the supply chain by providing more accurate forecasting for demand, inventories and sales.

Last-mile logistics. With the rise of e-commerce, and the rapid evolution of consumer behavior, last-mile logistics is becoming increasingly critical for efficient supply chain operations. AI and ML can help with the optimization of cost, service and asset utilization, ameliorating these inherent challenges within last-mile supply chain logistics.

Outlook: The global logistics industry is expected to reach more than $15 trillion by 2023, with a compounded annual growth rate of 5% per year, while the U.S. logistics industry is expected to exceed $2 trillion by 2023, representing 8-9% of total U.S. GDP. Businesses that leverage AI and ML will be well-positioned to optimize their supply chain and respond with greater agility to changing consumer behaviors and external factors.

Electric Vehicle Adoption Brings New Shipping Challenges

Thaddeus Puccini Senior Executive, Packaging and Global Business Development, Labelmaster

Analyst Insight: The electric vehicle market continues to grow, bringing with it complex supply chain challenges associated with transporting the large-format lithium-ion batteries that power EVs. With the vast majority of automakers selling or unveiling EVs, every organization in the automotive industry – from the automakers themselves to the corner repair shop – needs a plan for large-format lithium-ion battery transport.

The ongoing transport of new, end-of-life and damaged large-format batteries through the supply chain can be a complicated and highly regulated endeavor. Why is it so challenging? To begin, EV batteries are big, powerful, bulky and, if damaged, can be unstable. Their weight can exceed 400 kilograms. This makes packaging, handling and transporting complicated.

Lithium-ion batteries are also fully regulated Class 9 dangerous goods (DG), with strict regulations around how they're packaged and shipped. They're also prone to "thermal runaway," which results in a ballistic reaction triggering an immediate fire.

The transportation of lithium batteries requires an understanding of complex hazmat shipping regulations and coordination with many supply chain partners, including manufacturers, distributors, logistics providers, recyclers and carriers. Whether managing large recalls or the daily transport of smaller battery modules, organizations must proactively plan to handle these complex, highly regulated goods safely and compliantly.

This plan should include:

Knowing your batteries and the regulations. Many factors impact how goods are packaged and shipped. Consider the battery's dimensions, weight distribution, power capacity and status. You must follow both transportation regulations and possible hazardous waste regulations simultaneously. That requires being aware of the rules that govern transport (especially any shipping restrictions), including any variations between country or transportation mode and any carrier or company-specific rules, and ensuring you have the proper processes and infrastructure in place to maintain compliance across the supply chain.

Having proper packaging ready to go. Unlike most automotive parts, large-format lithium batteries require specific regulated packaging that often needs to be custom-made to a specific battery. This specialized packaging must meet all UN packaging regulations, comply with hazmat and hazardous waste shipping regulations, and be able to handle the size and weight of the battery.

Establishing strong partnerships. Most large-format lithium battery transportation involves multiple parties executing various stages of the journey. For the operation to be completed safely and on schedule, there must be seamless communication at all times.

Properly training employees and partners. All parties involved in the transport of EV batteries must receive proper training, not only to comply with hazmat training mandates but also to prepare them to do their jobs safely and efficiently. This training is country and mode of transport specific, and cannot be overlooked.

EV automakers currently have plans in place for transporting large-format lithium-ion batteries. Unfortunately, recalls are unplanned and companies across the supply chain aren't typically ready for them, which can have costly and dangerous results. With large-format lithium batteries, it's essential to have a plan in place to deal with potential issues before they become real problems.

Outlook: With the number of EVs on the road expected to reach 39.2 million by 2030, it becomes increasingly critical for companies to understand and manage lithium battery transport. From large-scale recalls to the daily transportation of smaller battery modules, proper packaging, training and shipping will require resources that some organizations lack. Automotive companies must proactively take steps to ensure the safe and compliant shipment of lithium-ion batteries before they become a problem and impact their business.

The Journey to the Autoverse

Ankit Tiwari Director, Supply Chain Consulting, Tata Consultancy Services

Analyst Insight: Consider the terrain. Mother Earth is calling the shots. Government leaders, globally, are tasked to pave the way to a sustainable future. Simultaneously, widespread digitization unlocks exponential value for consumers and enterprises. These two phenomena combine to offer the chance for ARCS — an autonomous, renewable, connected and shared future for the automotive business network. The future will see a transformation from a product-centric to a consumer-centric ecosystem. With this shift, an omnichannel "phygital" network is unleashing new products and business models.

Climbing to the pole position in this reincarnation, organizations are honing in on their value proposition. From the ARCS perspective, we are starting to see leaders, challengers, visionaries, and niche players stand out, based on their completeness of vision and ability to execute. Leaders like Tesla stormed into market by showing the art of the possible with ARC capabilities. They ruled in the realms of product innovation and consumer orientation, and are now focusing on achieving operational efficiency.

There are various applications of AI and ML, and differing ways they can be operationalized throughout the supply chain. Some of the key areas where they can have the potential to make a transformational impact include:

Organizations can improve their positioning as leaders in the following ways. On the consumer market front, they can create behavior-shaping one-stop-shop experiences with their products and personalized digital services. A differentiation built on such innovation will drive new consumer acquisition and loyalty.

On the supply chain front, in times plagued with extreme uncertainty due to regional lockdowns, geopolitical tensions, interest rate fluctuation and fickle consumer behavior, organizations must employ strategies to assure supply, and guarantee demand fulfillment. They should:

- Stop thinking and acting as individual organizations and start thinking about themselves as the Keiretsu (business partner ecosystem), by cross-investing vertically and horizontally.
- Expand the Keiretsu controllably, both in physical and digital ways, simultaneously and keep digital collaboration as a forethought.
- Move from total cost of ownership to total value of ownership, for the Keiretsu to develop ecosystems' IQ and assurance of supply.
- Promote localization of manufacturing across major markets to ensure diversity, equity, and inclusion in global growth.
- Focus on creating an ecosystem knowledge graph (EKG) including their products, services, and supply network, enabled by internet of things.

The tailwinds for ARCS adoption in the automotive industry comes from improving awareness, desire, knowledge, ability and reinforcement (ADKAR) scores of consumers around digitization and sustainability, which in turn provides return-on-investment increases for ARCS-based investments by the ecosystem. In addition, government investments through policies like the CHIPS Act are promising strategies for supply chain resilience.

Likewise, headwinds and hyper-centralization of suppliers in limited regions will present bottlenecks for critical parts availability. Increasing mining of minerals like lithium, cobalt, and manganese to support critical part manufacturing like batteries present sustainability challenges. Finally, the telecom infrastructure supporting ARCS capabilities faces higher cybersecurity risks.

Outlook: In the long run, the focus on renewable business practices will drive investments in carbon-neutral transportation options. The transportation, parking and re-fueling infrastructure in cities of the future will evolve to support renewable and shared mobility. The increase in data from IoT enabled devices will advance quantum computing and cybersecurity technologies to ensure secure delivery of digital services on the go, and entry into the Autoverse!

Leading the Charge in Multi-Enterprise Supply Chains

Brandon Owens Vice President, Energy Practice, Insight Sourcing Group

Analyst Insight: The global energy industry hasn't been immune to the disruptions that have affected supply chains over the past several years. Now, it faces a fire that must be contained in 2023 if it's to meet global energy demand.

The resolution of supply chain constraints in the energy industry is critical to the success of the global economy. Energy industry stakeholders are going to have to rise to the challenge, through both individual and collective action, to cultivate both short- and long-term supply chain resiliency.

Electric utilities are currently experiencing shortages of distribution transformers, smart meters, conductor materials, skilled labor and bucket trucks due to the ongoing economic impacts of the COVID-19 pandemic. Lead times to purchase new distribution transformers have risen from three months in 2018 to 12 months or more today. Utilities have relied on their existing inventory to bridge the gap between equipment purchase and arrival, but have begun to report that inventories are decreasing to unacceptable levels. The increased gap between the demand and supply of electrical equipment is also slowing the transition to clean energy.

Supply chain disruptions have already resulted in rising energy costs, project delays and productivity losses. There's no standard playbook for overcoming these challenges, but there are actions that stakeholders can take to alleviate supply chain pressures over both the short and long term.

Short-term actions include using emergency stocks of components to address near-term demand, planning all scheduled work, substituting available materials when possible, improving communications with suppliers on the timing and delivery of materials, and relying information technologies to improve information flow and efficiencies. Many of these efforts are already underway, but will need to be accelerated to meet global energy needs in 2023.

Over the long term, energy stakeholders will need to focus on achieving supply chain resilience through both individual and collective action. Organizations need to annually stress-test the resilience of their supply chains and develop contingency plans under disruption scenarios. This will allow them to identify weaknesses and put into place strategies for overcoming disruptions by identifying alternative suppliers and strengthening supply chain networks before disruptions occur.

Collective action is required. Where possible, energy industry participants should create a collaborative response to supply chain issues by sharing insights and resources. Pooling demand for equipment and other supplies, to help improve energy availability and system efficiency, is critical. The creation of shared infrastructure will allow the industry to highten the responsiveness of its assets and resources. This type of coordination can be challenging in highly competitive environments, but if done properly, it will strengthen the position of all participants.

Outlook: Energy companies will never be able to avoid all the risks to their supply chains. However, they can adopt new technologies and implement fresh approaches that will allow them to predict and manage disruptions as they emerge. They can also take collective action to strengthen their supply chain networks and manage the negative consequences of disruptions in the future. We're in the midst of an energy industry supply chain emergency, and it's time to work together to extinguish the fire.

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Holman Logistics Uses Artificial Intelligence to Increase Forklift Safety

Holman partners with OneTrack to bring AI solutions to the issue of forklift accidents.

THE CHALLENGE

For Holman Logistics, nothing is more important than the safety of its team members and the customers for whom they provide manufacturing logistics, warehousing, omnichannel fulfillment, and transportation services.

"Our core values set the foundation for the work we do, and we have no more important core value than safety. We constantly seek technology, training, and other innovative resources to help us maintain our superior safety performance," commented Brien Downie, president of Holman Logistics.

Holman operates forklifts in all of its locations across the U.S., and operations managers and customers understand the human and financial costs of forklift-related accidents. Holman always monitored and tracked forklift activity; however, management wanted to understand the root causes of mishaps and find out if it was possible to create a system to warn of problems and prevent accidents from occurring.

Holman custom logistics solutions are both cost-effective and safe. AI technology provides real-time feedback and detects patterns to prevent collisions.

THE SOLUTION

Along with ensuring that it hires, trains, and develops technically proficient forklift drivers, Holman chose to partner with OneTrack to leverage that company's expertise in Computer Vision and Deep Learning, also known as Artificial Intelligence (AI).

Computer Vision refers to software processing images from an onboard camera. While the concept of Computer Vision has been around a long time, recent advancements in Deep Learning allow computers to detect, recognize, and predict high-level concepts from images with superhuman accuracy and reliability.

A system powered by Deep Learning has the ability not only to detect that an incident occurred but also to learn why that incident occurred. Most importantly, it can recognize the same pattern in the future and provide a real-time warning when it thinks a similar incident is about to happen. Such a system continues to learn while deployed, actively preventing incidents and continuously getting better at doing so. As the system learns, drivers become safer and more effective, and the number of accidents can be reduced over time.

These technologies create a safer, more efficient workplace for everyone, which is important for Holman because processes, requirements, and workflows can vary greatly by customer and location across its network of facilities.

Brien Downie concluded, "I am confident that these AI tools, along with our never-ending safety focus, are helping us move steadily closer to our goal of accident-free operations. AI technology can have a positive impact on the safety performance of the entire industry."

Why Retailers Need an Omnichannel Platform

Kari Polson Marketing Manager, Deck Commerce

Analyst Insight: Consumer shopping habits have changed over the past few years, thanks to the pandemic and the rise of e-commerce purchases. A recent Forrester Research report focuses on consumer buying habits and reveals that the customer's journey and expectations have changed. If retailers aren't maximizing their stores across multiple channels, they leave dollars on the table.

A recent story on omnichannel statistics in FitSmallBusiness finds that more than half of shoppers looked at products online then bought at a physical store, and vice-versa.

Other stats show:

- Retailers that don't provide an omnichannel experience for online shoppers miss out on up to 30% of sales.
- For online shopping, retailers with three or more channels can increase order rates by more than 490%.
- Nearly half of customers say they're more likely to complete online shopping purchases if they can return in-store.

Consumers want the ability to buy a product from any location and have it delivered anywhere they want it. More importantly, regardless of how consumers shop, they demand a seamless experience. They want visibility into which products are available online and in their local retail store. Consumers also want access to the same level of customer service regardless of how they're shopping.

Moving excess inventory continues to be a struggle for brands. To fix this critical issue, they need visibility into where all their inventory is located. An omnichannel order-management system provides total visibility into inventory, and keeps it in sync across all digital channels. This allows retailers to expose all products that are available to sell, and avoid "out-of-stock" messaging when there are products available in another channel.

Research shows that brands that prioritize an omnichannel approach retain 89% of their customers. Two key ways to create that omnichannel experience are product availability and fulfillment options. Retailers can offer preorders and backorders for popular items, showcase local store inventory on their storefront, or get products in front of more shoppers via marketplace selling.

By offering multiple fulfillment and return options, including buy online, pickup in store (BOPIS); buy online, return in store (BORIS), and ship from store, brands can get orders to customers how and when they want them, improving the overall customer experience and creating repeat shoppers.

An omnichannel approach gives retailers the flexibility to route orders to the best fulfillment location, whether that's a warehouse or local retail store. They can set routing logic based on the location that's closest to the customer, as well as fulfillment center capacity levels, to ensure they're meeting their customers' delivery expectations without hurting the bottom line.

Outlook: While Amazon has set the bar for an excellent customer experience with fast deliveries, retailers that prioritize an omnichannel strategy can create seamless, end-to-end shopping experiences. And that's the best way to create lifelong customers.

The Drivers of Next-Generation Enterprise Resource Planning

Richard J. Sherman Senior Fellow, Supply Chain CoE, Tata Consultancy Services

Analyst Insight: Enterprise resource planning (ERP) arose from material requirements planning (MRP), evolved into manufacturing resource planning (MRP II), then scaled globally. Now comes ERP4, drawing on Business 4.0 technologies to meet the next "Connected Age" wave of change: Ecosystem Resource Planning. While not on many markets' radar screens, these new platforms are being put into play by innovators and early adopters.

Supply *chain* management is rapidly transforming into supply *network* management. The unintended consequences of regulatory decisions by government officials during the pandemic highlighted the network effect. Supply professionals became painfully aware that their supply chains were linear and sequential in nature, and not responsive to the complexity and dynamics of modern-day supply network ecosystems.

Instead of the bullwhip effect, which results from delays originating upstream, the cat o' nine tails effect demonstrated the consequences of downstream supply shortages. Material flows, governed by the networked ecosystem of multi-echelon intersections and relationships, are more representative of current reality than the old supply chain structure metaphor.

Just as we saw the market for batch mainframe legacy enterprise applications implode due to the adoption of network-based applications or ERP, we're about to experience the "Connected Age" wave of change, bringing digital transformation. It's manifested by pervasive cloud and mobile technology, multi-enterprise ecosystem commerce platforms (ECP), plug-and-play composite applications, ecosystem platform data (versus enterprise big data), cognitive technology and analytics, and the demand for sustainable, profitable, and resilient ERP4 applications.

We see companies embarking on a five-phase digital maturity journey:

Digital transformation and digital twins, including:
- *Digitization:* Converting manual process data to electronic forms,
- *Digitalization:* Using process automation data for robotic process automation, and
- *Simulation:* Involving business modeling and scenario analysis.

Connected commerce, including:
- *Collaborative supply network management*,
- *Analytics and decision support,* including integrated business planning & execution, and
- *Enterprise supply network* (ESN), realizing that the traditional supply chain is inadequate.

ESN control towers, including:
- *End-to-end visibility and network optimization*,
- *Cognitive analytics,* deploying artificial intelligence and machine learning, (AI/machine learning)
- *The internet of things,* including process automation, and track-and-trace capability, and
- *Ecosystem realization.*

Ecosystem commerce, including:
- *Community of commerce* with ESN orchestration,
- *Link to ecosystem commerce platforms* (ECPs), and
- *Network of networks ecosystem visibility.*

Ecosystem resource planning (ERP4), including:
- *Ecosystem federated data* enabling ecosystem network optimization,
- *Cognitive autonomous supply network,* and
- *Ecosystem shared services and value savings.*

We don't compete on transportation lanes; we compete at the point of demand and sale. Resource capacities are facing shortages, and only optimal resource capacity utilization — powered by ecosystem commerce and collaboration — will enable efficiency and resilience in the face of competition and disruption.

Outlook: In 2023, expect additional entrants into the multi-enterprise ecosystem commerce platform market. ERP providers are diligently migrating their applications to the cloud, and the best-of-breed providers are being rolled up or acquired. While not on the majority-market radar yet, the innovators and early adopters are aggressively deploying digital transformation for ecosystem commerce and resource planning. You don't want to be on the wrong end of the cat o' nine tails.

Best Practices in Selecting the Optimal Distribution Site

Blaine Kelley Executive Vice President, CBRE

Analyst Insight: Locating a new distribution site requires a thoughtful plan executed by an experienced team. In the tumultuous, post-COVID-19 world, having a disciplined process is especially paramount to offset supply chain bottlenecks, inflationary pressures, workforce constraints and tight real estate markets.

In a recent survey of business leaders, 64% expected to expand their distribution footprint in the next three years. Concerns centered around labor and pressures in transportation and occupancy costs. What, then, are best practices that companies can employ to achieve optimal project outcomes?

Network and facility design. All planning events start with an operational assessment against a basic cost and service model. Historically, inbound and outbound transportation studies have framed the geography to be evaluated. E-commerce, however, has completely changed consumer expectations from traditional two- or three-day delivery to next- or same-day. Companies must meet that promise by adding both inventory-analysis capabilities and staffing.

Facility design offers an independent look at the current state, inventory mix and growth projections. Labor modeling, automation and adjacencies create the "future state" against which any new facility is designed. Future facilities will have 40-foot ceilings, heavier loading capacity and abundant power. The network and facility design must be done early on to create the roadmap and location centroid.

Workforce planning and analysis. In the past, labor availability was a given, with analysis a cursory event based on flawed data. Today, labor costs can represent 30% to 50% of a company's operating budget and must be closely scrutinized. Any geography needs to be viewed through the lens of three key criteria:

- *The longevity* of a given market to accommodate a company's supply and skilled worker needs;
- *Scalability* to meet seasonal demand and supply chain bottlenecks, and
- *Density* of skilled candidates within competitive proximity to the targeted location, calculated for future growth.

Meeting the challenge head-on requires becoming an employer of choice, flexibility, heavy investment in training and agile planning.

Real estate and financial structure. In recent months, there's been a doubling of demand to supply, and the two won't reach equilibrium for at least the next 18 months. As a result, timelines have been compressed, with a bidding war for space. Rents have spiked by 30% to 70% year over year. And with the recent tightening by central banks, development capital will be further constrained. Creative deal structures drawing on company balance sheets will be key to surviving over the near term. Capital for tenant improvements will increasingly be borne by companies directly.

Construction management. Facility construction requires an accurate budgeting, scheduling and feasibility mechanism. Extreme volatility in the pricing of commodities like steel, concrete and roofing products has caused significant startup delays and unprecedented risk. Aligning the construction and design team early on is equally crucial.

Incentives from government agencies. The negotiation of meaningful governmental incentives must run concurrently with the process. Today, we also must add to the criteria availability of infrastructure such as electricity, water, roads and fiber optics. Companies also need to partner locally, with training opportunities at the local and state levels, including community colleges and high schools.

Outlook: Expect to see continued growth of industrial facilities in the coming months. While economic headwinds are strong, a refreshed network design to meet tighter service levels is essential to building an agile process for location selection. By combining labor, real estate and feasibility analytics, business leaders can better manage risk and execute a successful growth strategy.

Today's Digital Forwarder Uncovered

Martyn Verhaegen CTO Digital Forwarding, Magaya

Analyst Insight: The digital transformation of the logistics and freight forwarding industry picked up speed about 10 years ago, when startup freight technology firms saw an opportunity to modernize forwarding with digital solutions. Today, the transformation to digital from manual processes is full speed ahead, and there's a broad array of freight technology solutions available to enable forwarders to compete on a level playing field and deliver a great customer experience.

With the recent downturn in the market, logistics providers (LSPs) and forwarders are seeking logistics technology solutions that provide the greatest business value.

The work to automate time-consuming manual processes will remain a top priority, especially in a down market, where lowering costs, saving time, and improving operational performance will give companies the resilience needed to get through challenging times.

For 2023 and beyond, here are the freight technology investment opportunities at the top of the list to stimulate growth, increase market share and address the needs of customers.

End-to-end visibility. Online access to visibility data is a necessity for timely, data-based decision making. The ability to address issues when freight isn't moving as planned is key to improving operational effectiveness, streamlining inventory management and increasing efficiency. In addition, sharing data with all parties to a shipment furthers the ability to sync freight moves for a more streamlined and reliable flow of goods to market and a higher level of customer satisfaction. It also contributes to greater supply chain resilience and agility.

Significant improvements to visibility solutions will continue. Data will become more accurate and actionable, nearing real time, and advancements in machine learning and artificial intelligence (AI) will enable more predictive data to continually enhance supply chain execution.

Digital integration. Digital connectivity and integration of freight technology solutions is a high priority given the complexity of modern logistics and the volume of data that needs to be shared with shipment stakeholders. These connections are critical to establishing a smooth flow of shipment data across a forwarder's freight technology platform for complete door-to-door shipment management. Forwarders equipped with a comprehensive, connected digital infrastructure improve their competitive position and provide customers with a better experience.

Customer relationship management (CRM). There's no place for organizational silos in today's fast-paced, connected online world. Given the high number of touchpoints involved with serving a customer, from the initial quote all the way to the shipment's final destination, it's important to ensure that all customer-facing teams are operating with the same, up-to-date information. CRM can play an important role in ensuring a consistent, optimal customer experience. It's also a useful tool that helps sales teams manage pipeline and stay on top of prospective business.

Self-service freight management. Offering B2B customers a frictionless, streamlined freight transaction experience means offering fast, easy, online access to accurate rates, plus the ability to book cargo and access tracking information any time, day or night. This is an important step in strengthening business relationships and meeting the high expectations of modern customers, and it's also beneficial in reducing operational costs. Ultimately, it's a new era in freight management, and providing customers with self-service options has become essential for sustainable success.

Outlook: Forwarders and LSPs must continue to adopt freight technology solutions to achieve operational efficiency and meet customer expectations. The old way of doing business by phone, e-mail, and paper simply can't keep pace with the growing demands of global shipping. The right technology can not only help LSPs be more productive and lower costs, but is also the linchpin to making those important connections, and delivering the best customer experience.

Create a Resilient Supply Chain for 2023 and Beyond

Mike Short President, Global Forwarding, C.H. Robinson

Analyst Insight: Fewer lockdowns may make it feel like the pandemic hardships are behind us. But several forces continue to strain supply chains, from congested ports and chassis shortages to geopolitical uncertainty, rising fuel costs and possible labor strikes.

To manage costs and risks amid this lingering volatility in 2023, shippers will need more resilient supply chains — and can build them with lessons learned over the last three years of disruptions.

In addition to those that continue to slow shipments, factors like ever-changing compliance requirements, pressures to improve sustainability and the potential for new tariffs are adding further cost and complexity to global supply chains.

Shippers that want to protect their shipments from today's top risks — and put minds at ease in the C-suite — can do so by strengthening their supply chains with the following actions:

Building in sufficient lead times. Ocean capacity may be opening up, but it's still not guaranteed. Meanwhile, congestion and drayage challenges continue to slow container movement in and out of ports.

Given this potential for delay, shippers should increase lead times by at least four to six weeks for ocean shipments. The added time can give them more carrier and port options to work with, and allow them to plan drayage activities further out to help reduce the impact of chassis and driver shortages.

Taking a holistic view. Real-time supply chain visibility can help shippers monitor shipments across all modes and regions, and see whether those shipments are trending toward committed delivery dates. It can also help shippers monitor and quickly react to delays and disruptions as they happen.

Of course, even better than knowing what's happening is knowing what's potentially going to happen. With the right data and artificial intelligence capabilities, shippers can predict incidents such as severe weather events, capacity shortages or congested ports, then proactively plan for them to mitigate their disruptive impacts.

Diversifying the carrier base. In addition to contending with ongoing supply chain chokepoints, shippers today must be mindful of activity like geopolitical strife that can impact shipping routes and costs at a moment's notice.

Shippers can reduce their exposure to such risks by diversifying their carriers. For example, making sure all carriers aren't based in just one region can help protect shippers against congestion and geopolitical risks in that part of the world. And shippers that have historically used a one-carrier approach should consider using non-vessel operating common carriers (NVOs) or freight forwarders, so they can transfer shipments across carriers when capacity becomes limited.

Improving inventory management. Inventory shortages and empty shelves at the start of the pandemic have led to excess inventory problems today.

The past few years have shown shippers the heightened importance of managing inventory based on economic indicators like sales. Doing this will require using data to identify the trends between inventory and sales. Shippers that don't have this capability in-house should look to a partner with supply chain engineering capabilities and experience in assessing, forecasting, predicting and solving these types of challenges.

Outlook: It wasn't long ago that shippers would plan international supply chains primarily around the rates of shipping from one port to another. But today, supply chains and the risks to them are more complex. In 2023 and beyond, shippers will need a more holistic view of supply chains, as well as a more planned and diversified approach to keep shipments moving across the globe without delay.

A New Normal for Healthcare Industry Supply Chains

Terry Wheat Senior Manager, Healthcare Practice, Insight Sourcing Group

Analyst Insight: The supply chain disruptions of recent years have shined a harsh spotlight on the resources of the nationwide healthcare system, from oxygen machines to vaccines, and the industry has faced a multitude of supply shortages. These issues are far from being resolved, and we can expect to see further impacts in 2023 and beyond, as healthcare struggles to define a new normal.

Transformations are underway across the healthcare industry as it reshapes itself, forcing procurement leaders to make their processes more agile and adaptable.

Several factors will contribute to instability in the healthcare supply chain in 2023. An end-of-year downturn in manufacturing, increased labor costs and the potential for spikes in COVID-19 infections will result in additional delays, and manufacturers will spend the first half of the new year catching up with increased demand.

It's critical for healthcare facilities to plan for shortages in 2023. They must have strong relationships with preferred, secondary and tertiary suppliers for critical items throughout the supply chain. By devising alternative routes and suppliers, providers can mitigate the risk caused by regional spikes in infectious diseases and supply chain disruptions. It's also imperative that facilities anticipate rising costs for medical supplies due to increases in the cost of labor.

Last year saw a rise in mergers and acquisitions in the healthcare industry. This is expected to continue in 2023 and the years following, as healthcare companies pursue mergers to realize cost savings, broaden their base of vendors and distributors, and achieve an overall synergy of operations. Mergers also provide the opportunity to increase procurement optimization, with the goal of achieving higher rebates, lower markups and improved overall profitability.

In the coming years, expect to see increased demand for telehealth and telemedicine. Telehealth offers an efficient alternative that's convenient for both patient and caretaker, and reduces the health risks of in-person care. It also provides a solution to labor shortages. With a need for fewer people onsite, particularly in remote locations, healthcare facilities can reduce costs by 20%-30%.

Outlook: In 2023, supply chain management and procurement processes must be adaptive. Healthcare prices will continue to rise before reaching a "new normal." Supply shortages and disruptions, as well as higher labor costs, will contribute to price inflation. Procurement leaders should be planning now by building relationships with multiple suppliers to reduce the risk of shortages. The industry will be in a transformational period for the next several years. Best practices for managing healthcare supply chains will include the creation of strong, top-down strategies for adapting to changing commitments; backup plans for meeting changing conditions, and a surplus of suppliers on tap to decrease the risks of shortages.

Trade Compliance Trends to Watch in 2023

Julie Gibbs Director, BPE Global

Analyst Insight: The last few years in trade have been turbulent to say the least. We've seen unprecedented and rapid-paced sanctions put into action. Many companies have been left scrambling to figure out how to comply with new regulations and whether they can export to, or provide services to, their customers. Following are some takeaways for planning for the next year.

Countries around the world have continued to add Russian and Belarusian companies and individuals to their restricted party lists. Shippers and any company with operations in Russia, Belarus and certain regions in Ukraine will continue to monitor activity in these regions in order to abide by current and evolving regulations.

In addition, oil continues to be a focus for punitive action. In early December, 2022, the European Union and G7 adopted a price cap of $60 per barrel on Russian crude oil. The price cap is clearly a way to limit revenue to Russia. Ship-to-ship transfers of oil will happen as a way to evade this measure, but it's yet to be seen how that will affect oil prices and transportation costs, as well as those of products requiring transport — going forward.

Companies should continue to be wary of diversion of their products to Russia. For instance, Azu International, a Turkish company, is keeping a steady supply of U.S. computer and IT equipment to Russia. While they're not on a restricted party list, your company could be found in violation if unlicensed or unauthorized shipments are sold to this company and then shipped on to Russia.

Continued sanctions against China are having an impact on traders on multiple fronts. In December, the Office of the U.S. Trade Representative announced a nine-month extension of 352 product exclusions from duties under Section 301 of the Trade Act of 1974. There has been no update from the Biden Administration on the status of the Section 301 tariffs going forward. Companies, especially smaller ones, continue to pivot their operations based on duties for Chinese-manufactured products. It doesn't appear that there will be any change to these tariff-based actions before the next election in 2024.

The area of supercomputer regulations has to be one of the most confusing and unprecedented for companies to digest. Published and effective on the same date, regional stability controls specific to China for certain items on the Commerce Control List were issued by the Bureau of Industry and Security (BIS). The following new export control classification numbers (ECCNs) have been added: 3A090, 3B090, 4A090 and 4D090. But all items (including those classified as EAR99, which are low-technology consumer goods that often don't require a license) are impacted by these regulations that could have an "end use" in a semiconductor fabrication facility in China that develops or produces integrated circuits meeting or exceeding certain technology parameters. BIS also answers frequently asked questions about the definition of a semiconductor fabrication facility, along with other information.

Outlook: Exporters should have a companywide trade compliance training program in place that provides an overview of high-risk areas. Training seminars and conferences such as the BIS Update and U.S. Customs Symposiums are great ways to stay updated, but companies should also invest in training that's specific to their industries, products and markets. Trade compliance training is a company's greatest ally.

Why Is Labor Not Buying What Employers Are Selling?

Tony Gray Director, Supply Chain as a Service, Tata Consultancy Services

Analyst Insight: The North American talent pool has shown few signs of improvement in the post-pandemic new normal. U.S. labor participation rate declined 110 basis points since February 2020 while Canada declined 50 basis points. The European Union, in contrast, improved 160 basis points over the same period. With 37% of all U.S. jobs in supply chain, North American supply chains and supply ecosystems are particularly vulnerable to weak labor participation.

Labor Participation Rate (LPR) is the percentage of eligible labor working or actively seeking work. LPR declines when job seekers stop looking for work.

Why are workers not buying the jobs that potential employers are trying to sell? Research suggests multiple factors are driving declining U.S. LPR, including aging population, delayed workforce entry due to education, eldercare commitments, limited childcare options, and declining workforce health. Supply chain firms need to adapt to labor participation trends to gain competitive advantage in hiring. Relevant labor participation and workforce trends include:

Not everyone wants to retire. According to the U.S. Bureau of Labor Statistics, the number of unemployed individuals in the U.S. seeking full-time or part-time work grew more than 11% over the last five years. During the same period, the pool of job-seekers age 55 and over grew more than 24%. Supply chain employers faced with hiring shortages could do well to look to the pool of available (and likely experienced) older talent.

Full-time or no-time. While total job seekers grew by 11%, individuals seeking part-time work declined 2%. Labor data suggests increasing preference for full-time work. Hiring strategies that feature "contract to permanent" or "part-time to full-time" need to be re-thought or discarded. With more opportunities than qualified candidates, fewer candidates are likely to buy in to the promise of "full-time later."

The side hustle. Sources suggest the 30% to 40% of North Americans have a "side hustle" or side business. The U.S. Census Bureau reported a record 5.4 million new business applications in 2021. While firms need to ensure that company time and resources are not used for personal ventures, employer policies can be modified to attract candidates who also maintain side businesses. More predictable work schedules, compressed work weeks, contract roles, and job sharing can help to attract entrepreneurial candidates with active side businesses.

How can an employer improve labor participation? Few supply chain firms are large enough to materially impact the national labor participation rate. With the goals of gaining and growing superior talent, employers should, however, understand labor participation factors for current and former employees. Structured exit interviews, supported by data analysis, will reveal factors that cause valued employees to leave. Of particular concern should be resignations made despite having no plan for the next job. Would a compressed work week (40 hours in four days) motivate staff to stay? Could lunch periods be shortened to give staff more time at home? Do some employees need to leave 15 minutes early to pick up children from school? Keeping in touch with former employee "alumni" helps firms to understand how to proactively encourage labor participation. It also forms a recruiting base when former employees choose to return to the labor pool.

Outlook: In November 2021, LinkedIn reported 224,000 supply chain job openings; by November 2022 there were 269,000. The U.S. Bureau of Labor Statistics reports employment of supply chain logisticians is projected to grow 28% per year, "much faster than the average for all occupations." Supply chain employers need to understand and strategically respond to workforce participation challenges to attract and retain critical talent effectively and competitively.

The Last Mile Reaches a Tipping Point to Meet Changing Consumer Preferences

Brian Broadhurst SVP Supply Chain Consulting, Transportation Insight

Analyst Insight: The fragmented last mile is rapidly reaching a tipping point because of unprecedented funding and new market entrants. Changing consumer preferences and growth in e-commerce are significant contributors to redefining the last mile. The redefinition of the market includes a closer alignment to the middle mile, along with business intelligence and analytics for faster and more consistent, on-time deliveries.

Funding for supply chain startups reached a record level in 2021 — more than $80 billion, which is a 95% increase from 2021 and a 70% increase in annual growth since 2014, according to consulting firm McKinsey. Primarily, this was due to a 25% increase in e-commerce from 2020, and the need for resilient supply chains and end-to-end visibility.

According to McKinsey, on-demand last-mile delivery platforms and new last-mile parcel networks were among the top companies attracting investments in 2021. Pitney Bowes forecasts parcel volume to double in the next five years, reaching 266 billion in 2026, with an 11% CAGR from 2021 to 2026.

As a result, last-mile offerings emerged from retailers such as Walmart, which introduced its GoLocal service, and retailer American Eagle, which acquired middle-mile provider Quiet Logistics, and last-mile tech startup AirTerra. In addition, UPS acquired gig platform Roadie, and regional carriers LaserShip and Ontrac merged.

The diverse last-mile strategies will ultimately result in some carriers leaving the market, and others consolidating as the last-mile market continues to grow.

Carriers that are successful in building delivery density will survive any potential market fallout and will likely be profitable.

As retailers move supply chains closer to customers, linking the last mile with the middle mile through micro-fulfillment facilities, last-mile hubs or other similar facilities will be critical to driving faster deliveries.

However, a number of the new entrants are more locally minded, and will need to either partner with larger carriers, such as UPS and FedEx, or providers specializing in the middle mile, in order to fill up trailers and fulfill orders quickly to ensure quicker, on-time deliveries. The stronger middle-mile partner will determine the success of the last mile.

Technology will be necessary to link the last and middle miles, optimize routes and provide real-time tracking. Routing has become more than a physical, static routing guide. Instead, it is incorporating artificial intelligence and machine learning to monitor changing conditions to ensure more efficient and on-time deliveries.

For a successful last mile, retailers need access to the right relationships and supply chain knowledge. Whom to use, whom to go to? How does one find the right carriers? How does one e ngage them?

This should be done through analytics and modeling, in which the optimal carrier selection (when to use Carrier A versus Carrier B, etc.) is identified, and the right service levels are determined. From this, retailers can use technology to manage shipments and provide real-time tracking to customers, which helps further expand and improve customer experience.

Outlook: The last mile's evolution will be closely linked to the growth of e-commerce and consumers' changing purchasing preferences. Carriers will adapt through consolidation, service-level enhancements, and technology investments as the last mile extends closer to the consumer. However, the key to success for carriers will be achieving delivery density and incorporating the middle mile into last-mile strategies.

Trucking Solutions in Latin America

Ezequiel Blumtritt Director Product Development, Latin America, C.H. Robinson
Thomas Schoett Vice President, Latin America, C.H. Robinson

Analyst Insight: It will be a challenging year for international trade in 2023. With the potential for new COVID-19 waves, a global recession, government changes, geopolitical conflicts and environmental issues, we will continue to see a volatile logistics environment. Adaptable and agile supply chain models will continue to be crucial moving forward as global logistics goes through demanding times.

In a changing global economic landscape, new opportunities for Latin America have emerged, generating market growth in countries such as Argentina and Brazil. The decelerated availability of products in some parts of the world led to Latin America positioning itself as an important supplier of food, mining and technology products.

In the last two years, trucking in South America has developed rapidly. This growth was accelerated in part due to the unprecedented interruption of the global supply chain caused by the COVID-19 pandemic and the logistical disruption of maritime freight. Previously, some routes only had transportation via ocean, such as the route between Argentina and Peru, but land cargo services are now more available in the region.

The global environment continues to be volatile, leading to rate and capacity fluctuations, so it's best to seek strategies that minimize risk and increase the ability to adapt to market changes. While truckload growth has led to opportunities for companies to expand their supply chain in Latin America, not all regions are created equal. Consider thinking through the following strategies before implementing supply chain shifts in the area:

Connectivity, technology, and innovation are vital when working with cross-border and intra-country truckload freight. For example, comprehensive logistics platforms allow end-to-end tracking and visibility of shipments throughout Latin America. Providing this visibility allows shippers to adapt or make changes down the supply chain when there's a delay in customs, for example, or inclement weather that holds up the driver.

Technology tools enable shippers to consistently face obstacles and make decisions more efficiently.

Keeping risk levels as low as possible is key. Ensuring truckload cargo is safe starts with choosing the right carriers. Additionally, shippers can look at the timing of the arrival and delivery of their freight to further mitigate risk. Analyzing all the relevant aspects of the logistics chain will contribute to success in Latin America.

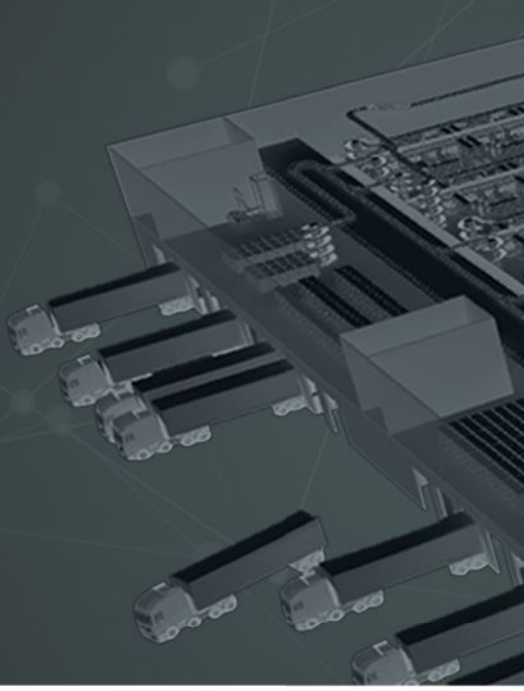
In addition, it's important to understand each country's compliance regulations.

It's crucial to partner with companies that have a focus on making the supply chain more sustainable and environmentally friendly. As in other parts of the world, sustainability is important to companies and consumers across Latin America, especially since climate change is one of the biggest challenges facing top markets like agriculture and food production.

Outlook: Supply chain opportunity in Latin America is continuing to grow, especially in the trucking space. While it's clear that challenges will continue in 2023, working with a reliable global freight forwarder that offers a global suite of services and has a local presence and understanding of the region can be the difference between success or interruptions in your supply chain when challenges arise.

NEXT GENERATION

FULFILLMENT CENTER



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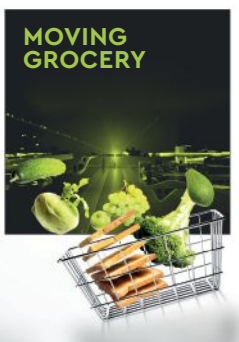

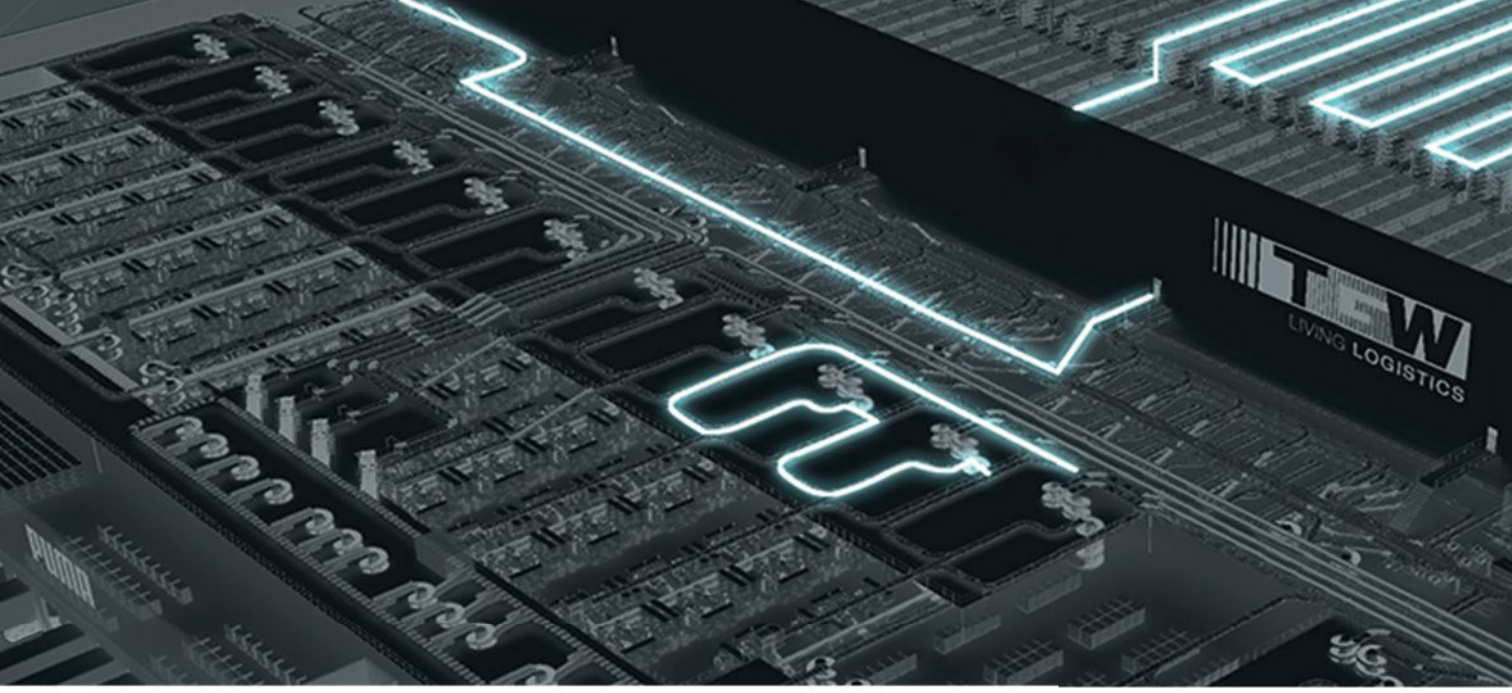

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LIVING LOGISTICS

How Smaller Companies Benefit From Outsourcing Logistics Operations

Ryan Polakoff President, Nexterus

Analyst Insight: The pandemic and recent supply chain disruptions have affected small to medium-sized companies more than bigger enterprises. This is because smaller businesses have fewer alternatives and can't afford many tools that streamline operations and improve efficiencies. These businesses have found that outsourcing their logistics operations can help them to become more competitive against bigger enterprises and thrive.

According to the 2022 Third Party Logistics Industry Report, supply chain disruptions cost $228 million in 2021. While small companies often outsource their payroll, accounting, HR and marketing operations, only some understand the benefits of outsourcing their logistics operations. By outsourcing to a 3PL, small companies can "help their customers manage supply chain disruptions by offering visibility into inventory, real-time access to data for better supply chain transparency, seamless workflows, and insights into future challenges or issues," per the 3PL report.

Outsourcing logistics operations helps small to mid-size businesses to:

- **Cut costs.** When shippers outsource their logistics operations, they convert fixed costs into variable costs, release capital for investment in the business, and help companies avoid large outlays of cash when the business starts. 3PLs have a vast network of qualified carriers they work with, ensuring the business will get the lowest freight rates and faster transportation times. 3PLs can also negotiate general rate increases and fuel surcharges, further reducing costs.
- **Increase efficiency.** When shippers perform operations in-house, such as R&D, production and transportation, they must pass these costs on to the end customer. If shippers outsourced these operations, they could offset costs and improve efficiencies, because the outside provider has a better cost structure and greater economy of scale.
- **Reduce labor needs.** When outsourcing, small businesses don't have to hire additional personnel to perform certain operations, such as picking and packing in the warehouse, cross-docking, taking inventory and shipping orders. These operations can all be performed by a 3PL, so smaller shippers don't have to hire the labor for these operations.
- **Reduce training needs.** When small businesses start new product lines, open new markets or begin new projects, they must hire and train the right people, which can require an additional budget to fund such activities. A 3PL can fill in the gaps with people who are already trained and experienced in these areas.
- **Focus on business.** Small businesses need to focus on their core business to grow, but often executives are tasked with managing crises and other activities. Outsourcing to a 3PL gives managers more time to work on their priorities of gaining market share and profits.
- **Use advanced technology.** Many large enterprises can afford their own warehouse management and transportation management systems, while smaller businesses cannot. Working with a 3PL, the small business can access state-of-the-art tools without investing in those systems.
- **Have a competitive edge.** Outsourcing logistics operations helps small businesses level the playing field. Small companies will have access to many of the operations and benefits that large companies have when outsourcing, without adding employees, training people, buying new equipment or learning a new operation.

Outlook: For small to mid-sized companies, it's vital to outsource logistics operations to qualified and experienced 3PLs, helping the small business to streamline transportation processes and operations. With streamlined operations, the small business reduces the complexity of procedures, allowing it to focus on crucial aspects of the organization. Working with a 3PL eliminates the need to add more labor and invest in training and new equipment.

Logistics Outsourcing Calls for Robust Data Portfolios to Create Enduring Supply Chains

Jason Lockard Senior Vice President of Managed Logistics, BlueGrace Logistics

Analyst Insight: Logistics outsourcing is more in demand than ever. An increasing number of shippers are moving towards logistics outsourcing to gain better visibility into their freight track and spend, two key factors in determining business vitality. Although supply chains are starting to normalize and rebound, COVID-19 exposed a lot of weaknesses and led shippers to gain a better understanding of the importance of data portfolios, which is the primary purpose of outsourced logistics solutions.

Visibility and data remain top-value propositions that outsourced logistics entities solve for. Consider inflation and the rising costs of production and manufacturing: Almost everything, whether the transportation of fuel, raw materials, or workers, has caused shippers to lean on logistics professionals to provide contextual data on how all those variables are affecting their own customer base. This information is then used to adjust shipper pricing strategies, eventually pushing increased costs back to consumers. The ripple effect of inflation has streamlined the benefits of managed logistics, which provides insights to combat escalating costs in an effort to maintain profit margins. In a nutshell, outsourcing is more in demand than ever from shippers because of rising costs.

Over the next several years, outsourced logistics programs will need to evolve to include greater automation processes. It is crucial to identify as many tasks and administrative functions as possible that can be self-sustained. Logistics management operators are working to embed efficiencies that can be passed along to shippers, as well as deep dive into predictive and prescriptive analytics. Current analytics gives logistics providers a sort of "rear-view mirror" approach, allowing practitioners to make observations from a specified data set and then recommendations going forward. And so, the next step will involve finding methods to predict what's going to happen in the future before it actually does, using historical data.

At a macro level, the impending recession could pose many challenges and cause deviations in the tactics of outsourced logistics offerings. Current plans are based on budgets, forecasts, and strategic vision. Depending on how deep the recession goes, companies will decide next how to balance service levels with cost control.

Achieving supply chain optimization requires next-generation technology products that go beyond standard logistics systems. The right TMS is designed to give ownership over simplified supply chain management. Driven by data and actionable insights, shippers can increase the value of their business.

Outlook: Optimizing supply chains through outsourced logistics takes a custom logistics management program that includes cloud-based TMS, ERP integration, process management for mode conversion, order optimization and network design, RFP management, dedicated account managers, and supply chain analysis of distribution processes. A full-service, managed transportation program allows shippers to gain more control over their logistics network while focusing on core competencies and allocating resources to scale their business.

A New Normalcy Emerges, But at a Higher Cost

Drew Herpich Chief Commercial Officer, Transportation, Insight & Nolan Transportation Group

Analyst Insight: After two years of pandemic-driven high rates and extreme demand, the trucking market is undergoing a reset, as a sense of "normalcy" returns to the market. However, "normalcy" will likely bring higher costs for updated trucks, equipment, parts, and components, fuel, insurance, and wages. To help offset higher operational costs, trucking firms embracing technology platforms will win more freight from customers being able price their freight more quickly.

The post-pandemic trucking market is slowing as customer demand slows. Expectations are that trucking demand will be flat to negative through at least the first quarter of 2023, and will only begin to significantly pick up when customers look to replenish inventories, and manufacturing activity improves.

"We have revised our economic forecasts and are now modeling a recession in the first half of 2023, although flat (0.0%) for 2023," said Kenny Vieth, president and senior analyst, ACT Research, a market research firm focused on the commercial vehicle and transportation markets.

Sustaining high costs will be difficult for many carriers and result in some leaving the market by choice or bankruptcy, while others will be acquisition targets. According to some estimates, nearly 3,000 truck drivers have lost their jobs this year as trucking companies large and small declare bankruptcy. However, the American Trucking Associations' Chief Economist Bob Costello estimates the current driver shortage has risen to 80,000 — an all-time high for the industry. The wide discrepancy is due to the fragmented trucking market.

Roughly 90% of truckloads moving on the road today are contract freight. Compare that to a year ago when it was 75% contract, 25% spot, according to DAT Freight & Analytics data. The difference is due to higher fuel prices this year.

Furthermore, DAT noted that most carriers rebidding their contracts with large shippers are asking for more volume. But, while they may win more volume, contracts are coming in about 12% lower than last year.

"The difference this time around, is that last year's lack of capacity burned shippers. Now, shippers are sending out their bids to a more select group of carriers that played nicely with them last year," principal market analyst for DAT Freight & Analytics, Dean Croke, said during the Women In Trucking's 2022 Accelerate Conference & Expo.

Indeed, **shippers are now in a position to push for better rates.** If shippers are still holding on to contracts six months or older, now is the time to capture lower prices. But shippers must be mindful that they're working with a trusted partner.

Because of continued fluctuations and uncertainty in supply chains, working with a trusted partner that offers end-to-end solutions, including truckload (TL) and less-than-truckload (LTL), drayage, and specialized transportation services such as vans and sprinters, will be the best solution for shippers.

Managing such solutions via online platforms will benefit shippers and carriers by providing quicker rate quotes, faster deliveries, and timelier payments to carriers.

Outlook: Embracing online platforms will likely increase in 2023, as shippers and carriers become more cost-conscious in an uncertain economy. In addition, online platforms will help shippers focus more on their core competencies while offsetting higher operational costs for carriers.

However, as the number of online platforms grows, those backed by knowledgeable analysts will be the winners, because the trucking market remains a business in which strong relationships and trust are essential.

The Great Divide: Understanding LTL and Truckload Market Shifts

Bryce Williford Vice President of 3PL Services, BlueGrace Logistics

Analyst Insight: Movement in the less-than-truckload (LTL) and truckload (TL) sectors has been at odds over the past few years. While the TL market is in free fall, the LTL market has fared much better. TL volumes are barely above levels seen in the 2019 freight recession, and most experts believe we haven't reached the bottom. Analysts point to several macro trends buoying the LTL market, specifically e-commerce growth and the increasing impact of near-shoring since the start of the pandemic.

Supply chain and transportation have never been more important to our economy. The truckload market is cyclical in nature; therefore, demand will rebound once inflation starts to recede. Freight precedes the economy by six months, which means that if the market rebounds in the second half of 2023, one can expect to see an end to the recession shortly thereafter. In the interim, shippers and carriers must remain focused on long-term growth by negotiating fair pricing.

The shift to e-commerce within the LTL market has pushed more freight into its space than ever before, but stakeholders should expect to see more consolidation with an increased focus on first mile and final mile, white glove and special handling, expedited service, and over-dimensional and bulky deliveries. Market watchers shouldn't be surprised to see LTL carriers push the limit upward on the size of orders they can take, further encroaching on truckload space.

Understanding the dynamics of the freight market is challenging. Although the industry is deeply fragmented, it has created a market rich with opportunity. Emerging technologies and increased consumer demand allow for new entrants and disrupters into the marketplace to engage and pursue exponential growth. Unfortunately, many stakeholders are stuck in the past, unable to see the evolution of freight. That mindset, along with inadequate risk management in areas such as cargo theft, safety and claims, remain the biggest threats to the industry.

There are several challenges that operators will need to navigate, including the effective management of fuel and insurance costs. Not much can be done in the foreseeable future that will lower fuel prices. Nuclear verdicts, punitive contract language and increased cargo claims are driving up insurance costs. The truth is that shippers who try to eliminate risk from their transportation budgets using contracts instead of behavioral change are causing the rise of insurance costs. Furthermore, the driver shortage will impact consumers directly at some point. Some estimates put the number of drivers needed to provide transportation over the next 10 years at over 80,000.

Outlook: Visibility within TL and LTL is going to be table stakes moving forward. With the advent of GPS and electronic logging devices (ELDs), trailer-tracking devices will allow for 100% visibility to freight in transit. Market watchers can also expect e-commerce and near-shoring to continue to have a major impact in driving increased freight volumes. Finally, expect a continued focus on efficiency solutions attacking areas of opportunity such as empty trailer space and empty miles.

How to Uncover Savings as LTL Rates Remain High

Ryan Heath Director, Transportation & Logistics Practice, Insight Sourcing Group
Thomas Storch Director, Transportation & Logistics Practice, Insight Sourcing Group

Analyst Insight: Dry van full truckload (TL) rates have dropped almost 40% due to a decrease in demand and an increase in capacity in the market, yet less-than-truckload (LTL) carriers are showing rises in the 6%-10% range for their annual general rate increases. A differentiated strategy for LTL is necessary to manage costs and maximize revenue.

As truckload carriers become increasingly fragmented, with hundreds of thousands of carriers in the market, their rates will continue to deviate from LTL, which has fewer than two dozen key players. The top 12 carriers account for over 80% of all U.S. LTL revenue. Additionally, LTL carriers have more fixed overhead costs than truckload carriers, including tractors and trailers, terminals to cross-dock shipments, and more operational staff. Volume for truckload has come down considerably, while that for LTL has only dropped by a handful of percentage points.

Conducting a request for proposals in 2023 will be key to realizing savings in LTL expenses. This might seem counterintuitive, but by setting a competitive environment, even when prices are increasing, carriers will provide updated rates, and holes in their network can be taken advantage of, pushing them to bid more competitively.

For example, FedEx Freight might increase its rates by 7% from Georgia to Texas, but Southeastern Freight Lines might want more volume on this route, so could decrease its rate to accommodate that need and win the bid. This approach will also allow companies to standardize pricing structure.

Implement or audit the following standardizations:

- Utilize an industry-standard base rate and a seven-miles-per-gallon escalator fuel scale.
- Standardize all bids to the ZIP-to-ZIP level to allow for the most competitive detailed rates.
- Standardize and reduce pricing for top accessorial charges.
- Right-size freight-all-kinds (FAK) assignments to ensure that actual classes are grouped appropriately and fairly.

Develop and implement a plan to optimize freight:

- Mode-shift smaller items under 150 pounds to small parcel.
- Compare rates and, when possible, mode-shift shipments that are over 10,000 pounds to truckload.
- Consolidate shipments. Work with sales teams and customers to consolidate to weekly or bi-weekly shipments that can be one heavier LTL, or a full truckload shipment.
- Pick the right carrier. Shippers often use a more expensive carrier than the one with the best rate on a lane. Shop your carrier to ensure the best rates. Regional carriers are more competitive in their region than national carriers.

Outlook: The deviation between TL and LTL in both rates and carriers is a trend that transportation and logistics teams will continue to monitor in 2023. Prior planning and carrier consideration are increasingly central to managing the impact of rate increases, and will remain a key aspect of the 2023 strategy.

Why Companies Need Intelligent Warehouse Orchestration

Keith Moore Chief Executive Officer, AutoScheduler

Analyst Insight: Warehouse management systems help businesses keep up with customer demand and order fulfillment. Yet, today's WMS needs more functionality for optimizing processes that incorporate current business constraints, such as labor shortages, too much inventory and transportation challenges. Warehouse executives benefit from using warehouse optimization technology that orchestrates activities within the warehouse so businesses can better meet customer deliveries on time and in full.

According to a Gartner report, "Top Technology Trends Transforming Warehousing Over the Next 5 Years: Part 2, Handling Volatility and Complexity," published on January 13, 2022, "Warehouse resource planning will help drive higher degrees of warehouse labor and equipment utilization, helping reduce labor costs and increasing order fulfillment rates. This will come by optimizing work allocation while considering warehouse constraints."

Warehouses need to adopt technology that deals with supply chain complexities, such as fluctuating consumer demand, fuel price increases, parts shortages and labor shortages. These challenges require sophisticated planning and scheduling solutions. Warehouses and distribution centers need advanced technology, such as artificial intelligence and machine learning, to meet the growing deficiencies in today's WMS.

Planners and administrative staff use all data available in every distribution center to manage shipping, receiving, dock schedules, inventory control and work release. Distribution centers have complex tasks that need to be performed, and each has a variety of constraints that need to be understood and balanced by the planning staff to get all the proper inventory out of the right door at the right time. The challenge is that there are just too many decisions to be made to optimize your warehouse and labor and deliver to customers.

Warehousing is like a game of chess, where businesses deploy pieces (such as floor workers and automation equipment) that work toward completing an objective, such as shipping inventory on time. Unlike chess and its 64 squares, warehouses are much more complex, having thousands of locations and dozens to hundreds of "pieces" moving around the facility to execute the workload. And many warehouse workers vary in skill from shift to shift. Given the complexity of the tasks to solve, these workers need technology to help them plan and schedule so that orders get out the door at the right time and are sent to the right place in the right quantities.

Using intelligent warehouse orchestration that works in conjunction with a WMS, warehouse managers can look across the fragmented operations in a warehouse and optimize labor, touches and inventory to drive efficiency. Often called WMS accelerators, these tools integrate data from across the enterprise, creating a unified view of the operations. Then digital twin, artificial intelligence, and machine learning technologies can be applied to determine what must be done to meet schedules and create optimal plans.

WMS accelerators adapt and rebalance activities based on what happens inside a warehouse in near-real time. WMS accelerators rearrange schedules, review labor requirements, schedule replenishments, cross-dock orders, and ensure shipments arrive on time and in full. They also ensure that the right amount of labor shows up at the correct dock with the inventory needed to fill orders. With this technology, warehouses can be brought into the 21st century.

Outlook: Most supply chain organizations invest in warehouse management system upgrades, yard management systems, labor management, warehouse control systems, inventory management systems, slotting systems and more. The need for a single software to consolidate all other software running siloed operations has never been greater. With chess as the model, it should be possible to have all warehouse execution planning be done by AI, to maximize warehouse throughput while minimizing cost.

Expanding Supply Chain for Emerging Pharma Companies

Andy Prinz Associate Partner, PAC Consulting
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Analyst Insight: Emerging pharmaceutical companies are a vital source of product innovation and breakthrough treatments for the pharmaceutical industry. These companies often evolve in an agile fashion, bringing together scientific invention and rapid commercialization of supply chain operations to support new products. As industry trends and regulatory changes dramatically alter the speed and path to market for new treatments, these evolving companies need to take a fresh look at their current and future supply chains.

A fundamental challenge for emerging and maturing pharmaceutical companies is striking a balance between growth and investment. This requires pharma companies to examine their existing decisions and investments to understand whether a similar path or structure will meet their future needs. With this perspective, companies can develop a vision for the future, understand the potential options available, and evaluate those options through a structured investment framework.

Aligning on strategic vision. Determining future supply chain needs starts with reviewing and understanding the company's current-state strategy, policies, structures, processes and challenges. This evaluation informs the strategic vision for the supply chain and its alignment with the overall direction of the organization. The vision should include the objectives of the supply chain and outcomes that the supply chain should achieve over the next five to 10 years, such as speed to patient, cost efficiency, service levels and resiliency.

Understanding potential strategic options. Once there's alignment on the strategic vision, there needs to be an understanding and evaluation of structural (insourcing), operational (process change) and advanced capability (digital twin) opportunities available to support the company's growth portfolio over the next decade.

For emerging pharmaceutical companies, the ability to meet future demand is critical, so structural opportunities like insourcing, co-investing or outsourcing to a contract manufacturing organization (CMO) are often prioritized. Insourcing gives these companies greater flexibility and control over their production; however, without an experienced partner, it may require five years or more to conduct a greenfield investment. Outsourcing production to a CMO allows these companies to hand off production to an experienced partner with less upfront cost than a greenfield investment, albeit at the expense of control and flexibility of production. Co-investing options range from reserved capacity at a CMO with limited control and flexibility, to a joint build or expansion with a CMO partner that gives the company greater control and flexibility, but comes with a larger upfront cost.

Operational opportunities such as vendor management should be continuously reviewed for cost efficiency and flexibility benefits. These are often short-term and less capital-intensive opportunities yet are vital for continuous improvement in a dynamic supply chain environment.

Advanced capabilities such as workflow automation, flexible production, and digital twin support overall efficiency and flexibility, and should be incorporated as future initiatives.

Evaluating strategy options and investment sizing. Once the options for future supply chain have been identified and prioritized, value validation should be completed. Rough order of magnitude diligence must be completed to estimate upfront cost, operating cost, and value drivers associated with the various structural investment opportunities. Aligning leadership and key stakeholders to the synthesized roadmap and strategic vision requires this analysis of the financial implications of recommended opportunities.

Outlook: Enabling a successful supply chain is a challenging task for emerging pharmaceutical companies. However, effective planning for this unpredictable future can save these companies from a reactionary state during commercialization. Although components of the roadmap will certainly change, creating a strategic vision and framework from which to build as new factors come into play will support these companies in their pursuit of speed to patients, changing service level, flexibility and cost efficiency priorities.

Choosing the Right Metrics to Drive Supply Chain Success

Robin Acevedo Writer, APQC

Analyst Insight: Supply chain management is central to an organization's operations and business success, so picking the most relevant performance metrics is crucial. The need for employee engagement and retention in a tight labor market adds an additional challenge, but is also an opportunity if firms implement performance measures strategically.

Beginning in 2020, many supply chain organizations put aside their usual processes and standards to deal with disruptions brought about by the pandemic. As the crisis settles, many are ready to move beyond survival mode and return to the strategic use of internal and external metrics. In fact, the highest-performing organizations never stopped capturing data, positive or negative, and can now use it to quantify gaps and improvements in performance.

Ideally, firms carefully choose supply chain metrics that align with business goals and desired behaviors. But too often, leaders choose metrics based on trends or past habits. Another common temptation is to measure only those factors that indicate success, and avoid those that shine a light on performance gaps. Finally, firms should avoid the practice of casting out all data from 2020 to 2021 as an "anomaly," and instead seek insights from the information gathered during that time period of intense pressure.

To avoid these pitfalls and instead use data to drive performance, supply chain leaders should choose metrics that are:

Strategic. With input from senior management, choose measures that align with the highest priority business processes and organizational goals.

Balanced. Choose measures that capture a range of different and potentially competing priorities such as cost, quality, customer outcomes and cycle times. This ensures that some goals, such as quick delivery times, don't come at the expense of other goals, such as quality or cost targets.

Simplified. Highlight the most important data by choosing no more than 10 metrics per single dashboard.

Contextual. Data without context is meaningless. To be able to act on information, present data points in relation to prior time periods, to highlight areas of success and opportunities for improvement. For greater context, incorporate external benchmarks to compare performance against peers.

Performance and quality ultimately rest on the people within a supply chain organization. To ensure buy-in from employees, leaders should:

Use behavioral measures. Incorporate behavioral measures into individual performance evaluations. Reward desired behaviors using standardized definitions for data and processes, so that employees know exactly what's expected, and see that metrics are applied fairly.

Be encouraging, not punitive. When packaged effectively, behavioral measures signal that an organization cares about the professional development of its workforce. Communicate rewards and performance improvement opportunities as initiatives being done for employees, not to them.

Engage employees. In the current labor market, supply chain leaders are wise to use performance metrics to promote a corporate culture that focuses on quality and allows employees to feel that they're part of a larger mission. Research has consistently revealed that when employees feel more engaged with an organization's culture, job satisfaction and retention metrics also improve.

Outlook: In 2023, organizations must be intentional in picking the right measures that align with their business objectives, and balancing those measures across a range of priorities. Data can be a powerful instrument to gain competitive advantage. Supply chain leaders can harness this tool by thinking strategically and considering all angles when choosing the metrics that will drive organizational and individual behavior.

Enhanced Visibility Will Drive Supply Chain Resiliency

Danny Dever Product Manager, TransmetriQ

Analyst Insight: In the wake of recent supply chain turmoil, resiliency has become a key element in the planning, development, and execution of logistics operations. For shippers who are dependent on single-mode logistics, the time has come to take a close look at how multi-modal services can be added to the options that will keep things moving when unexpected glitches develop.

Not only is it critical to develop these options for supply chain reliability, but also in order to achieve safer, sustainable, and more efficient business models.

Rail shipping can provide these attributes, recognizing that it comes with a set of variables that must be managed to drive the success or failure of shipment delivery.

The best way for shippers to deliver safely, sustainably, efficiently — and with resiliency — is to use data that supports accurate and near real-time shipment visibility. You are best prepared to fix problems when you know where and when disruptions might occur.

Ultimately, the goal is to provide your customers with a solid estimated time of arrival (ETA). Historically, rail ETAs relied on moving averages or other simple models, without accounting for other possible operating conditions that could affect transit time —including service days, differences in train types, and consistent delay trends — leaving customers with a less-than-optimal ETA.

Also, shippers lacked an integrated single source of rail shipment status data, instead having to piece together disparate data from multiple railroads, third parties, ports, and first/last mile carriers.

Now, advances in rail industry technology have created integrated tools that put quick-action solutions at your fingertips. These tools are rapidly evolving with the use of artificial intelligence (AI) and machine learning to create dynamic predictions based on thousands of origin-destination pairs. These models analyze and process information much faster and deliver it to the shipper in near real-time.

Utilizing sequence modeling, the system quickly learns over the course of trips how to identify the most important sequence elements and other real-world factors that will impact a shipment's arrival time. This provides the ability to predict and update expected ETAs in near real time as shipments move over the rail network.

This rich data stream enables rapid adjustments to regular operations and supports development of out-of-the-box ideas that keep distribution centers properly stocked, and plant operations efficiently producing goods.

Sequence modeling has greatly improved during the past three years. Today, the rail industry can provide:

- Near real-time visibility.
- More reliable shipment ETAs.
- Enhanced historical analyses.
- Alerting and exception management.
- User-configurable dashboards with customized insight capabilities.
- Map visualization of shipments.
- Analytics and insights powered by AI and machine learning.

The work to improve rail visibility has yielded significant performance improvements, with development continuing. Data scientists are working on location sensors, geo-fencing, and network health and performance maps to create visual data. Functioning across the various applications, users will be able to access this visual data to create metrics, and interact with predictive and prescriptive analytics.

Outlook: Recent improvements in technology have convinced many shippers to add rail into their transportation mix as a greener and safer option. Shippers can develop strong, resilient supply chains that incorporate more rail service, which is safer, more sustainable, and more efficient than single-mode highway service. Greater use of multimodal solutions will allow shippers to "have it all": long-haul efficiency, flexible last-mile delivery, and more shipping options in support of supply chain resiliency.

The Role of Inland Waterways in Building Supply Chain Infrastructure

Mary Lamie Executive Director, St. Louis Regional Freightway

Analyst Insight: The supply chain disruptions that have rocked the logistics industry over the past few years have made one thing abundantly clear: Infrastructure investment and innovation are key to supply chain resilience and efficiency. It takes both to create the redundancy and available capacity that are essential to keep freight moving, even when the unexpected occurs.

One area of investment has the potential to create additional capacity, and a new alternative for shippers. It centers on better utilization of the inland waterways by increasing container-on-barge traffic, and launching a new container-on-vessel (COV) service. The latter calls for moving containerized cargo on a new, all-water, north-south trade lane connecting the Midwest and St. Louis region to a gateway port on the lower Mississippi River, then on to worldwide destinations.

The COV service will utilize patented, environmentally friendly vessels with the capacity to carry 2,375 shipping containers, 20 feet long by eight feet tall, up the Mississippi River at 13 miles per hour with minimal wake. Expected round-trip time to Memphis is six days, and to St. Louis 10 days, significantly faster than traditional barge tows. Smaller "hybrid" vessels would move through locks and low-lying bridges on the tributary rivers, providing service from Memphis and St. Louis to feeder ports along the Mississippi, Missouri and Illinois rivers, including ports in Kansas City and Jefferson City in Missouri, Joliet and Cairo in Illinois, and Fort Smith in Arkansas.

In spring 2022, Missouri officials awarded a $25-million grant to the Jefferson County Port Authority to support development of a state-of-the-art intermodal container facility at its port in Herculaneum, just south of St. Louis, to serve the central Midwest region for both the export and import of containerized cargo. American Patriot Container Transport LLC, which is developing the patented vessels, will soon select a shipyard to build the first four, marking another critical milestone in this initiative. Backers hope the new service will be operational by 2025.

Public- and private-sector, cross-industry and multi-state collaboration played a key role in advancing these ambitious plans over the past few years, and multi-layered collaboration is also the foundation for many of the St. Louis region's other recent successes. It's at the heart of the approach the region takes to identify multimodal infrastructure priorities and advocate for funding for them. The new $222 million Merchants Bridge, one of the region's highest-priority freight infrastructure projects, opened in September, 2022, doubling capacity on the bridge that serves six Class I railroads and Amtrak crossing over the Mississippi River at St. Louis.

Sustainable infrastructure funding will be critical to delivering bold new initiatives such as COV service. With any new option to transport freight, service providers and the regions offering it will need to demonstrate how carriers can overcome the risks before they will embrace it. Continued industry collaboration and engagement will be essential to educate shippers about the savings COV service can deliver, and Maritime Administration grants can be pursued to help bridge the startup cost gap.

Outlook: While work remains before the U.S. inland waterway will be fully utilized with the logistics industry's support, the progress being made is real, as are the savings that shippers can realize. It's likely only a matter of time before we see container-laden vessels navigating the marine highway, and helping to revolutionize the container-shipping industry.

Addressing Challenges to the Hazardous Materials Supply Chain

Pia Jala Vice President of Consulting, Labelmaster

Analyst Insight: Ongoing global supply chain disruptions and the growth of e-commerce have put tremendous pressure on the professionals and companies responsible for shipping dangerous goods (DG) safely and compliantly. It has spotlighted the need for improvements in DG management processes, training and technology in order to keep pace with the changing supply chain landscape.

For years, DG pros have reported key gaps within organizations' supply chain processes and infrastructure that have made maintaining a compliant and reliable hazmat supply chain challenging. These gaps became especially evident as companies struggled to adapt to shifting customer demands, labor and material shortages, and a host of other supply chain snags. Yet even as organizations struggled to navigate the difficult supply chain landscape, many organizations improved their DG operations over the past year.

A recent Labelmaster global survey of DG professionals found a 35% jump in organizations that increased their DG investment year-over-year. Additionally, large numbers of DG pros reported improvement in key areas: C-suite support (48%), regulatory enforcement (48%) and compliance confidence (46%).

However, more than half of respondents reported no change in several areas: ability to handle reverse logistics (64%), fast and quality responses from regulatory authorities (56%), reliable master data (55%), ability to deploy technology (55%) and ease of applying rules (53%).

There is also still work to do within many organizations to meet the complexities of future needs. In fact, 75% believe their infrastructure isn't ready to meet future needs, and 82% say their organization's DG investment can't support future regulations or supply chain changes.

Compliance Challenges Remain

While organizations improved in some areas, challenges still exist across many aspects of DG management. The areas that are the most problematic:

- Automating processes (69%);
- Harmonizing processes across supply chain (59%);
- Accessing complete and accurate data (52%);
- Obtaining special permits, letters of interpretation, etc. (48%), and
- Ensuring that training is effective and up to date (45%).

Getting accurate and reliable data can also be difficult, as barely one quarter of respondents said they received accurate, complete safety data sheets from partners. And almost one-third (30%) don't trust most of their locations to ship DG efficiently and reliably.

Building a Better DG Supply Chain

The survey underscores the need for organizations to assess their DG operations and identify processes and infrastructure gaps and areas of opportunities. The good news is that making meaningful improvements doesn't have to be difficult or require significant investment. Following are four practical steps to creating a better DG supply chain.

- *Technology.* Automate DG operations and establish reliable processes across the supply chain.
- *Training.* Utilize gamification or 3D training experiences to better train and recertify employees.
- *Packaging.* Utilize new packaging solutions to further improve efficiency, safety and compliance.
- *Regulations.* Use digital regulatory materials to keep DG professionals up to date.

Outlook: The growth of e-commerce and proliferation of lithium batteries in global supply chains are two indicators that the number of DG shipments will grow. This, combined with new and changing regulations, will only make shipping and handling DG compliantly and efficiently more difficult. To keep pace, it's critical for organizations to continuously assess their DG operations and identify opportunities to improve compliance, safety and efficiency through better technology, training and processes.

The Growing Demand for Supply Chain Compliance and Transparency

Jackson Wood Director, Industry Strategy, Global Trade Intelligence, Descartes

Analyst Insight: Unprecedented geopolitical volatility, combined with escalating shareholder and stakeholder expectations, is driving demand for supply chain compliance and transparency. Business leaders can no longer focus only on the mechanics of their logistics operations; they also need to consider the impact of supply chain operations on people and the planet, and embed compliance into the movement of goods and services around the world. Otherwise, they face delays and monetary penalties.

When thinking about global supply chains, many consider only the physical movement of goods. While transportation is the visible aspect of supply chains, many don't see the legal side — compliance — that takes place in the background. While compliance is less visible, cross-border trade can come to a dead stop without the proper legal foundation for a supply chain. Compliance ensures that organizations follow the laws and regulatory requirements of the countries they work with and operate within.

Transparency takes compliance a step further. While compliance confirms that organizations *can* do business with vetted countries and entities, transparency dictates that businesses *should* do business with them. By providing visibility into the supply chain, transparency protects companies from exposure to risks that may damage the brand, its reputation or resilience. With transparency, companies self-sanction — not because it's illegal to conduct business in sensitive regions or with questionable entities, but because the level of risk isn't tolerable.

The more global nature of business today poses much greater complexity and risk to organizations. Volatility is another factor: The pandemic and Russia-Ukraine war have brought into sharp focus how quickly the world can change. From a supply chain compliance and transparency perspective, being prepared for the rate and scope of change can greatly bolster resiliency, keep shipments moving smoothly, and ensure that companies aren't working with denied parties or countries under trade restrictions or embargoes.

Another issue is new legislation and regulatory requirements. Environmental, social and governance (ESG) is an emerging domain that has received exceptional attention. Having created its Climate and ESG Task Force in March, 2021, the U.S. Securities and Exchange Commission has already announced enforcement actions against several firms for misconduct. Forced labor alerts have also become a big compliance driver. For example, there is now a law enforcing importers to be highly diligent when sourcing from the Chinese province of Xinjiang, amid allegations of forced labor among the Uyghur population. With reports of systemic use of forced labor in Qatar for the 2022 World Cup, the issue is sure to remain a primary focus as ESG compliance grows exponentially.

The burden of due diligence on business is huge, as the accountability for supply chain compliance and transparency falls to the organization itself. While compliance leaders have a wealth of knowledge, they need help to automate and streamline many of the more manual and operational components of compliance, such as denied-party screening, export-control processes and broader third-party due diligence. Global trade intelligence technology provides this level of automation and helps businesses to access specialized information and trade data to keep pace with evolving requirements, and make the best possible compliance decisions.

Outlook: Across diverse industries, leading organizations are thinking now about how to position the compliance practice for success, instead of reacting to a significant event. Effective compliance will not only drive growth and profitability; it will also help businesses demonstrate a commitment to "doing well by doing good."

Automating the Hazardous Materials Supply Chain

Mario Sagastume Vice President of Software & Customer Success, Labelmaster

Analyst Insight: With global supply chains enduring unprecedented challenges, organizations that want to remain competitive are embracing automation to cope with numerous systemic stress factors. Most already use software platforms for transportation, warehousing and order management, and by 2024, fully half will invest in applications that support artificial intelligence and advanced analytics. A lot of organizations, however, overlook one facet of automation that can help or hinder their success: dangerous goods automation.

Begin with the end in mind: companies need tested, repeatable and reliable processes to streamline shipments. Shipping and handling dangerous goods (DG) — from pharmaceuticals and industrial chemicals to power tools and electric car batteries — can be complicated and time-consuming. The regulations governing the thousands of items classified as DG continually evolve, and vary depending on how and where the goods are transported. Organizations not only have to stay up to date on and understand the latest regulations, but must effectively align their operational processes to comply with those requirements. This can be especially difficult for those with multiple locations or business units.

With dozens of tasks required to put a DG item into transport, including packaging, labels, documentation, carrier selection and employee training, slow compliance processes mean slower fulfillment, deliveries and overall business. This complex and often fragmented process also means there's a good chance of significant inefficiencies, and that errors or delays could occur with one or more supply chain partners.

Automation streamlines, consolidates and modernizes the tasks required to ship DG and provides multiple operational benefits, including:

- *Efficient shipping.* More repeatable and reliable operations for every shipment, across all locations.
- *Financial advantage.* Improved compliance processes that simultaneously enable organizations to operate more cost-effectively and reduce the risk of fines.
- *Risk reduction.* The reduced chance of a DG-related shipping incident that could impact employee and public safety, the environment and brand reputation.
- *Resource utilization.* Better staff utilization and the ability to offset labor shortages.

Establishing more automated and consistent DG processes boils down to a few key components:

Have the right product information. A product's components, dimensions and origins impact every process required for safe and compliant shipping. Shippers must first know exactly what they're shipping, then understand the regulatory requirements or restrictions for those goods.

Ensure that the right processes are in place. Once an organization knows exactly what it's shipping and the rules for transporting those goods, it can then define the specific processes that are needed to ship those goods safely, compliantly and efficiently. These processes should be reliable and repeatable, across all locations and supply chain partners.

Utilize technology to enable efficient shipping processes. Automation enhances the ability to establishing correct and consistent processes. DG shipping software can help validate orders against the latest regulations, and drive efficiencies for repetitive shipments from the same or multiple locations.

Enable proper deployment and training. Even with increased automation, training is still required for employees involved in shipping DG. A modern, tech-driven approach to hazmat training helps businesses quickly and effectively train and recertify employees remotely.

Outlook: Supply chain challenges aren't new, and competitive pressure will continue to drive businesses to focus on automation and risk management. Organizations that embrace DG-specific automation strengthen their position for success in today's fast-paced, demanding and quickly changing climate. However, when left ignored, inefficient, manual compliance processes will remain a major risk in an organization's broader growth efforts, and can significantly slow down the entire supply chain.

Shrewd Procurement Can Counter Projected 2023 Challenges

Claire Christopher Director, Insight Sourcing Group
Erik Trum Senior Manager, Insight Sourcing Group

Analyst Insight: Retailer supply chain and procurement teams, beaten and battered after two years of dealing with supply challenges in an inflationary and consumer demand-driven environment, are bracing themselves for a different type of storm.

As supply improves, economic uncertainty and fears of reduced consumer spending will necessitate a pivot to an intense focus on savings and margin enhancement — all while satisfying ever-increasing demands around environmental, social and governance (ESG) issues.

Following are the main themes that arise in discussions with retail partners today.

Inflating inventories. After recovering following supply chain shortages in 2020 and 2021, consumer demand has deflated. Retailers are left sitting on a glut of inventory, and are equally worried about the erosion of margins caused by heavy discounting intended to avoid the burden of excess stocks at the end of the peak season.

Fears of recession. Transportation rates, a leading indicator of economic challenges, have fallen off precipitately, raising real concerns about consumer sentiment and the health of the economy going into 2023. There's the potential for inventory issues to be compounded by reduced consumer spending, and for inflation to outpace increases in demand for the year.

The need for new procurement strategies. In 2023, we're beginning to see some relief in critical areas of spend. Savvy procurement leaders will quickly pivot from firefighting through price increases, and instead adopt a proactive approach to regaining margin.

In a sharp turn of events from 2021, suppliers have begun seeing excess capacity in their business. Procurement leaders can capitalize on this by introducing competition into the current supply base. Organizations failing to survey the market in areas like transportation are leaving money on the table. Now is the time to re-source and re-contract rates where current agreements allow.

Most major commodities, including paper and plastics for store bags, and metals for fixtures, are falling, and the moment has come to take advantage of the softening. By following indices that drive costs in key categories, retailers can drive pricing decreases in line with the market, and tie future market softenings to those indices.

Retailers with global supply chains should pay attention to currency exchange rates. The U.S. dollar has grown stronger in relation to the Chinese Yuan, opening the door for price concessions wherever suppliers are paid in dollars today.

ESG concerns. With the growing focus on ESG, organizations can simultaneously accomplish two goals by looking for joint sustainability and profitability wins. Companies should consider changes such as shifting specifications for shopping bags to recycled kraft bags, reducing materials used in shipment packaging, and consolidating shipments to minimize the number of trucks on the road. Organizations should also rely on competitive sourcing events to identify diverse and minority-owned suppliers, and evaluate renewable energy opportunities such as solar panels for brick-and-mortar stores and distribution centers.

Outlook: Retailers may indeed be facing inflated inventory levels and a looming recession. But shrewd procurement leaders can take advantage of numerous opportunities to combat these challenges, actively attack spend, and recapture margin.

Alignment of Supplier Diversity With Business Strategy

Rod Robinson Senior Vice President, Supplier Diversity Practice, Insight Sourcing Group

Analyst Insight: In 2023, organizations should incorporate socio-economic and other environmental, social and governance (ESG) initiatives into their overall business strategies. One way to accomplish this is to undertake a supplier-diversification effort, and set benchmarks to ensure that suppliers and vendors can meet certain requirements and standards.

To be successful, corporate supplier-diversity initiatives should be aligned with the higher business strategy. This allows companies to focus their supplier spending goals on areas that drive revenue growth, while simultaneously having a positive socio-economic impact on their local operating markets.

Most companies take a tactical, bottom-up approach to targeting spend categories in line with short-term diversity objectives. This tendency reflects the reality that most supplier-diversity programs begin as a reaction to a customer or market demand. Instead, companies should be taking a more proactive approach that's aligned with overall corporate objectives. These organizations view their suppliers as potential customers, capable of providing unique insights that lead to product innovations and access to new market opportunities. Visionary companies understand that the most diverse and inclusive supply chains are about more than just compliance, but are true sources of competitive advantage. Following are some common practices adopted by best-in-class companies.

Market-driven goal setting. While many companies struggle with establishing diverse spending goals, best-in-class organizations consider specific internal and external factors that underscore the importance of supplier diversity. These include customer requirements, industry regulations, market demographics and targeted customer segments. For example, a company learns that it generates 20% of its revenue from diverse customer segments, but spends only 3% of procurement dollars with diverse suppliers. In this case, 20% would be the benchmark for establishing the initial supplier-diversity spend goal.

Emphasis on strategic relationships. Best-in-class companies focus on establishing relationships with top-performing diverse suppliers across key categories. They often include IT marketing and promotion; professional services, such as accounting, consulting and legal; real estate and facilities, and staffing. As the supplier consolidation trend continues, leading organizations can lean into diverse suppliers that can develop and fulfill needs across a broader range of categories.

Diverse supplier advisory councils. Best-in-class companies consider their suppliers to be an extension of the organization, as current or potential customers who are uniquely qualified to provide valuable market insights. As a reflection of that approach, they'll establish advisory councils consisting of some of their top diverse suppliers across representative categories. This not only enables them to capture "the voice of the supplier," but also serves as a built-in customer focus group from which to gather insights that aid in product and process enhancements.

Outlook: As companies continue to realize the tremendous impact of supplier diversity and inclusive procurement programs on overall ESG efforts, expect to see corporate executives assessing supplier diversity and environmental sustainability initiatives together under the ESG umbrella. Crucial to their success is incorporating those efforts into the overall business strategy, instead of maintaining them as sidebar initiatives. From a procurement perspective, this combined view of encompassing sustainability and supplier diversity forms the basis for responsible sourcing.

Strong Relationships With Suppliers Are More Important Than Ever

Nathanael M. Vlachos Writer, APQC

Analyst Insight: For supply chains that are more innovative and resilient in the face of disruption, organizations can no longer afford purely transactional approaches to supplier relationship management (SRM). Leading organizations forge strategic partnerships with their most important suppliers, and collaborate with them to drive value and competitive advantage. Given the benefits of this type of SRM, it makes sense to see that awareness and adoption are growing across industries.

SRM is a set of practices that organizations use to ensure that third-party suppliers comply with set contractual terms, service levels and performance objectives. While traditional SRM is mostly a one-way conversation in which buyers dictate their terms to suppliers at the end of the procurement process, many leading organizations have shifted toward more collaborative models of SRM.

In the face of continued disruptions and materials shortages, leading supply chain organizations work with their most strategic suppliers throughout the procurement process to innovate and plan toward outcomes that are beneficial for both parties. With buyer and supplier sharing risks as well as opportunities, this more mature form of SRM helps ensure that organizations and their supply chains are more resilient and better prepared for disruption.

Organizations with strong supplier relationships fared much better during the severe disruptions of 2020 and 2021. With better visibility into their most strategic suppliers, for example, these organizations learned about disruptions and could respond much more quickly than their competitors.

Given these benefits, it's no surprise to see that awareness of SRM is growing across industries. Through its SRM quick poll, APQC finds that 65% of respondents are now extremely familiar with SRM. This is a big improvement from 2018, when just 40% of those surveyed reported being extremely familiar with SRM.

Growing awareness of SRM and its benefits is, in turn, driving greater adoption. APQC finds that 71% of respondents today are using SRM, in contrast to 2018, when only 39% of organizations were. As further evidence of SRM's growing value for organizations, 69% of those who have not yet adopted SRM are extremely or very likely to do so in the next two years.

Of course, not every organization that adopts SRM is taking the mature and collaborative approach that is characteristic of leading organizations. But APQC is encouraged to see that the percentage of organizations that use SRM simply as a tool to force supplier compliance is shrinking (from 72% in 2018 to 44% in 2022), while the percentage of organizations that recognize suppliers as a potential source of innovation is growing (up to 46% from 38% in 2018).

Not every supplier relationship needs to be marked by the kind of collaboration and innovation seen in newer models of SRM. You can buy pens and sticky notes anywhere, for example, so your office supply vendor isn't the best candidate for intensive collaboration toward mutually beneficial goals. For your most strategic suppliers, however, this type of relationship can make all the difference when disruption hits your business.

Outlook: Recent supply chain disruptions have reinforced the need for organizations to cultivate strong supplier relationships. Rather than using SRM to strongarm suppliers into compliance with their terms, leading organizations recognize the importance of collaborating with their most strategic suppliers to reduce risk, drive innovation, secure competitive advantage and more. Organizations that form these types of relationships with key suppliers will be able to respond to disruption much more quickly regardless of what the future brings.

The New Competitive Edge: Analytics-Driven Supply Chain Design

Milena Janjevic Research Scientist, MIT Center for Transportation & Logistics

Analyst Insight: Recent supply chain issues and disruptions have shone a spotlight on deficiencies in supply chain design. Companies' responses have mostly been operational; they were able to absorb some of the shocks and not others. This raises the question: Is this a one-time glitch, or is there something more profoundly problematic with our supply chain?

MIT Center for Transportation & Logistics Research has found that how supply chains are designed is responsible for most supply chain problems. Traditional supply chain design has focused on standardization and efficiency, which lead to economies of scale, centralized distribution and just-in-time, lean manufacturing. However, the rise of trends like globalization, outsourcing and e-commerce have placed significant strain on supply chains. In a world where we have both delocalized production and same-day delivery, our global supply chain model has been stretched too thin.

Despite this, companies are not rethinking their legacy models: We're still using the same basic paradigms of efficiency and cost minimization when designing our supply chains.

The deficiencies we see in supply chains today are due to outdated methods and approaches to supply chain design. We need to use a more holistic approach to succeed in today's business environment.

Move from a cost- to a value-driven approach. Supply chains are not only a cost center but a driver of competitive advantage. Rather than focusing on cost minimization, companies should focus on long-term value creation. Given the current competitive environment, it is absolutely crucial to consider the interaction between supply chain design choices and revenue management.

Move from a siloed to a collaborative approach. More stakeholders need to be involved in the process. Supply chain design should no longer be confined to the logistics department; it should include other functions, like sales, finance, and marketing.

Move from an event-based to a continuous design approach. Traditionally, we redesign our supply chains every few years in response to some specific event, like changes in the market or corporate strategy. Given the pace of change today, this approach is obsolete. We need to continuously monitor our supply chain design and adapt it.

Embrace the power of data and analytics. Traditionally, supply chain design tools used aggregate data and were constrained by computational power. Now, however, we have the ability to use new methods like machine learning and network science to analyze highly complex supply chains. This allows us to have a much more accurate understanding of our supply chains, incorporating (1) more granular data reflecting real-life operations, (2) tactical and operational planning decisions that were typically left out of supply chain studies, and (3) a much larger set of future scenarios, allowing us to make supply chains more resilient.

In the near term, a lot of companies are aware of the problems, but they don't necessarily have the solution yet. Supply chains are at the center stage of corporate strategy and there is a lot of excitement and a lot of experimentation happening, particularly around new products and services enabled by new designs.

Outlook: The next few years will allow us to identify winning strategies. An intentional, analytics-driven approach will be key. Specifically: Striking a balance between customer-centricity and global operations, leveraging new business models and collaborative relationships to build in design flexibility , accounting for risk and uncertainty in a more structural manner, and setting up organizational structures to account for a link between supply chain design and other decision-making.

Supply Chain Risk and Resilience: State of the State

Gregory L. Schlegel Founder, Supply Chain Risk Management Consortium

Analyst Insight: The COVID-19 pandemic has pushed awareness of the need for better risk management to the top of virtually every corporate agenda.

According to a 2021 study by McKinsey, for the first time in about 10 years, 95% of executives in a recent survey said they had formal supply chain risk-management processes in place. A further 59% of companies said they had adopted new risk-management practices over the past 12 months. A small minority (4%) had set up a new risk-management function from scratch, but most respondents said they had strengthened existing capabilities.

This is very encouraging news. In the last three years, many more companies have begun exercising best practices for ensuring effective supply chain resilience and risk management. Gartner has identified three relevant key issues in this area. The first is digital transformation of the supply chain. The second is talent, or what it calls "The Future of Work." And the third is risk management embedded throughout the enterprise.

In a later report, Gartner stated that more than 65% of executives planned to be "more proactive and better prepared for disruptions. This approach will be integral to how we operate in 2022 and beyond," the executives said.

Because COVID-19 has had such an uneven and devastating effect on almost every industry, the watchword for all has been resilience. A resilient enterprise has the capacity to overcome disruptions and continually transform itself to meet the changing needs and expectations of its customers, shareholders and other stakeholders.

That's a very tall order. However, in the last 12 months there's been an active dialogue among companies seeking new strategies for the creation of super-efficient supply chains — not just those that are merely effective or resilient. This has resulted in wide-ranging discussions covering near-shoring, onshoring, less reliance on lean and just-in-time inventory models, and a stronger commitment to identifying risks and building out supply chains that can weather many types of risk events. It's all part of an effort to reinforce resilience throughout the industrial supply chain — including acts by Congress to allocate funds for fostering more secure and resilient supply chains across multiple industries.

Outlook: Expect to see the emergence of more cloud-based technology solutions, drawing on predictive analytics and machine language algorithms to become prescriptive, and even cognitive, in identifying and responding to risk. They'll end up supporting additional pillars of the entire supply chain, from suppliers' suppliers to customers' customers, fulfilling the vision of end-to-end supply chain risk management. Many more companies will be embracing best practices for supply chain risk and resilience, and embedding them into their daily supply chain decisions.

Expanding Supply Chains for Emerging Pharma Companies

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Analyst Insight: Uncertain economic times create great challenge. Companies often face increased pressure to maintain profit levels while cost and consumer trends eat into margins. The supply chain swiftly becomes an area of focus for executives to cut costs and lessen financial impact while they ride out the low cycles. While three years of the pandemic have already stressed the supply chain, the impending economic uncertainty is sure to bring its own hazards.

The best time to react to an economic downturn is before it happens. Experts are divided on when or even if a global recession will occur. However, the World Bank has stated that the two most likely predicters to recent recessions, a weakening of global growth in the previous year and sharp slowdowns in major economies, have already happened. Interest rates and inflation, on the rise in 2022, are expected to stay above recent historical norms well into 2023.

Regardless of whether a full recession materializes or not, there are several ways to safeguard the supply chain against financial headwinds without making dramatic cuts that can impact future operations. A comprehensive supply chain finance and cost strategy should be developed, and evaluation of strategy options should be completed with both a near-term improvement and long-term capability mindset. Four options for cost and financial improvement which fit both of these timeframes are outlined below.

Commodity management is harnessing the material and sustainable value trapped in the supply chain relationships in major purchases. Procurement teams can release this value by identifying and managing commodity pricing dynamically, de-risking themselves as well as their supply base. The pandemic has seen companies caught in long-term contracts and unable to take advantage of falling prices. Recent inflation has shown how quickly prices can bounce back, underscoring the need for the advanced buying of commodities.

Workforce optimization is a set of levers, strategies or methods that seek to improve efficiency, decrease cost and future-proof a workforce. The most effective optimization exercises identify the optimal combination of these levers, matching those with strategic priorities. While there are optimization opportunities associated with mergers, acquisitions or new services, an economic downturn is a major driver of changes in staff — and with it comes opportunities to explore workforce optimization.

Continuous improvement efforts aim to deliver consistent processes to achieve strategic goals on quality and cost. First, understand the voice of the customer and diagnose the root causes of issues that do not align to customer value. Then, design new processes with the intent of capturing the missing value. Finally, develop controls and governance to sustain and optimize the process post implementation, and achieve strategic goals of higher quality and lower cost.

Waste valorization is the process of developing techniques that generate value and opportunities from waste products and materials. Improving the efficiency of the manufacturing process can reduce the amount of waste created. Reusing, recycling or composting processing materials are other ways that can help reduce overall waste and associated costs. Additionally, companies can look externally to find or create applications for their waste material.

Outlook: Separately or in combination, these activities work to reduce the overall cost of the supply chain while continuing to provide the value that customers expect. Efforts that can be made ahead of economic slowdowns are easier to implement, more consistent and more sustainable than those undertaken during periods of hardship. Don't wait until your organization is consumed by battling market forces before implementing changes that can drive value.

Better Supply Chain Visibility Begins With Better Data

Sean Santiago SVP, Technology Platforms, Transportation Insight & Nolan Transportation Group

Analyst Insight: More than ever, organizations need a comprehensive view of their end-to-end supply chain to navigate compounding disruptions, market volatility and changing customer demands. But having a cohesive view of the supply chain – from shipment location and inventory levels to carrier performance and sustainability goals – doesn't automatically happen. Achieving this level of visibility starts with complete and accurate data that can be turned into actionable insights.

Supply chain visibility means different things to different people. It covers everything from the physical — "Where is my shipment?" — to the virtual, like margin management and total landed costs. But in today's environment, mature supply chains need a comprehensive view of all aspects of the supply chain, not just one piece.

Beyond simply tracking goods, enhanced visibility allows organizations to better measure performance to make smarter, data-driven decisions. For example: how profitable is it to ship this particular SKU to this customer from this location? Can multiple LTL shipments be consolidated into a single truckload? Would changing shipping locations or days of the week reduce detention times or improve on-time pickup or delivery levels?

Access to historical data also allows organizations to better forecast future needs — allowing them to analyze the fluctuation of factors like demand and fuel costs over time.

Access supply chain data is powerful. However, it's important to note that there is such a thing as bad data. To be truly effective, data must be captured authentically and interpreted correctly. After all, you can't accurately measure on-time percentages if you don't accurately capture arrival data. This requires having a data management plan in place.

Consolidate data. A supply chain generates a tremendous amount of data, and accessing all of it is not easy, especially when working across multiple vendors, customer segments, or transportation modes. Consolidating information across systems and sources is the first step toward identifying actionable opportunities from supply chain data.

Embrace data governance. To make informed decisions, you need to start with good data. This means embracing data governance to ensure the accuracy of the data being used. Data governance must focus on creating and processing data that can be turned into an operational asset. This requires paying close attention to all aspects of data handling, including data validation and maintenance, to ensure ongoing data integrity and oversight.

Start small and scale up. Visibility into the entire supply chain requires visibility into each link. Organizations facing visibility gaps should start with a few smaller data projects and then scale up. For example, a Power BI or Tableau tool can deliver powerful insights without requiring significant resources.

Lean on trusted partners. Partner with transportation providers and other organizations that can support your data needs. This will give you access to important data, and support your efforts to make meaningful changes like performance improvement, reduced costs and adaptability to market changes.

Outlook: The need for supply chain visibility isn't going away. If anything, it will continue to increase. To keep pace, shippers must increase access to quality data, utilize digital technologies, and partner with providers with the right visibility tools and capabilities. The more data that's available, the more insights can be gained, leading to better, smarter decisions across the supply chain.

End-to-End Visibility: A Solution for Uncertain Times

Ken Sherman President, IntelliTrans

Analyst Insight: As companies struggle with supplier shortages, transportation constraints and labor challenges, businesses need end-to-end visibility into their global supply chains, to know where their cargo is, the reason for delays, the estimated time of arrival for goods, and contingency plans for rapidly mitigating issues.

When the Japanese earthquake of 2011 left the country with $235 billion in infrastructure damages, supply chains across the globe came to a screeching halt. Many businesses were relying on supply from Japan, including 22% of the world's 300mm silicon wafer supply, 60% of critical auto parts, critical lithium battery chemicals and flash memory. The devastation resulted in massive shortages affecting supply chains for years. Managers woke up and realized that the information they needed to survive and thrive was locked away in multiple information silos.

Supply chain visibility technology and related data integration allow companies to react quickly to disruptions. End-to-end visibility provides real-time data and a holistic understanding of partners across the supply chain, from procurement to the end customer.
Visibility goes beyond just knowing where your stuff is at any point in the supply chain. More and more organizations are recognizing that access to data is equally critical to planning, relationship management and crisis response. Armed with real-time information about the location, production and delivery of raw materials, components and finished goods, companies can more easily identify and mitigate disruptions.

Data helps supply chain executives make informed decisions about where to position inventory in the event of an issue with a transportation mode, such as a potential rail strike. The supply of empty railcars, for example, can be increased at key facilities so that plants can continue to operate.

In 2022, only 6% of companies reported having total visibility into their supply chains. The solution lies in the implementation of intelligent visibility tools. They help companies to react more quickly, develop contingency plans and make more informed decisions as disruptions happen. With the help of supply chain visibility technologies, businesses improve inventory management with fewer stockouts, acquire better fulfillment processes with more on-time deliveries, and improve customer service levels.

Outlook: At its core, visibility improves and strengthens supply chains by making data readily available to every stakeholder, all the way to the customer. Companies with high levels of visibility tackle their most significant data challenges and transform information into valuable insights. Such wins are crucial in today's uncertain global business environment. With total supply chain visibility, businesses tackle market issues and disruptions with greater agility, and are able to thrive regardless of the situation.

Understanding Supply Chain Process Maturity Will Be Critical in 2023

Gregory L. Schlegel Founder, Supply Chain Risk Management Consortium

Analyst Insight: After three years of pandemic-driven disruptions, supply chain executives are developing new strategies for contending with high inflation, economic slowdown, talent shortages, excess inventory and a continued level of global uncertainty. But understanding the maturity of their supply chain processes is a crucial first step.

Many executives are re-evaluating their product portfolios, entertaining the thought of re-scaling their supply chains, including a move to near-shoring and onshoring of manufacturing and supply, based on the growing realization that China is no longer an entirely reliable partner. Executives are also considering options to improve supply chain visibility upstream to their suppliers and downstream to customers, while simultaneously addressing environmental, social and governance (ESG) issues within their global supply chains.

There are a number of new and significant supply chain issues that must be addressed in 2023 and beyond. In particular, supply chain process maturity will become a critical success factor for survival. In a 2022 report, Gartner emphasized three major questions to be asked: First, what are the seven key supply chain processes that are essential to achieving end-to-end supply chain excellence? (Sourcing and procurement, supply chain planning, transportation, warehousing and distribution, manufacturing, store operations and services.) Second, what is supply chain resilience? (Gartner's definition: "Avoiding, absorbing and recovering from the impact of major disruptions and continuing to operate under stress.") And third, why is supply chain risk management important? (Because, according to Gartner, failure to practice it can negatively impact company performance, cause reputational and financial damage, and threaten a company's sustainability efforts.)

Unfortunately, most companies don't approach supply chain management from an end-to-end perspective, and are therefore not ready to move forward with a bona fide supply chain risk program. The effort must begin with the building out of a model to highlight a company's process-maturity status as it currently stands. After all, knowing the extent of the problem is half the solution. Supply chain process maturity improvement equates to future positive financial performance and a strategic advantage.

Outlook: The pandemic has brought supply chain management to the forefront. In 2023, supply chain executives will have to deal with multiple issues. But it's especially vital that they take a hard look at their supply chain process maturity. That's the best way to ensure sustainability in an ever-changing world.

The Supply Chain Control Tower Maturity Model

Deanna M. Rainwater Engagement Director, Tata Consultancy Services (TCS)

Analyst Insight: Enabling supply chain visibility via control tower technology and capabilities remains one of the most sought-after supply chain initiatives for many organizations. However, many companies underestimate the time and effort required to effectively launch and fully meet these objectives through the orderly buildout of the foundational digital capabilities and infrastructure to meet current and more advanced control tower product functionality and ROI.

In our experience, companies deploy supply chain control towers for many reasons that include facilitating operational improvements, improving on-time and in-full (OTIF) supplier performance, addressing purchase order and outbound shipment status visibility gaps, or identifying a product's inventory levels versus demand throughout all nodes within the supply network.

Our experience also recognizes that, while the reasons for employing a supply chain control tower are undeniable, unrealistic timelines and unmet expectations are often caused by lack of understanding of the typical maturity curve for deployment of full-scale digital core, real-time, end-to-end supply chain visibility that aims to enable predictive and prescriptive decision support.

To better align organizational goals with supporting project plans, the following incremental steps on the journey toward control tower proficiencies are recommended:

Discovery assessment. Best-in-class companies invest time up front to understand the depth and breadth of fundamental and aspirational control tower capabilities. Creating a foundational definition, along with defining the level of advanced control tower capabilities desired, will proactively identify data needs. It will also provide key insights to guide the selection of supporting technologies and infrastructure. This analysis will also facilitate building a roadmap that provides incremental business value and expands control tower proficiencies over time.

Control tower enablement. Best-in-class companies establish a rock-solid digital core that includes a centralized data structure and an integration strategy; one that brings together data from key business and supply chain systems throughout the evolution of the control tower initiative. An efficient supply chain control tower relies on high-quality data and strong data governance procedures. This directly impacts the output of insights and the degree of visibility provided to business users.

Control tower buildout. This stage enables operational visualization across each in-scope supply chain functional area. As workflow digitization and the degree of operational visualization increases, the need to refresh more frequently data from additional internal and external sources increases in importance. Control towers must also be well designed to display meaningful real-time KPIs that monitor the "heartbeat" of the supply chain, thus driving awareness and alignment with strategic organizational goals and current performance.

Advanced capabilities enablement. This is the rewarding stage in which advanced control tower functionality can be deployed and implemented to include predictive and prescriptive analytics, automated decision support, and autonomous planning and execution. These processes and workflows enable business users to proactively address supply chain issues, often providing alerts in advance of occurrence. These capabilites also permit users to respond quickly and more intelligently, minimizing business impacts. The most sophisticated supply chain control towers provide advanced analytics to assess the operational and financial impacts of any changes, and provide decision support to help users address issues very quickly.

Outlook: In 2023, expect to see further growth in the demand for supply chain control tower-related initiatives. The visionary companies already have these initiatives well underway and are beginning to realize significant benefits in many areas. As these results become more known, others will follow the leaders. Don't wait to see your competitor's case study success story at the next industry conference!

Assessing the State of Supply Chain Sustainability

David Correll Lecturer and Research Scientist, MIT Center for Transportation and Logistics

Analyst Insight: In recent years, sustainability has had a rocket-ship ascendance into the spotlight. Supply chain sustainability is no exception. In fact, an annual survey from the MIT Center for Transportation & Logistics has found that companies are facing sustained, increasing pressure, year after year, to make their supply chains more sustainable. However, while sustainability efforts ramp up, we're still trying to crystalize how exactly we define supply chain sustainability.

Should supply chain sustainability be limited to climate change mitigation, or should it also include social dimensions like human rights protection and diversity, equity and inclusion? It's a uniquely confounding moment; at present, there is no broad consensus across industries or geography. This is telling in and of itself. Discrete focus areas of sustainability are prioritized differently in various industries, so supply chain managers need to bear in mind a wide range of sustainability dimensions to meet their goals as they work with customers, vendors, policymakers, and investors with varying priorities.

But, amid this confusion, there's no time to feel sorry for ourselves! New policies and stakeholder expectations are coming, and we have to be prepared.

In the next few years, we're looking for a few major improvements in this area. The first is how we measure supply chain sustainability, particularly in Scope 3 emissions. Right now, we can talk about a lot more than we can actually measure in terms of supply chain sustainability — hence, perhaps, the dissensus mentioned above.

Second, as the definitions and parameters of supply chain sustainability become more widely standardized, policy expectations need to settle as well, so that businesses can effectively plan for them. Firms can and will adapt to new rules, once they know what exactly they are and have a reasonable expectation that they won't change.

And third, firms' urgency of action needs to match the intensity of their publicly stated net-zero goals. We're not there yet; research has found that firms' actual investment in sustainability has consistently lagged behind their goals. It seems like a lot of companies are betting on a fourth-quarter Hail Mary pass to meet their net-zero goals.

Things are heading in the right direction, though. Within two to three years, we can expect to see some major changes in mode choice on the roads and on the seas, as well as many more companies using alternative-fuel freight trucks and cargo ships.

The problem, however, is that with many vessels, there is a long wait to procure and receive them —especially ships. So if a company wants alternative-fuel vehicles, they might need to order now and wait a few years. Essentially, then, firms need to bet now on alternative-fuel technologies that have yet to be proven at scale, and live with those bets in the time leading up to their net-zero goals.

Outlook: Crisis improves us. COVID-19 was a catastrophe that had the unexpected benefit of improving supply chain sustainability. In the near term, it's clear that Russia's invasion of Ukraine will be the next crisis that begets supply chain sustainability improvements. We already see it with energy conservation efforts in Europe. Further out, there will be some other horrible calamity – there always is – and that too will challenge us to rationalize our energy and resource conservation yet again.

ESG Gets Real: Legal Requirements for Supply Chain Sustainability

L. Tony Chen Partner, Global Supply Chain Consulting Practice, Tata Consultancy Services

Analyst Insight: Regulatory pressure is intensifying globally to hold businesses accountable for sustainability in their operations as well as in their extended supply chains. Companies that vowed to make good on their sustainability pledge are now being pressured to deliver on those promises, as measured by their degree of regulatory compliance.

Germany's Supply Chain Due Diligence Act, effective January, 2023, is a first-of-its-kind effort to require enterprises to validate efforts to prevent human-rights and environment-related violations in supply chains. It aims to prevent or end such supplier wrongdoing. The due-diligence requirement scrutinizes companies' risk-management programs, and levies penalties for violations, including fines of up to 2% of revenue, as well as exclusion from future government contracts. Companies that previously governed their suppliers merely by applying the same "code of conduct" as their own must now implement far more rigorous measures to enforce supplier compliance, or be subject to severe penalties.

The Corporate Sustainability Due Diligence Act, adopted by the European Commission in 2022, constitutes similar legislation. It fosters sustainable and responsible corporate behavior throughout global supply chains, enforceable by EU supervisory authorities through imposition of fines, sanctions and compliance orders.

Both laws require annual disclosure of related risk procedures, preventive measures, and remedial actions taken by companies for both environmental and human rights concerns. Until now, most large public companies published ESG efforts on a voluntary basis. The new laws will mandate sustainability reporting for legal compliance. Furthermore, the EU has adopted a Corporate Sustainability Reporting Directive, which sets the standard for companies of all stripes to disclose the compatibility of their activities with the Paris Agreement's goal of limiting global warming to 1.5 degrees Celsius.

In the United States, the Securities and Exchange Commission has proposed to begin mandating climate-related disclosures in March of this year. Under this proposal, public companies are required to provide climate-related financial data, and report greenhouse gas emissions, including those from their supply chains, in public filings. Sustainability reporting isn't just a feel-good self-promotion for companies, but a legal obligation to fulfill.

Due to evolving regulatory pressures, companies must respond quickly to be ready when the laws take effect. Immediate actions should include assessing the potential impact of the regulatory and policy directives, devising a plan for complying with the laws, creating preventive measures and monitoring procedures, and applying due diligence broadly, including for partners and customers in the extended supply chain.

Existing ESG standards frameworks such as the Global Reporting Initiative, Sustainability Accounting Standards Board and others overlap the upcoming regulations to a large extent. Companies that already publish annual sustainability reports following these frameworks have a head start. Those that haven't done so prior to 2022 can prepare a fresh report to begin. A good exercise is to compile and prepare data that's material to companies' business and sustainability goals as the end of the year approaches. A structured assessment to understand the gaps, from business risks to related data maturity, should underscore a strategy to be formulated in meeting regulatory requirements as well as benefiting stakeholders.

Outlook: As the evolving regulations are finalized in 2023, expect companies to have greater transparency and consistency in disclosing sustainability-related performance and progress. Recently released Scope 3 emissions reporting requirements by the International Sustainability Standards Board is further evidence that more standardized reporting will cover extended supply chains. Companies must formulate strategies and action plans to be compliant and deliver enduring stakeholder values. It's a matter of go green, or go home.

Managing the Volatile Transportation Market With a TMS

Jared Wilson SVP, Customer Operations, Managed Transportation, Transportation Insight & Nolan Transportation Group

Analyst Insight: Fluctuating capacity, unpredictable transportation costs and high inventory levels continue to impact shippers of all sizes and freight types. As demand softens heading into 2023, shippers need effective transportation management solutions that provide greater visibility, access to capacity, and the ability to optimize mode and carrier selection in order to adapt to market changes and address both short-term and long-term needs.

Since July 2020, approximately 195,000 new trucking companies have entered the market, according to FTR Transportation Intelligence, to address the high consumer demand for goods and to take advantage of strong spot rates. The market quickly absorbed this new capacity, but as shipping demand began to falter in 2022, spot rates fell and we will now see capacity rebalance in the months ahead. Both the truckload and less-than-truckload markets softened in the second half of 2022.

Heading into 2023, reduced demand due to the macroeconomic environment, combined with higher trucking operating costs (particularly fuel and higher wages), will likely cause even more capacity to leave the market. While this may balance demand and overall capacity, some volatility should still be expected.

To position themselves for success, shippers need solutions that give them options to identify the right transportation mode, manage costs, remain assured of capacity availability, and gain visibility into needed shipment detail. An intelligent, multimodal transportation management system (TMS) lets shippers do just that, by automating their transportation operations and simplifying the way shippers source capacity and manage shipments.

Shippers of all sizes and freight types can benefit from a TMS in several key areas:

Capacity. A TMS can provide access to a larger, more diverse carrier network, and digital freight-matching capabilities can streamline the procurement process by allowing users to match loads quickly and efficiently with available capacity, while providing instant quoting and booking capabilities that make securing moves more efficient.

Visibility. Shippers gain greater visibility into key aspects of their transportation operations, including shipment data and available capacity in specific markets and lanes. Access to better shipment and market data supports smarter, faster planning and execution.

Optimization. Digital platforms enable shippers to better optimize their transportation operations, including optimal mode, route and carrier selection. They provide a controlled environment to ensure the low cost and high performing carriers are selected — whether using a bid board in the spot market or contract carrier selection.

While a TMS can provide exceptional value, in today's complex and volatile environment shippers need more than just technology that simply matches freight using algorithms. They need solutions that are backed by a team with market expertise and strong carrier relationships. Partnering with a logistics provider that combines intelligent digital solutions, a large carrier network and deep industry expertise will enable shippers to better optimize their logistics, and be able to scale and adapt when the market shifts or disruptions arise.

Some organizations, especially within the SMB space, have tried bringing their transportation operations entirely in house when it's not a core competency and have started to fall behind. But having the right partner helps shippers simplify and optimize their transportation management, and allows them to focus on business vs. supply chain market trends and disruptions.

Outlook: More trucking capacity is expected to leave the market in 2023, which will allow capacity and demand to start balancing out. The truckload market will continue to be fragmented, so we should still expect some volatility in the near and short term. Inventories are also expected to remain elevated throughout the beginning of the year, which will contribute to tighter capacity in the market.

How to Design and Maintain Supply Chain Strategies in 2023

Jenny Vander Zanden Chief Operating Officer, Breakthrough

Analyst Insight: Transportation is undergoing massive volatility resulting from economic uncertainty, the ongoing fuel crisis and an overall shift in demand. Collectively, these threats pose critical challenges for consumers, businesses and shippers in 2023.

In the face of a vast degree of uncertainty, agile transportation management strategies are becoming more critical to navigate the market. Looking ahead, shippers need to reflect on their fuel, freight and sustainability practices in order to regain control of and advance their supply chains.

In balancing consumer expectations, complying with new government regulations and battling increased costs, shippers are constantly finding themselves at a crossroads. They must home in on three critical areas — fuel, freight and sustainability — to achieve a holistic approach to their operations. Following are some actions they must take to achieve traction in a recessionary environment.

Implement fuel forecasting strategies. The current economic climate is prompting a "backwardation" trend — whereby the current price of an underlying asset is higher than prices trading in futures markets — alongside a continuing fuel crisis. As a result of this structure, fuel costs continued to rise in 2022, quickly becoming a top energy market concern. However, as we move into 2023, fuel costs are forecasted to gradually decline. And while that's a step in the right direction, shippers need to create and maintain better overall visibility of transportation data, so as to think more strategically about their use of fuel. For example, by examining supply chain data and demand forecasts, shippers gain a more accurate view of how demand for trucks will fluctuate over the coming year, and how that could affect fuel consumption. Combining these strategic insights with accurate fuel pricing forecasts can help them identify patterns, and factor fuel costs into ongoing budgeting.

Become more strategic by building enduring relationships within the freight network. Although this should be common practice beyond times of economic uncertainty, it's vital for shippers to honor contracts and increase volume, if possible, with favored carriers in 2023. To achieve this, they must reflect on the transportation network to see what's working and what isn't. Are there areas where new carrier partnerships would improve the stability of the network? What changes will work within the network, and which carriers fit well into that bottom line? By being more proactive in decision-making, companies can open more opportunities to build not only fair and equitable partnerships, but also sustainable ones.

Support emissions reduction with transparent data and technology. Such actions not only protect the bottom line, but also lead to emissions reductions in times of economic hardship. As more companies begin to disclose their greenhouse gas emissions and the risks they face from climate change, shippers will need to dedicate time to calculate their overall emissions baseline. Gaining visibility into fuel costs and consumption is the first step toward setting sustainability goals, such as reducing Scope 3 emissions. By investing in new technologies and data transparency, shippers can realize the full potential of the significant changes to transportation that are due to occur over the next decade, including the proliferation of autonomous and alternative energy vehicles.

Outlook: In 2023, shippers need to prioritize the implementation of real-time data to thrive not only in today's fast-paced transportation market, but also during times of persistent economic uncertainty. Market volatility continues to alter the picture on a near-daily basis. The first step in coping with it is the effective management of fuel, freight, sustainability initiatives and data. Together they'll improve transparency across the entire organization – with a significant impact on the bottom line.

How Technology Can Help SMEs Compete Against Larger Enterprises

Sam Polakoff Chief Executive Officer and Founder, BrillDog

Analyst Insight: Small and medium-sized enterprises (SMEs) face many of the same supply chain issues as large companies: Supply outages, labor shortages, tight transportation capacity, port congestion and more. Larger companies can deploy multimillion-dollar software applications to guide everything from sourcing to warehousing, while SMEs remain stuck with a myriad disparate systems and archaic methods. They need tools to be competitive, even as they struggle to afford or even understand them.

Large companies mitigate the impact of unforeseen supply chain interruptions using applications such as enterprise resource planning (ERP), transportation management systems (TMS), sourcing management and analytics. To manage transportation operations, SMEs use manual processes with Excel spreadsheets, individual carrier and broker logins, PDFs and e-mail. SMEs contact carriers to find capacity at a rate shippers want to pay, then book the freight directly. If the SME uses a TMS, the shipper can receive multiple freight estimates, schedule shipments and track shipments, all from a single dashboard. Yet there's no central repository for data, and no way to use the data to make tactical decisions. For years, even large companies have chased down a "big-data" solution with mixed success. Today, platforms are emerging to aid even the smallest of companies in this mission-critical quest, a game changer for any company.

Automating processes that involve paperwork and manual tasks like purchase orders, customer invoicing and document management frees logistics managers to focus on customers' needs. Automation lets shippers perform their day-to-day tasks in less time, leaving more hours to focus on profit-making activities.

The TMS must be easy to use, so that small shippers can be up and running quickly without extensive training, IT support and customization. Many TMS systems run in the cloud and can use application programming interfaces (APIs) for easy integration with other systems such as load boards, accounting apps, internet of things (IoT) devices and business intelligence tools. Software-as-a-service-based TMS models are supported by the vendor, so users don't have to worry about employing an IT staff for implementation and upgrades. Many emerging technologies contain a startup assistant to help the user customize and make intelligent choices.

TMSs help SMEs to compete against larger companies. Shippers can choose lanes with a preferred carrier that provides the best quality service for the best price. Technology is the key to making the customer experience the best it can be.

Many TMSs feature digital load tracking on trucks and load locations that are shareable with customers. Just as Amazon.com lets customers track orders, TMS users can alert customers to any delays. By tracking shipments, small businesses can also identify inefficiencies in their operations.

Previously, the decision to purchase a TMS was based largely on price. Many TMSs today are more affordable, easier to use and more flexible for smaller shippers. Some vendors offer "freemium" models, whereby a basic TMS can be deployed at no charge. These provide basic freight rate quotes; electronic carrier dispatches; access to carrier rates, spot-market or market load boards; bills of lading; and shipment tracking and basic reporting. If the shipper wants more advanced features, such as analytics, freight bill audit and pay, parcel management or network mode optimization, they can upgrade to a paid model.

Outlook: Using TMS technology, SMEs can do more with less, improving productivity and realizing efficiencies that drive value and reliability throughout the supply chain. With a TMS, businesses can provide a better customer experience, reduce costs and streamline operations. This can level the playing field to help SMEs compete with bigger companies.

Tackling Ongoing Transport and Distribution Pressures

Dave Howorth Executive Director, SCALA

Analyst Insight: Never before have transport and distribution been the focus of such public discussion. Disruptions caused by events of the past three years have made transport and distribution increasingly difficult. The industry has been confronted by cost challenges, environmental pressures and an increased level of competitiveness. Transport and distribution are seeing a shift from being an "always-available commodity" to an area of potential competitive advantage.

The biggest challenge for the transport and distribution sector this year will be the continuing need to tackle these ongoing issues, as they show no sign of easing for businesses.

In recent years, particularly with the shift in retailing from the high street to online, transport and distribution have become a competitive capability. This was largely fuelled by the rise in e-commerce during the pandemic, which saw the likes of Amazon.com reporting profit increases of nearly 220% in less than a year from the first lockdown. Businesses were forced to compete on speed of service. With the introduction of next- and same-day delivery and ever more competitive promises of service, these new offerings are requiring nimble and efficient transportation capability.

The price of transportation is continuing to rise in line with inflationary pressures. Fuel prices have reached an all-time high, especially in the United Kingdom, and remain volatile with geopolitical circumstances and the dollar-pound exchange rate. Add to this the well-documented driver shortage crisis, which resulted in spiralling labor costs.

The rising cost of fuel and labor is coupled with environmental pressures on businesses to switch to more sustainable options. Some have made meaningful steps toward sustainable transport, with Waitrose in the U.K. developing a fleet of electric vehicles with wireless charging technology for short-distance journeys. However, there remain barriers to the growth of EVs, including the lack of infrastructure and charging capabilities.

Looking forward, transport can't continue to be seen as a commodity by users in 2023. There needs to be significant investment in technological advancement, for both financial and environmental reasons. A major investment in technologies to speed up last-mile deliveries is vital if businesses are to stay competitive in the rapidly changing market. Increasing the number of drones used to deliver small packages quickly to local areas, as well as driverless vehicles, will be paramount to the success of the transport and distribution industry this year.

Furthermore, investment into the development of alternative fuel sources is desperately needed to meet government and business net zero targets and to avoid businesses collapsing due to exorbitant transport costs. This includes improvements to the availability and technology behind hydrogen and electric vehicles, and the development of electric road systems (ERS). While there have been some green initiatives introduced by the government concerning transport, considering that up to 90% of a business' carbon footprint comes from its supply chain, more needs to be done, and fast.

Outlook: Ideally, the next 12 months will be a period of real change for the transport and distribution industry, as it adapts in order to cope with ongoing global disruption by embracing technology to reduce costs, improve sustainability and stay competitive.

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Five Challenges to Supply Chain Resilience in 2023

By Robert J. Bowman Editor-in-Chief, SupplyChainBrain

Anyone with the slightest interest in global supply chains — and that pretty much makes up the entire populace — could rattle off the many crises that disrupted the flow of goods over the past three years. Which events will have the greatest impact on businesses and consumers throughout 2023, however, is much less clear.

Whatever form they take, they'll have one thing in common: a connection to supply chain risk management, an area that has understandably become a major topic of concern in the executive suite in recent years. So it only makes sense to get a perspective on 2023 from an expert in the field.

Bindiya Vakil is chief executive officer of Resilinc, a vendor of software for supply chain mapping, monitoring and risk management. She lays out five trends and challenges to supply chains to watch for in the coming year.

The economy and financial markets. Fears of a recession in 2023 aren't going away. In fact, certain sectors might be in one now. (It's common for economists to identify recessions retroactively.) For companies in the consumer electronics space, Vakil believes, the decline might have taken hold as early as the end of the first quarter of 2022. Strong demand continues in other key industries, such as automotive, infrastructure and healthcare, but the number of business failures over the past year could prove to be an unsettling harbinger for all sectors in 2023.

"In the last two years, we've seen a record number of companies exiting the market," Vakil says. "Either they weren't performing well, their supply chains weren't

keeping up, they didn't have the parts, or they were struggling to meet growth targets."

Should that trend continue or even ramp up in 2023, companies could be motivated to curb spending in expectation of dwindling demand. And while inflation has eased up in recent weeks, business costs are still high, especially in the energy sector; interest rates remain at their highest level in years, and stock market valuations are down. Companies that had easy access to capital when interest rates were low lack the same ability to raise money now. All of these factors are "contributing issues that can send suppliers into financial instability and sometimes bankruptcy," Vakil says.

Increased geopolitical risk. Relations between the U.S. and China have been frosty at best over the past decade, but they could hit subzero if China chooses to invade Taiwan. Vakil says such a dire turn of events doesn't even need to occur in order to trigger major supply chain disruptions. "The fear of these things happening causes companies to take action." (The same goes for consumers, who might cut back on spending in anticipation of a recession, thereby creating a self-fulfilling prophecy.) Similarly, the continuing war in Ukraine could cause companies to alter production plans as they worry about an ongoing shortage of energy and critical raw materials.

Cybersecurity and an increase in cyber attacks. Nothing new here; businesses have been under relentless attack by cyber thieves and hackers for years. But Vakil is concerned about the buck-passing that goes on within the various functions of many companies, with each department claiming that the others are responsible for protecting internal systems from breaches.

Vakil's background is in procurement, where managers tend to argue that cybersecurity is essentially an IT issue. But those on the IT side of the house say it's up to procurement to vet suppliers up the chain. Still, when something like a ransomware attack occurs, as in the case of the Colonial Pipeline hit in 2021, it's the entire business that's affected. "If they can't transact," Vakil says, "everything comes to a grinding halt."

Vakil says companies can't afford to be reactive in responding to cyber threats, or complacent when they dodge an attack. "Just because nothing happened the last three times you had a disruption doesn't mean you're going to be spared the next time."

Regionalization of sourcing. To say the age of globalization is over is an overstatement. But there's a definite shift in sourcing strategies taking place, triggered by concerns over China's continuing ability to turn out cheap and reliable products for the world market. While Chinese leaders have scrapped their "zero-COVID" policy of drastic lockdowns affecting entire cities, the country's production capacity remains threatened by high infection rates. Russia's invasion of Ukraine is yet another event that awakened manufacturers to the need to diversify sourcing of key materials and components. Moreover, the change in thinking has some companies looking to reshore production to the U.S., despite questions of labor availability and cost. Passage of the CHIPS and Science Act last year signaled a realization of the need for local access to microprocessors and other essential materials. Moving production out of China and other traditional sources takes time, but the effort is underway.

Climate risk. And so we come to the big one: the issue that affects not just supply chains, but the whole world. Vakil notes the sharp increase in climate-based disruptions in Resilinc's database: from between 30 and 70 extreme weather events between 2015 and 2017, to more than 250 in the last two years. And the number is likely to go on rising.

Barring any sudden breakthroughs in weather control, supply chains can at least prepare themselves for future events by mapping their universe of suppliers. That means knowing where every factory is located, through multiple tiers. "You can't just be sitting there, heading blind into a disruption," Vakil says. "Mapping and monitoring are foundational capabilities for companies to have."

Even supplier diversification, which is undertaken to reduce risk, entails its own level of risk, to the extent that a company sourcing from a new part of the world knows little or nothing about it.

For these and all other eventualities, Vakil recommends devising three planning scenarios, from least to most affected by any given disruption. "You always plan for the worst" she says, "and hope for the best."

JIT and Industry 4.0: The Future of Modern Manufacturing

By Bernardine Henderson Director of Global Procurement and Strategic Sourcing, Protolabs

Just-in-time inventory management has been around for roughly half a century. In that time, however, the original concept has become muddied, causing some companies to face precisely the supply chain issues that JIT was conceived to solve. This was especially true during the supply chain crises of the past three years.

It's time to reassess. Fifty years offers plenty of time and data to evaluate how the system has performed, how it's changed, and specifically how it can be merged with Industry 4.0 principles to create maximum efficiencies.

The original JIT model was said to be perfected by Toyota as part of its Toyota Production System (TPS), although the company may have just been one of the first to apply the concept to manufacturing. Whether Toyota deserves the credit or not, it successfully applied it. Given the automaker's meteoric success over the past half-century, it can't be denied that JIT can be an incredibly effective system.

The concept is a simple one. Maintain just enough inventory onsite to keep the manufacturing supply chain humming for a given period of time. If you need more, recognize it in advance and order from a local supplier close to your company. This lessens the time it takes to get parts to you, while massively reducing the cost of shipping. A side benefit is that local suppliers are more easily overseen. You can even visit them, should you ever need to, enhancing your ability to maintain quality control. Finally, and most importantly, JIT reduces the need to warehouse inventory onsite, a hidden cost not usually considered when it comes to piece-part pricing from offshore manufacturers.

Has JIT Become Irrelevant?

Over time, however, the notion of

having nearby suppliers providing "just-in-time" parts became something of a quaint relic. As manufacturing globalized, the JIT methodology did as well, meaning that it became more typical to order parts in large quantities from abroad, then warehouse material to ensure it's available when needed. On the face of it, that move seemed smart, as it's hard to beat piece-part pricing from certain foreign countries. In truth, however, it invites a litany of hidden costs to contend with, as entire supply chain organizations are needed to manage and move materials around the world.

There are also long-term costs incurred when your company can't iterate quickly because of extended lead-times and excess inventory in the supply chain. In today's consumer culture, there's an expectation that products don't come in one flavor or style. Instead, consumers are looking for choice, uniqueness and customization. Moreover, they want inventiveness and cutting-edge elements, especially advanced technology. If your parts speak to last year's models and concepts more than this (or next) year's, you may lose customers.

Iteration across an ocean is a painfully slow process. It takes time to get parts produced and transported for inclusion in the final product, and even longer when they encounter international shipping and customs delays. They can also be affected by concerns such a pandemic, geopolitical upheaval, or even ships blocking international shipping lanes. These one-time events seem to be happening with greater frequency, with pundits suggesting that instability is here to stay. And of course, there's the matter of tariffs. So what can lessen these risks? A return to JIT sensibility, tied to Industry 4.0 principles.

The Local Sourcing Model

JIT suggests that working with local or regional — rather than global — suppliers can help simplify and improve the supply chain. Using fewer transfers to produce and deliver parts increases the chance that you'll receive them when they're needed.

Imagine a not-terribly-unusual scenario. Your company is ready to prototype a molded part design. You send the computer-assisted design (CAD) model abroad and wait, sometimes for months, to get the part back. Issues crop up and you need to change the tool; it's not rare that molds require multiple iterations. But waiting months to finalize one part design can set you back, and suddenly you're in your product's next model year and unable to deliver on your promised timeline. Using JIT sensibility instead, you would send the model to a regional manufacturer that can turn it around in a fraction of the time.

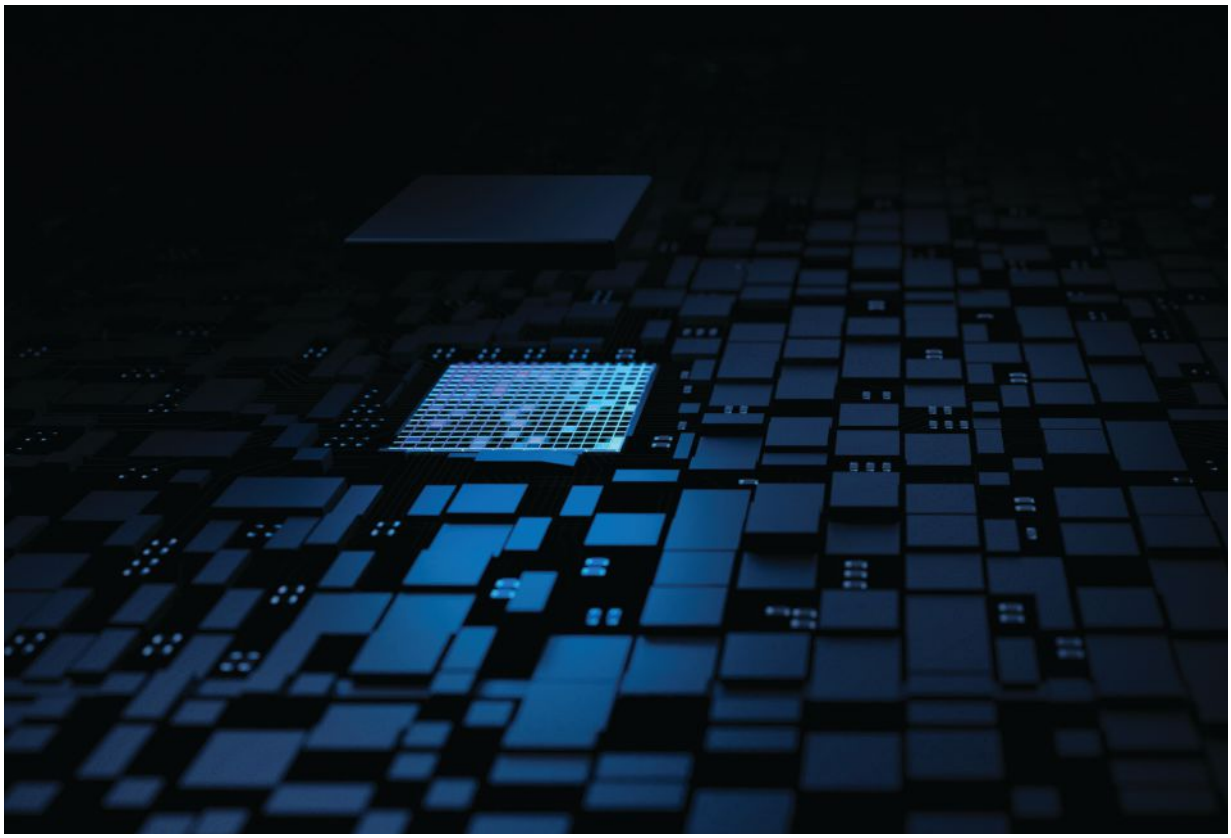
In response to recent disruptions, supply chain leaders are changing their strategies. A recent McKinsey survey revealed that 44% of respondents have moved to regional sourcing in the last year, and more than half expect that trend to continue.

The revitalization of the old JIT philosophy comes at a time when the many benefits of a regional supply chain can be paired with technologies made possible by the Fourth Industrial Revolution, to create a sourcing strategy rich in efficiency and agility.

For example, a regional manufacturer that adheres to Industry 4.0 principles puts your CAD model through the manufacturing process as a digital twin, a virtual version that's created and evaluated for manufacturability. Once changes are made to improve moldability, physical molds are cut, parts are made, and you have them in your hand in days instead of months.

With Industry 4.0, we talk about on-demand manufacturing, one of the foundational elements of JIT. Like JIT, it says that rather than stocking excessive quantities of parts, you only order what will be needed for a given period of time. At the start, it's a process of informed trial and error, but the ultimate result is that you don't have to keep an entire warehouse filled with parts and endure the attendant storage costs. It also means that you reduce waste should you need to change your product, necessitating version 2.0 parts. You can make small changes to existing part designs, or even iterate new ones, without worrying about the need to reduce inventory of existing parts first, or worse, just throwing them away. This speaks to another Industry 4.0 principle: sustainability and environmental sensitivity.

Digital manufacturers have discovered the benefits of merging their regional facilities with a global strategy, offering up the best of all worlds to their customers. Some take it a step further and work in partnership with a specialized network of approved manufacturers, offering all the benefits of a local JIT model with a comprehensive international sensibility that maintains high levels of speed, reliability, and quality. This may prove to be the wave of the future, and it's cresting right now.



Does the U.S. Need to Reduce Its Dependence on Taiwan for Semiconductors?

By Robert J. Bowman Editor-in-Chief, SupplyChainBrain

Are U.S. high-tech manufacturers dangerously dependent on Taiwan as a source of semiconductors?

The raw numbers suggest that the answer is yes. Taiwan accounts for around 65% of global semiconductor supply, and nearly 90% of the smallest and most sophisticated chips. And one Taiwan-based semiconductor producer, Taiwan Semiconductor Manufacturing Co. (TSMC), is alone responsible for 55% of the world's supply. That's a more dominant position than OPEC commands in oil production.

The U.S. has only recently begun to wake up to the fragility of its semiconductor supply chain. The tariffs wars with China were the first sign of trouble, followed by the destabilization of multiple economies by Russia's invasion of Ukraine, and the surge in demand for cars, video games and other high-tech products in the wake of the COVID-19 pandemic.

The CHIPS and Science Act, proposed by the Biden Administration and enacted into law in August, is intended to bolster U.S. domestic research, development and production of semiconductors. And efforts by private industry toward that goal are already underway. Recently announced ventures include a $40 billion plan by Micron to build memory manufacturing in the U.S., extension of a partnership between Global Foundries and Qualcomm for domestic semiconductor production, and similar plans by Intel, Texas Instruments, Samsung Foundry and even TSMC, which recently completed construction of a $12 billion manufacturing facility in Phoenix, Arizona.

Don't expect the balance of power in global chip production to alter significantly anytime soon, however. "Taiwan is and will remain, as far as we can tell, one of the leading producers of chips in the world," says Anthony Rapa, partner and lead of the National Security Team of Blank Rome LLP. "For that reason, Taiwan continues to be viewed as a global crown jewel of semiconductor production."

Even with passage of the CHIPS Act, there's a way in which the U.S. doesn't want to jeopardize its dependence on Taiwan. The Biden Administration is reportedly considering the imposition of further controls on exports of certain high-tech products, including advanced computing chips, to China. To do that successfully, Rapa says, it needs "local compliance and cooperation around the world, including in Taiwan."

"Over the last few years," Rapa says, "the role of Taiwan has been very important in terms of complying with U.S. export-control laws. It matches up with U.S. national security priorities vis-a-via China."

For its part, Taiwan seems eager to retain strong trade and production ties with the West. In September, Taiwan president Tsai Ing-wen said she looks forward to producing "democracy chips" in partnership with the U.S.

"In the face of authoritarian expansionism and the challenges of the post-pandemic era, Taiwan seeks to bolster cooperation with the United States in the semiconductor and other high-tech industries," Tsai said.

Can the U.S. simultaneously restrict high-tech exports to China while sharing sensitive intellectual property with Taiwan? "Taiwan is treated differently in terms of licensing requirements," says Matthew Thomas, a partner with Blank Rome. For the moment, there doesn't seem to be much concern that advanced technology deployed in Taiwan would leak to mainland China, despite the fact that a number of companies in Taiwan have manufacturing facilities there. In such cases, Rapa says, U.S. export controls would cover more than the first port of call, to embrace the entire lifecycle of a product.

Rapa notes that the U.S. is attempting to put together a multilateral coalition for semiconductor production — a so-called Chips 4 Alliance that would include Japan, South Korea and Taiwan. But progress toward that end has been slow, with private companies based in those countries unwilling to share trade secrets with giant TSMC, let alone American manufacturers that might be keen on ramping up domestic production of semiconductors. The prospective members of such a club are also worried about alienating China, on which they depend for a broad range of critical raw materials.

Any major shift in semiconductor sourcing patterns will take time. In the short term, Thomas says, U.S. manufacturers can only diversify supply as much as possible, to lessen the potential impact of a disruption in Taiwanese factories.

What producers seem not to be overly worried about right now is China invading Taiwan, and bringing global high-tech production to a standstill. "I don't know if I subscribe to the thesis that the situation at this moment is especially volatile," Thomas says. "Talking to people in Taiwan, we didn't hear from anyone a sense of extraordinary alarm."

Rapa concurs. "I'm not aware of any sort of blaring sense of urgency from a national security perspective that we have to immediately diversify away from Taiwan, expect in the sense that generally speaking, the U.S. wants to bolster its domestic industry and have a secure supply chain when it comes to semiconductors."

Still, with all of the crises that have plagued supply chains over the past three years, high-tech manufacturers can't afford to be complacent. Rapa believe those events have indeed served as a wakeup call about the fragility of supply lines. "There's an across-the-board awareness regarding the need to have [both] domestic and globally diversified supply chains," he says.

Are the U.S. and Europe on Different Economic Trajectories? The Cost of Energy Is the Key

By Helen Atkinson Managing Editor, SupplyChainBrain

Citizens of both the U.S. and Europe are complaining about high energy prices to the point of political consequences and even civil unrest. There's no mistaking a growing impact on supply chains — including increased costs in transportation, but also in manufacturing, which relies on oodles of fossil fuels and other forms of energy. Since man first harnessed the power of fire, fuel prices have affected everything. They're certainly responsible for the lion's share of current inflation rises across the globe. It's tempting to think we're all in the same boat.

But don't be fooled — these two giants of the world economy may well be on very different economic paths, and the key is the price of energy. In short, the U.S. has secure access to cheap energy and Europe does not.

Right now, a gallon of gasoline in the U.S. is hovering around $4 per (U.S.) gallon, compared with just under $7 per gallon in the U.K. (let's pretend the U.K. is in Europe for the duration of this article) and up to $8 in Northern European countries such as Denmark. Domestic electricity charges in Europe, from whatever source, show an even greater disparity. The household cost for a kilowatt-hour (kWh) in the U.S. is currently just over $0.16, and $0.32 in Spain. A reporter for the New York Times living in Belgium remarked during a podcast October 24 that her heating bill had increased three-fold over the last year.

While the cost of natural gas in

Europe has fallen temporarily — mostly because of a loophole in sanctions that allows the import of (frozen) liquefied natural gas (LNG) from Russia — the prospects for Europe are grim. Led by Germany, which signed off on the ill-advised Nordstream I and II projects that made it critically dependent on Russia for affordable natural gas supplies, European nations have essentially abandoned the idea of being energy independent. Hydro-electric and wind energy projects just don't fulfill their energy needs, and most countries abandoned nuclear power more than a decade ago.

The U.S., by contrast, is energy-rich, almost to the point of independence. Not only does it have a fulsome domestic supply of natural gas (albeit obtained through environmentally questionable means such as fracking); it also imports the majority of its gasoline from nowhere near politically dodgy allies such as Russia or even the Middle East. As of 2021, Canada provided 51% of U.S. gross total petroleum imports and 62% of gross crude oil imports. Next up are Mexico, at 8%, Russia at 8%, and Saudi Arabia at 5%. Most importantly, the U.S. is home to a huge capacity to refine crude oil into petroleum. In fact, the United States was a total petroleum net exporter in 2020 and 2021, according to the U.S. Energy Information Administration. That gives it extra leverage in the world energy market.

It is therefore perhaps no surprise that historian Tom Holland argued during a recent episode of The Rest is History podcast on the precipitous fall of short-lived U.K. prime minister Liz Truss, that Europe and the U.S. are about to pull apart, economically, in a dramatic way. He reflected that, when the global economy became centered on oil rather than coal, the whole picture changed. Oil overtook coal to become the world's largest energy source in 1964, with oil-rich nations such as Saudi Arabia emerging as the power brokers. But — the odd hiccup aside — international oil markets have been relatively peaceable up until now, masking Europe's weakness. Furthermore, natural gas is now a major source of energy, and Russia — rapidly becoming a trading pariah – is still the king of that resource.

Holland's co-host, Dominic Sandbrook, speculated that Western Europe would be "even more at the receiving end of globalization than in the 1970s and 1980s, and that communities in Britain that have become very dependent on foreign investment or on cheap manufacturing abroad… are going to face some pretty tough winters with energy becoming more expensive."

"Essentially, it is more expensive for Europeans to make things," Holland said, "because our energy is more expensive than it is for Russia or the United States. And we're definitely back in that situation now."

This observation should send a chill down the spine of industry leaders who rely on European manufacturing. Already, Volkswagen announced in September it is exploring ways to help its broad supplier network in Europe to counter a shortage in natural gas, including making more parts locally and shifting manufacturing capacity. At the same time, Mercedes-Benz said it has been working to identify Germany-based suppliers that would be at risk in a gas-rationing scenario and is in talks with them about shifting production to locations outside of Germany.

"Is there a risk now, not just for Britain, but for the whole of Europe, that we're going to go through a process of de-industrialization bred by the brute fact that we have less cheap energy than, say, the Americans do?" Holland asked.

"The United States is in a good position, because it's energy rich, and its energy is cheap. Ours is very expensive," Holland continued. "Conventionally, we like to think that all the West is in it together, that what happens in America is basically reflected in Europe. But… America and Europe may be going on radically different parabolas. If you have cheap energy… then your economy will grow. If you don't, it will decline."

Latin America's Prospects for Trade and Logistics Development

By Robert J. Bowman Editor-in-Chief, SupplyChainBrain

Like all major regions of the world, Latin America is struggling to emerge from the shadow of the pandemic. But according to one official with the Inter-American Development Bank (IDB), its long-term prospects for trade and logistics development are strong.

The future of Latin American nations varies widely, of course, bound up in geography, history, political systems and general economic conditions. Some are chronically impoverished, ruled by a series of authoritarian governments or racked by triple-digit inflation. Others are economically stable or growing. An accurate portrait of the region must take into account these individual differences.

Topping the list of most promising countries for trade and logistics development is Mexico, according to Jaime Granados. He heads up the Trade and Investment Division of IDB's Integration and Trade Sector, and has served as coordinator of the bank's trade and integration hub for Central America, Mexico and the Dominican Republic. Granados says Mexico is especially attractive as a source of investment and growth due to its low labor cost, existing industrial base, political stability and participation in international trade pacts, including the United States-Mexico-Canada Agreement (USMCA).

In recent months, Mexico has been the source of heightened attention as U.S. manufacturers look to shift some production away from China and other parts of Asia. The move to near-shoring is in response to rising Chinese factory wages, persistent trade tensions between China and the U.S., and a desire to lessen the risk of supply chain disruptions by diversifying sourcing and producing goods closer to

end markets. And given Mexico's existing infrastructure of maquiladoras — companies that can manufacture and export goods to the U.S. duty-free — the shift is relatively easy to achieve.

Mexico has ambitious plans to expand its transportation and distribution infrastructure, including the overhaul of two major ports, improvements to the rails and creation of 10 industrial development zones. Included on the agenda is further expansion of the Port of Lázaro Cárdenas, Mexico's largest seaport. But aspirations alone won't attract more international business. "Mexico has to deliver on these projects," Granados says.

Mexico is far from Latin America's only prospective success story. Granados cites Costa Rica and the Dominican Republic as additional areas of future promise. The latter acts as a logistics hub for IKEA, distributing product to the U.S., Caribbean and throughout South America. A modern network of ports and highways, as well as proximity to the Panama Canal, offer benefits that offset the logistical disadvantages of an island nation.

Multilateral trade agreements could serve as an engine of further development. USMCA is likely to be the biggest generator of growth for Mexico for years to come, given its long history and origins in the North American Free Trade Agreement (NAFTA). Then there's Mercosur, covering Argentina, Brazil, Paraguay and Uruguay (with a fifth member, Venezuela, suspended since the end of 2016 for failing to adhere to democratic principles). That group's prospects are less clear at the moment, given tensions between the four full members and the difficulties of hammering out a final trade deal with the European Union. "It's taking a lot of time to refine and define the legal text," Granados says. "I'm not sure when there's going to be a trade agreement in place."

Similar questions attend efforts to unite Caribbean nations in a single trading bloc. The Caribbean Basin Trade Partnership Act (CBTPA) grants duty-free access to the U.S. market to Barbados, Belize, Curaçao, Haiti, Jamaica, Saint Lucia, and Trinidad and Tobago. The region's nations also maintain trade agreements between themselves and with the EU and Central America, but such efforts "are slowing down a bit," says Granados. "They don't show the same dynamism as trade agreements between other regional countries and the U.S." Logistics costs remain a concern, and progress is hampered by changing administrations and differences among governments on how to move forward.

As for particular industries that stand to benefit most from regional trade and logistics development, Latin American countries are closely following the demands of U.S. markets, Granados says. That means developing capacity for microchips, renewable energy sources, pharmaceuticals, medical devices, textiles, automobiles and batteries, among other categories. In addition, knowledge-based and professional services could prove to be a continuing mainstay for the economies of Uruguay, Chile, Colombia, Costa Rica, Mexico and Brazil.

Of particular promise is the Alliance for Development in Democracy, launched in 2021 by the presidents of Panama, Costa Rica and the Dominican Republic. Among the group's priorities, Granados says, is integrating supply chains with companies in the U.S.

None of these changes will happen overnight. Any major infrastructure project is likely to take at least five years to complete, with success predicated on both government and private-sector financing. Still, trade is expected to be key to economic growth throughout Latin America for years come.

Granados remains optimistic that the vision will be realized. "While it's not going to save everybody from economic difficulties," he says, "it could be part of an effort to take advantage of current opportunities."

Three Post-Pandemic Actions for Repairing Global Supply Chains

By Geoff Coltman Vice President, Catena Solutions

Businesses had to make drastic in-flight adjustments to their supply chain strategies to navigate disruptions over the past three years. Now, as the world begins to regain a sense of normalcy, it's time for organizations to holistically reexamine their supply chains, to ensure they're equipped to meet the demands of an ever-evolving business landscape.

Following are three areas on which companies and suppliers must focus to repair and innovate their supply chains.

Organizational design and change management. Companies are accelerating their transformation initiatives in an attempt to address vulnerabilities brought to light by the COVID-19 pandemic. Yet many are struggling with strategy and implementation as they deal with both micro and macro supply chain disruptions.

That's because transformation is a people challenge as much as one of technology, and most companies lack the internal talent and bandwidth to evolve with market conditions. Half of change initiatives fail, and only 34% are a clear success, according to Gartner. It's a stark reality, but a fate that companies can avoid by aligning structures, practices, people, and processes, and promoting effective communications of change.

To succeed, leaders must make sure their transformation initiatives don't curtail worker productivity and engagement. They must approach change management as a comprehensive and continuous process, one that stresses worker empowerment in accepting and driving ongoing change.

One often overlooked but essential step in any supply chain

transformation is the creation of an end-to-end plan. It requires investment in experts in transformation who are able to outline all the implications, understand and explain the risks, and anticipate potential problems. Once the plan is drawn up, it's the responsibility of leaders not only to embrace and enact it, but also to understand and communicate the value of change management starting at the kickoff. They must extend the rollout and integration to workers in all business units, geographical locations and subsidiaries, as well as to partners and customers.

Leaders must also maintain open lines of communication to ensure that workers are informed of developments and outcomes, both positive and negative.

Supply chain data and analytics. Global supply chains came to an abrupt halt during the pandemic due to a number of bottlenecks. Going forward, data and analytics can help supply chain managers overcome such challenges and maintain a competitive edge. They can determine optimal inventory levels, sense demand and stay responsive to it, improve visibility, and keep the supply chain moving. Consider all the associated applications. There are systems for procurement, warehouse efficiency and logistics, to name a few. Each day, the software generates large volumes of data that can be used to achieve insights and enhance supply chain performance. These insights, usually in the form of dashboards and reports, are highly valuable because they give leaders the information they need to make decisions.

Indeed, a recent study by PwC showed that data-driven companies are three times more likely to achieve significant improvements in decision-making than those that rely less on data. In today's world, where 70% of supply chain leaders now report greater and more frequent disruptions, it's more important than ever to have insights in hand to guide strategy.

Supply chain analytics tools reveal crucial patterns and provide the knowledge that enables organizations to see risks before they arrive, avoid disruptions and save time and money. This is more critical now than ever. In a survey by Gartner, 72% of executives said the impact of disruptions to their supply chain has grown in the last three years. With reliable data and the insights that can be mined with analytics, companies can anticipate disruptions and draw up a response to address them.

Lastly, supply chain analytics can boost efficiency and reduce costs. With real-time data analytics, companies can identify inefficiencies and introduce changes to move products more seamlessly, streamline routes, cut fuel use, improve warehouse flows, minimize delays and more. With analytics, organizations can also look at expenses across an entire network, decide where to trim costs and where to access new opportunities. Analytics can indicate moments at which a company can tweak prices to increase profit and suggest changes in suppliers to reduce expenses.

Strategic supply chain finance and global sourcing. Inflation, changing consumer spending habits and challenges posed by global suppliers have made profitable business more difficult to achieve. Restructuring finance teams and implementing new supplier finance strategies can help. This, combined with new global sourcing strategies, can enable the business to reach its goals.

With a global sourcing strategy, an organization can better select sourcing destinations. Begin by doing market research to get an accurate picture of market conditions, and assess the ability of current and potential suppliers to deliver the product you need.

When you make sourcing decisions, take a team approach. Build a cross-functional team from sourcing, operations, finance and other departments who are directly involved with the target product. With a sound sourcing strategy and process, you'll significantly improve your company's chance of success.

The pandemic was a crisis for supply chains. But in every crisis, there's opportunity, and now is the time for organizations to transform their supply chains with digital tools like data analytics. Those that do will be better prepared to handle the next disruption the future throws at us.

What to Do When Volatility Is Normal

By Helen Atkinson Managing Editor, SupplyChainBrain

A wildly unpredictable demand pattern has been the nightmare that came true for many businesses in the past few years, especially retailers involved in e-commerce. Many have struggled to cope and even more have hoped the situation will go back to "normal."

Whether we'll be looking back in ten years on the pandemic years with rueful smiles, or noting it as the beginning of a new era of consumer habits remains to be seen. But in the meantime, it's worth adjusting supply chain and fulfillment strategies to handle volatility. In theory, it can even present benefits. If that sounds crazy, read on.

Take it from a company that doesn't just cope with volatility; it thrives on it – Uncommon Goods. A quick search will show you that this is the e-commerce site where consumers buy "creative, original gifts and experiences." In other words, goods that are more whimsy than utility. Gifts can generate demand spikes of 30X or more.

"We've been experiencing volatility for years," says Rob Carucci, Head of Operations at Uncommon Goods. "One of the interesting challenges for Uncommon Goods is that it's a very seasonal business to begin with."

Uncommon Goods can experience sales spikes of during its typical six-week peak period of up to ten times the average volumes in Q1 and Q3, and typically does two-thirds of its business in Q4. "So we're accustomed to that ramp up," he says, emphasizing that that absolutely does not mean they're filing their nails for the rest of the year. "Like the Macy's Thanksgiving parade, we start planning for the next one the day after the last one."

Getting the Workforce Right
Preparing for that wild ride through the fourth quarter is significantly about ensuring adequate staffing levels and skill sets, Carucci says. The recruitment effort is sizeable, and it has involved building strong partnerships in the local community in Brooklyn, but also with its 3PL partners, including ITS.

In a notable strategic move, Uncommon Goods offers workers who are doing everyday fulfillment tasks the opportunity to become front-line managers and supervisors of the extra workers that come in temporarily. "It's a great opportunity for them to develop. For seven months of the year, they're pickers and packers. Then, in Q4, they get removed from those positions, paid extra, and perform training of new team members. They're doing performance management and even admin work, and we provide training to them throughout the year in a variety of factors, so they grow into those roles for three months," Carucci says.

All this leads to great staff retention rates, Carucci says — something that's top of many facility managers list of priorities right now. It's a clear signal that pay alone is not enough. "We pay well, but a lot of people, after X years, they want to do other things," says Carucci. In a year where there's growth, Uncommon Goods is naturally able to offer that. But, as noted, most years are volatile. "So we also have intern programs, where they can go work in tech or finance, and learn other skills." Carucci's approach is to also keep an eye on building diversity into tasks, so that workers are not just picking and packing, but can move over to inventory control, for example.

"We ask: How do you make work a little more diverse? So even if they're not moving up, they're broadening their experience," says Carucci.

Forecast Well, Forecast Often
Apart from building and maintaining a satisfied workforce, Carucci says forecasting is key, even though volatility usually means unpredictability. "One of the lessons we've learned as a company is, if you're going to forecast correctly, it's important to forecast often."

Carucci says Uncommon Goods has been able to make useful data comparisons over the last couple of years, identifying year-over-year trends. "We know when the catalog drops. We can predict to the day how many are arriving in the home, so we can adjust predictive sales to that."

Another tool for forecasting sales is to get very granular about the data from prior sales, Carucci says. The company measures data such as units per order and revenue per item.

"We're constantly updating item-level sales velocity, and we adjust that to see where we're placing things in the warehouse."

All the same, volatility means building in some redundancy in operational capabilities. "In e-commerce, you should be building additional capacity. It's like insurance," says Carucci. "You have to have enough to flex to manage additional sales, because giving up that revenue at this time of year is too much to risk. It's a good problem to have!"

Carucci says it helps to have partners who can help the company flex, such as ITS. The ITS team has worked on initiatives to reduce delivery time, increased inbound vendor efficiency and, of course, work with the massive swings experienced by the retailer. To enable two-day delivery in the lower 48, Uncommon Goods and ITS opened a west coast distribution center in Reno, Nevada. Part of the expansion included a technology integration that sends customers an immediate notification at shipment through final delivery.

Automation Not the Answer?
Perhaps surprisingly, Uncommon Goods has not invested heavily in automation. Part of the reason is that the company's fulfillment center in Brooklyn is in the Brooklyn Army Terminal, which served as the largest military supply base in the U.S. through WWII, and is more than 100 years old. The company has discussed putting up walls and zone picking, and they do have some automated air-seal packaging equipment. They're also looking to build out zone picking and a put wall as a secondary sortation location. "But robotic picking doesn't really lend itself to our product mix, which is seven thousand SKUs and 1.2 million units of inventory at this time of year. We don't have the space."

What's Carucci's advice for retailers who are new to volatility? "We've noticed it's important to look at sales both pre- and post-pandemic, because there's more competition now," Carucci says. "We recognize that some of the growth last year might have been an aberration." In terms of fulfillment, he recommends re-negotiating contracts now with transportation and fulfillment providers, because there's been a lot of movement in last 12 months. "There are more favorable conditions than a year ago," he advises.

How Procurement Can Help Fight Modern Slavery in Supply Chains

By Valerie Touchon Chief Impact Officer, EcoVadis

Although globalization has reduced poverty in many regions, there's another scourge that's still thriving across sprawling corporate supply chains.

Despite increased global attention, resources and regulations, 10 million more people were living in slavery conditions in 2021 than in 2016, according to International Labour Organization (ILO) estimates. Of the 50 million people worldwide living in slavery — owned by another human being — in 2021, 28 million are trapped in forced labor. Moreover, it often surprises many that forced labor is highly present in developed economies: More than 52% of all forced labor can be found in upper-middle-income or high-income countries.

Procurement in the Risk Spotlight — Again

The ILO stresses the importance of supply chain due diligence to reverse this trend. With over 86% of forced labor occurring in the private sector, the spotlight is clearly on corporate procurement and supply chain teams, who are faced with a daunting due-diligence task and urgent moral imperative.

Although labor rights abuses in industries such as textiles or seafood have high consumer visibility, these conditions are present in construction, electronics, minerals and mining, and many others. Companies seeking to manage these risks urgently need to start incorporating labor rights due diligence and protections into procurement actions throughout their supply chain. The challenge is to do so while visibility and leverage over labor practices decrease with each additional tier. Some organizations can have tens of thousands of suppliers, and identifying the higher-risk suppliers can be challenging. In identified high-risk categories and regions, it's crucial that those suppliers also have their own policies and actions to cascade these practices down,

especially for actions such as outsourced labor recruitment.

Insights from the sixth edition of EcoVadis' Business Sustainability Risk & Performance Index give a glimpse into the depth of this challenge across global supply chains: Just 11% of companies in the EcoVadis Network conducted supplier environmental and social risk assessments, and only 5% performed child and forced labor internal risk assessments in 2021.

In addition to the moral urgency of safeguarding against human rights abuses, businesses face a range of risks from inaction on supply chain due diligence, including legal (court injunctions, product import bans and civil liability claims), reputational (loss of customer loyalty and trust), and financial (interruption of supply and related revenue losses, and ultimately the "license to operate" in a region or industry).

Further, with new and evolving regulations like the German Supply Chain Act and the EU's directive on corporate due diligence, it will soon become a legal requirement for organizations to include strategies to ensure that human rights due diligence adequately identifies and mitigates risk in their operations and supply chains.

Taking Action

Companies shouldn't wait to deploy their due-diligence strategies until legislation impacts them. They can start or accelerate their efforts, building internal understanding and a capacity to implement a foundation for monitoring and managing risks. A great starting point is international policy frameworks and guidelines such as the UN Guiding Principles on Business and Human Rights.

These strong frameworks for addressing human rights due diligence require investment, but can help organizations comply with new and evolving regulations. The elements of this framework include:

Establishing policies and mapping risks to inform strategy.

- Establish or update your sustainable purchasing policy, as well as supplier code of conduct, to cover modern slavery and forced-labor risks.
- Conduct risk mapping using category- and country-specific irisk data on human rights, to gain visibility on suppliers who may have high exposure potential to issues such as forced labor and related issues, and to help prioritize next steps in due-diligence assessment and monitoring.
- Train buyers on awareness and how to identify social and environmental risks and issues in their supply base.

Encouraging supplier engagement and transparency.

- Ensure that supplier sustainability assessments and ratings gather specific information on supplier labor practices for all regions and categories with material risks. It's also essential to assess how they manage their own suppliers through multiple tiers, especially contract labor.
- Integrate clauses into supplier contracts that require these engagements.
- For suppliers that fail to engage or are identified with poor practices or low maturity in managing labor risks, deploy a second-level effort such as on-site audits of environmental or social compliance.

Engaging in ongoing risk mitigation and monitoring to ensure sustained commitment.

- Conduct worker voice surveys or other advanced supplier monitoring practices, such as second-tier audits.
- Implement training and capacity building: Deploy tools such as corrective actions and training to work with suppliers to improve labor practices based on results of the assessment process.
- Implement recognition and incentive programs for improvement and good practices (such as supplier awards, preferred supplier program and access to requests for proposal).
- Engage in remediation efforts where incidents are discovered.

Start With a Holistic Approach

Modern slavery and human rights due diligence should be integrated as part of a broader sustainable procurement program that encompasses environmental and ethical topics. This creates efficiencies not only for your organization — by avoiding silos, getting data to flow more easily, and increasing understanding of correlated risks — but also for suppliers, which increases the incentive to participate.

Joining an industry or multi-stakeholder initiative can be a great accelerator: Benefit from other companies' collective experiences while increasing leverage to get suppliers to participate in a single unified program.

None of this will happen overnight. Adoption of a sustainable procurement program requires time, diligence and a significant amount of upfront investment. It's a journey, never an endgame.

Toss Out the Playbooks: A Thesis for International Freight in 2023

By Jack Freeman Partner, PeakSpan Capital

Back in 2021, PeakSpan published a blog post entitled "What Billy Beane Can Teach Us About E-Commerce Logistics." We used the example of analytics in baseball to dramatize the importance of nailing every node in the supply chain, and ensuring that brands maintain control over their customer relationships in the age of Amazon.com.

While we continue to be bullish on e-commerce logistics — we expect online sales to reach $6 trillion in 2023, accounting for 22% of total retail sales — this year we're zooming out to make a major bet on the digitization of international freight. And the sports analogy that we've chosen is baskiceball.

Born in St. Cloud, Minnesota and described as a mashup of "basketball, ice skating and beer," baskiceball is an extremely violent sport. It's often described as having no rules, with competitors simply "wailing on each other."

For those in the logistics industry, the comparison surely resonates. The common sentiment today: "Uncertainty is the new normal for international freight." Toss out the predictions, rulebooks and playbooks; as with baskiceball, all you can do is get out there and compete.

Technology offers endless opportunities to optimize and fine-tune the supply chain. That's the primary reason we're betting on international freight: the complexity is high, and volatility and variability are even higher. We see this as a recipe for technology to step in.

That said, the industry's current level of digitization and use of technology remains extremely low. Despite $26 billion being invested in logistics up until 2019, paper is still widely used as part of the procurement, sales and operations processes in international freight.

Following are our top ten themes which we feel make the case for further investment and digitization in the international freight technology sector.

Market size: a $2 trillion+ opportunity. Freightos estimates a $1.5 trillion market opportunity in ocean and air freight alone. When you add in revenue from ports, intermodal rail and drayage trucking, you quickly get to a $2 trillion market. From a technology perspective, even a modest 2% spent on technology represents a $40 billion software opportunity. However, we would argue that over time, this is really a $100 billion technology opportunity.

Volume and velocity: an optimization dream. On average, cargo changes hands 20 times and touches 20 different companies before it reaches the receiver's doorstop. One shipper told us that it will often do one million loads per year — nearly 20,000 per week — across 40 locations. To keep that volume moving, this particular shipper had a team of 40 procurement professionals working strictly on logistics. Given that much of this activity is done manually, that's a scary reality for most.

High fragmentation with multiple constituent groups to sell into. The international logistics landscape is highly fragmented, with 400,000 shippers and more than 100,000 freight forwarders or non-vessel operating common carriers. These figures can be further sliced by type of shipment, specialty shipping requirements and trade lanes. Add to this thousands of drayage trucking companies, railroads and port operators, all needing software.

Infrastructure is also highly fragmented. There are around 55,000 merchant ships trading internationally, including 15,000 for general cargo, 12,000 for bulk, 7,000 for crude oil, 7,000 for roll-on/roll/off vehicles, 6,000 for chemicals, 5,000 for containerized freight and 2,000 for liquefied natural gas tankers. There are 835 active ports around the world and more than 360 commercial ports in the U.S. alone. These fragmented ecosystem participants are all in dire need of software that's purpose-built for their role within international logistics. While

all players are investing heavily in tech, many have been stuck with siloed solutions that operate independently. What's needed to make supply chains more efficient is an investment in systems that talk to each other — and the people to plan it all out. Sadly, we're woefully behind where we need to be, and most expect several years to elapse before we're able to build more and bigger ports. Once again, there's an opportunity for technology to step in.

Most supply chains include an international voyage. Ninety-five percent of the world's trade is carried in ocean containers. You can't provide an excellent and transparent customer journey if you lack visibility into where the goods are, when they're due to arrive, and the potential for disruption or delay.

Shippers are shifting strategies, to control more of their supply chains. Amid massive waves of disruption, advances in technologies and a desire to provide a better customer experience, many shippers are pushing to own more of their international supply chain strategy. They're turning to freight forwarders to complete the tactical movement of goods, leaving higher-level strategy to their own supply chain teams. With so much inefficiency plaguing international freight, expect to see these constituents duking it out to capture more margin and savings.

Disruptions, disruptions and more disruptions. As the events of the last three years have demonstrated, supply chain disruptions are unpredictable. We're bearish on mankind learning to foresee these events anytime soon, but are bullish on the role that technology can play in help shippers to navigate choppy waters.

A new year's resolution: get off the paper! An average package of shipping documents includes 50 sheets of physical paper, and can sometimes be exchanged among as many as 30 stakeholders. These documents provide details on cargo, financing and licensing. They include bills of lading, carrier and authority certificates, import/export licenses and vessel-sharing agreements. For BOLs alone, the Digital Container Shipping Association estimates that a minimum of 16 million original documents are issued per year, costing the industry around $11 billion. And just 1% of those documents are electronic today.

A massive payments opportunity. On a recent logistics podcast: a shipper and carrier were discussing invoice accuracy. The shipper was complaining about being overcharged. The carrier was defensive, claiming that it was "nearly" spot-on with its billing. When shipper disclosed that on average, invoices were off by 14%, the carrier responded that "We're only off by 10%." When overcharging by 10% is considered acceptable practice, we can safely say that a lot of work needs to be done in the freight payments space.

The global freight-audit market alone is projected to reach $30 billion by 2030, and that's just one sub-sector of freight payments. There are so many ways to play this space, including simply digitizing B2B payments between shippers and carriers/forwarders or between forwarders and carriers — processes that are still quite manual. Another angle is fintech, which expands the total addressable market beyond the value of the cargo itself. Forecasts suggest the global trade finance market will reach $11 trillion by 2026.

The forgotten middle child: drayage. We include drayage in our "big bet on international freight," and see this segment of the supply chain as another area primed for continued digitization and disruption. Early applications have focused on connecting supply and demand, given the highly fragmented nature of drayage trucking. However, we also see plenty of software-as-a-service (SaaS) applications that might target carriers or the ports themselves. Whether you're a shipper or forwarder, nailing the container handoff from port to chassis can be one of the gnarliest and most inefficient processes. We still see this market as being in the early innings, with much digitization and collaboration needed across multiple constituents, including ports, carriers, shippers and Customs.

The size and importance of the international freight market is no newfound phenomenon, and we must recognize the disruptive nature of 2021 and 2022. Will supply chain executives need to continue honing their baskiceball skills in 2023? Or can technology help improve things? We sense the tide turning: the time is right for international freight digitization to accelerate.

Five Crucial Supply Chain Due Diligence Activities

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Trade compliance has always been a dense thicket to navigate. The fact that one global supply chain software provider processed nearly 50 million regulatory trade updates to its trade content database in 2021 is a good example of how tricky trade compliance can be without leveraging third-party expertise. International trade relationships are rife with hidden risks that can completely up-end a company because of expensive fines, imprisonment, revocation of privileges, and brand tarnish.

Every company should look at every entity with whom they are transacting, whether they're individuals or vendor companies, and ask: Are we doing business with persons or entities we're not supposed to? Whether they are contractors, suppliers, employees of providers, the list is long.

This is a step above traditional trade compliance. There's a whole additional layer of data companies should be examining. The good news is there's a lot of information out there. If an entity refuses to share the information you need, you can insist or stop doing business with them. Otherwise, you're risking your company's reputation.

Here are five areas to focus on.

1 Restricted parties.

The only way to ensure you're not doing business with restricted parties is by actively screening. One of the challenges is that the number of entities added to the many international lists of restricted parties — such as the U.S. Department of Commerce's Bureau of Industry and Security's (BIS) list of "parties of concern" for exports from the U.S. — is expanding daily. There are an overwhelming number of new rules in place that weren't there even six months ago. Another challenge is that most companies are trained to screen for export transactions only and don't consider the implications for imports, for example, regarding issues of forced labor in China and other countries.

Particularly in light of the supply chain disruptions of the last few years, where many U.S. companies have onboarded new suppliers, often rapidly, it's important to remember that you're responsible for who and what you're bringing into your supply chain.

2 Financial transactions.

Cryptocurrency has dominated the headlines for some time, but many other, more old-fashioned ways of laundering money remain. Again, active screening is essential because a typical supply chain involves far too many parties for it to remain a matter of trust. The U.S. Customs and Border Patrol (CBP) and its fellow entities in other countries are rapidly moving towards scrutinizing supply chains for signs of money laundering and are using highly advanced technology to monitor transactions at a fine-grain level.

At a recent CBP-conducted industry forum, customs officials stated they would like to see every order placed via an online platform. That would make a lot of supplier, customer, shipment, sourcing and other data available. As e-commerce becomes the norm for B2B and B2C transactions, the amount of data available will allow the authorities to be far more diligent and expansive in the future.

3 The goods moved — dual-use or sanctioned?

This is typically an export-oriented concern. The notable shipment of the aluminum tubes destined for Iran that might have been intended for use in the country's nuclear program, ending with a 20-year prison sentence for the man who tried to circumvent the law, is just one example of how critical it is to keep a close eye on things. Many companies are still relying on managing their export-screening process manually as a one-time task. They have a contract, they screen once, and that's it — they've identified a supplier as approved, even though people at

that supplier might change. That is not a workable strategy.

And the screening process must be strictly adhered to, allowing no workarounds. For example, it's no use if the sales teams are in compliance, but customer service is willing to comply with a request from a customer to make last-minute changes to the destination location. The consistency of the screening process, including how your staff is trained and managed, is important.

4 Will the shipment go to a location in proximity of a conflict zone?

It's absolutely critical to be aware of geographical proximity when shipping or doing business with third parties. For example, you must assess the destination of a shipment for whether it is going close to a conflict zone or a country with denied status, such as Iran or North Korea. If the recipient is just a few miles over the border, it could well be the goods will end up there, despite your intention to comply with the law.

Again, imports need to be scrutinized as well as exports, particularly for forced labor. Get out a map and look at the physical location of your supplier. If they're near the border of China's Xinjian region, forced labor could be likely. The same can be said about many regions, so proximity search capabilities are important to use early in the supply chain planning phase.

5 Are your procurement, HR and security teams also screening?

Companies with the best compliance risk management take a holistic, thorough view, including not just procurement processes and exports but human resources (HR) and IT security. Those things should all get wrapped into the overall risk management profile. For example, you may be doing background checks in screening new hires or business partners, but searching criminal records and credit scores is no longer sufficient.

Thinking back to 9-11, it seems incredible that 14 terrorists came into the country under their own names. In a world where contractors, especially skilled IT experts, are much in demand and hard to find, HR screening is just as important as the other areas of the business. It's a problem most companies are not fully addressing.

There's an identifiable need for companies to expand the use of vigorous screening beyond immediate business partners. It's worth considering putting contractual obligations in place with business partners that stipulate they must perform screening themselves for everyone they do business with. And you need to follow up and check that they do.

Resource Link:
https://www.e2open.com/global-trade/

How e2open Can Help

E2open is a business-to-business provider of cloud-based, on-demand software for companies operating supply chains, especially in the computer, telecom and electronics systems, components and services industries. The company specializes in meticulously maintaining a database of trade compliance rules and helping customers navigate the constantly changing, complex compliance landscape for exports and imports. One major benefit of e2open's capabilities is that it allows companies to collate and analyze information from almost any system, harmonizing data and giving a comprehensive view of operations at a level of technological sophistication, including the deployment of artificial intelligence (AI) that's beyond most companies' resources.

Suzanne Richer, director of e2open's Global Trade Academy, says companies have a fantastic opportunity to leverage the new capabilities offered by technology, especially AI. "I think we're at a perfect congruence of technology and the screening capabilities needed to automate due diligence," she says. "Now, advanced technology can monitor not just bad actors but bad supply chains, for example, when a company is moving goods through third countries to circumvent laws and then moving them to the U.S."

In the end, technology will only get you so far, says Sung Choi, AVP, solutions consulting at e2open. "The largest problem is not a tech problem; it's about collecting the right info at the granularity you need for the tools to work," he says. "Sometimes people don't have the right data, so we tell them this is the information you need to have on hand. We're really good at knowing what our customer needs to check for."

A Smarter Warehouse Can Solve the Workforce Challenge

Sponsored by Lucas Systems

Optimization software provides a low-impact alternative option for boosting efficiency in the warehouse, helping workers do their jobs with less work and stress, all while delivering warehouse performance improvements. It streamlines workflow, generates analytic insights and, importantly, helps to minimize staff churn and attract the next gen labor force. Oh, and it also works well with robots.

Warehouse operators saw cause for optimism earlier this year as pandemic-related market volatility showed signs of easing. Industry acceptance of automation as a way to address surging demand with a finite workforce has been on the rise, with a growing number of operators shopping for robotics vendors and testing the water with small pilot projects.

The ground has shifted again since mid-year as inflation, Fed rate hikes and recession fears have begun to slow demand growth. Many warehouse expansion plans have since been put on hold, especially those involving large dollar investments in fixed conveyor or racking systems requiring lead times of two to three years to complete.

Yet, while demand may be slowing, it isn't going away. The dramatic shift to omnichannel commerce models, even for traditional B2B freight — and customer expectations for on-time, in-full delivery that come with them — is likely here to stay. An estimated 66% of warehouses are still manual operations running on legacy software, and their limitations are becoming glaringly obvious, especially during seasonal peaks and sudden surges. But having enough capacity, and people, to get the work done, remains a harsh reality as job postings go unanswered despite rising salary and benefit offers.

"The main complaint we hear is about the rapid turnover of people, even if you can find them," explains Kyle Franklin, a senior solution consultant with warehouse optimization software developer and consultancy Lucas Systems. "I worked with a customer that opened a brand-new warehouse in April, and they've already turned over their entire staff twice, including leadership. It's not just the hourly associates, pickers or forklift drivers, it's managers too, so you lose a lot of that knowledge transfer and understanding about processes."

A critical concern among operators is to maintain a stable baseline workforce, supported by technology that increases productivity and streamlines workflow to make warehouse floor work easier and less repetitive. From there, operators have greater flexibility to attract and retain workers with performance incentives and career paths with more rewarding work for high performers.

As they rethink their options, operators see a promising fallback solution in software-based optimization, while they wait to see where markets settle out.

Building for Maximum Flexibility

Orchestrating and optimizing workflow throughout the warehouse will be critical to competitive advantage in the future, especially given tight space and configuration constraints in dense urban areas, and expansion of regional DCs to include complex multi-level operations that accommodate traditional and B2C operations. In such scenarios, the need to optimize utilization of people and assets will only increase over time, to align performance and costs as demand fluctuates. Optimization is largely a function of software driven by artificial intelligence and machine learning, and supported in some cases, but not all, by physical robots.

Dramatic productivity gains can be realized by applying AI and machine learning to determine instantly from current and historic operations data the optimal path, method or sequence for filling an order or completing a work assignment in the warehouse.

AI-enabled optimization software retrieves and analyzes order, inventory and location data from a warehouse management or other system against a range of business variables — order priority, selection location, travel costs, and product attributes — to orchestrate optimal work assignments. Analytics can be configured to prioritize among customers, orders, time or cost to complete, like products, or to balance multiple considerations. An algorithm can

do this one order at a time or, as one example, it can create zones for handling similar products or typically fast-moving items, to increase pick density for filling multiple orders at once.

Initially configured mainly to optimize and automate picking, AI modules now also address the full range of operations, from receiving and loading, to putaway and replenishment, to slotting and sortation, to audit and labor planning. Further downstream, optimization modules now on the market manage tasks like cartonization of parcel freight to save on packing materials and freight charges, and palletization to fit more freight in a truckload for fewer trips and lower fuel costs. The ESG benefits from these activities also translate into consumer and employee loyalty.

System-wide data feeding into the WMS adds control tower-level visibility for managers to monitor system operations and performance, in order to make better, faster decisions about allocating people, assets and workflow efficiently.

Optimized Work is Also Easier

The primary benefit for employees is a reduction in travel time. A typical on-floor worker spends an average 38% of a shift walking or driving through the warehouse to complete tasks — often more time than on pick, put-away or replenishment activity. Optimization can reduce travel time by 15%-30% for case-pick-to-pallet operations, and up to 40% for B2C e-commerce picking. Less travel can also drive further benefits, including minimizing physical and mental stress for workers, enhancing safety and freeing workers to perform more high-value tasks.

The potential benefits are greater still when physical robotics are integrated with the software. Networked autonomous mobile robots (AMRs) and autonomous guided vehicles (AGVs) on tracks or magnetic strips embedded in the floor can navigate aisles more quickly, reducing travel-related stress; pickers can more easily assemble orders brought to them by conveyors or goods-to-person robotic shelf systems optimized by the software.

Initially configured mainly to optimize and automate picking, AI modules now also address the full range of operations, from receiving and loading, to putaway and replenishment, to slotting and sortation, to audit and labor planning.

Elsewhere in a facility, automated selection and put validation generates exceptions when the wrong items are taken from or put back into inventory, or when in-stock items aren't where they should be, to ensure accuracy. Dynamic slotting positions product for optimal facility velocity and picking efficiency. Workflow orchestration and path optimization allow faster frictionless movement of people, devices and inventory throughout the warehouse, simplifying work while increasing freight velocity.

Speech recognition and voice-directed applications, with wearable handsets and headsets, make onboarding and training simpler and faster, but also take friction out of the workflow with hands-free, eyes-free prompts and validation.

Lucas commissioned an independent survey of 500 warehouse workers earlier this year, leading to a June 2022 "Voice of the Worker" whitepaper, in order to understand worker attitudes about warehouse jobs and introduction of technology. Among the findings:

- 74% of workers plan to stay three years or more in their current jobs; 35% plan to stay five years or more.
- At the same time, more than half said they would very likely or almost certainly accept a pay cut to work for a company deploying more or better technology.
- Three in four workers said physical strain on the job — mainly from travel time in the warehouse — takes a larger toll than the mental strain, with overexertion a common complaint.
- Workers particularly value data-capture and scanning technology, conveyors, voice-directed tools with headsets, and all

technology that 1) helps them meet performance goals; 2) improves accuracy and minimizes errors; 3) makes the job less physically demanding; 4) makes the job site safer, and 5) makes the job more exciting.

- Sentiment about robots is mixed, with favorable attitudes about reduced travel time and enhanced performance, but concerns about 1) redundancy, 2) increased quotas and oversight, 3) lack of control, 4) added mental strain, and 5) safety.

These are generally heartening signs, suggesting a commitment to the job, and openness to technology that streamlines workflow, improves performance and, importantly, demonstrates consideration for frontline employees. Significantly, these same improvements also benefit operators with improved throughput and overall productivity, a more stable workforce, and cost savings from less onboarding and training related to churn, plus fewer sick days or injuries.

Help Wanted: People and Robots

Robots, particularly AMRs, are unlikely to replace human employees anytime soon, says Ron May, another Lucas senior consultant. "The technology is still developing," he says. "They still don't have the grippers or the ability to pick things up autonomously, so, as far as what we're seeing goes, industry is going to continue relying on people to do that activity." Loading and receiving, however — especially in the "last mile" of the warehouse, when parcels and pallets are moved to the dock for vehicle loading — may be up for grabs as the lift capability of AMRs has increased to as much as 3,000 pounds.

Even then, with increased traffic moving at a faster pace, new work opportunities are expected to open up in overseeing robot networks, monitoring system operations, calibrating robot-human interaction on the floor, troubleshooting exceptions and managing surges or other disruption.

"The technology is still developing. They (AMRs) still don't have the grippers or the ability to pick things up autonomously so, as far as what we're seeing, industry is going to continue relying on people to do that activity."

For at least another five years, both May and Franklin see the goal of fully automated warehouses being pushed to the future due to the long lead times and financial risk involved, with large, fixed systems hit hardest. May points to a customer who installed a full automated storage and retrieval system in its warehouse and reduced headcount by 60 entry-level workers, but then needed to hire 35 more highly skilled, higher-paid employees to run the equipment.

In the current, less certain environment, a client Franklin has worked with had planned to fully automate an older warehouse with a conveyor system in response to a sustained surge in COVID-related demand. But with a two- to three-year lead time, the company is now rethinking its strategy in favor of a software-based optimization solution. "Their market seemed to be growing, but in reality, COVID accelerated a lot of things more than it caused real growth," Franklin says. "Now they're pulling back and saying maybe we can go with something faster and more flexible than a fixed big investment that we can't give back if we don't keep growing."

He sees a period ahead where automation is likely to be selective — a palletizer robot here, a shrink-wrapping one there — "to do whatever simple, tedious or strenuous task that warehouse associates now do, and it doesn't require re-design or changing everything around, but just finding that last bit of juice to squeeze."

All in all, the focus, in both the near and far future, will be on robots and humans working in an orchestrated way to bring further efficiency, safety and optimization of tasks. You won't hear many workers complain about that.

Resource Link:
www.lucasware.com/warehouse-optimization-suite/

Your Workers Need the Right Tools to Work Smarter, and Safer

Lucas Systems recent **Voice of the Warehouse Worker Insights** revealed 90% of on-floor workers believe tech is a critical driver in employee attraction and retention.

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Five Ways to Conquer Supply Chain Disruption With S&OP Technologies

Sponsored by Logility

Supply chains large and small are under siege by constant disruption. Companies find themselves struggling to serve customers, source materials, manage costs, handle supply constraints and shortages and, above all, gain visibility into what's next.

Thanks to technology, however, the headlines aren't all bad. The latest generation of sales and operations planning (S&OP) applications are providing better tools for managing supply chains internally. And they're enabling companies to plan collaboratively beyond the four walls of the enterprise. These new S&OP platforms utilize artificial intelligence (AI) and machine learning (ML) to support better, faster and more inclusive decision-making.

Following are five emerging areas of rapid development in S&OP, underscoring how companies today are using the technology, what they're getting out of it, and why this new inclusive ecosystem approach to what was once a status process can be transformational.

1 Functional collaboration is essential.

The chaos of the last few years has been unprecedented. But for supply chain, there's some good news coming out of the current environment. As a corporate function, supply chain is now front and center in the C-suite, no longer a secondary player in the boardroom.

At the same time, the C-suite is morphing to include more parties at the table — a greater cross-functional mix of players from all walks of the organization. Sales, finance, operations, marketing and supply chain are working together more closely than ever, ushering in the development of next-generation S&OP technology platforms.

The C-suite is investing in S&OP platforms that are capable of covering the supply chain end to end — designed, in essence, to work the fragility out of their operations and build in more real-time resiliency. Indeed, all internal and external resources must be coordinated and integrated for a successful aggregate plan.

2 Technology is increasingly in focus.

To operate in this new environment, enterprises now recognize the criticality of having a single data set — one version of the truth, designed with different "views" and supported by AI, ML, scenario planning and analytics, probability analytics and other smart decision and analytics tools.

Decision-making gets smarter when it's augmented by powerful analytics, ML and AI. As Gartner analyst Amber Salley observed, "With the capabilities we have today, we can solve problems in a matter of seconds. We've come a long way." Now S&OP platforms are hardwired with AI and ML, as well as gamification, pattern-recognition algorithms and scenario-building and assessment capabilities.

The bottom line: Managing with multiple disparate systems cobbled together through data translation layers and application interfaces is no longer sufficient to operate a world-class supply chain. And forget spreadsheets; they're not integrated databases but rather reside on individual desktops and the like. As one consultant commented, "Why do people keep using them? Because spreadsheets are easy, and everybody knows how to use them."

3 Process decision points are becoming more frequent.

Planning and process decision points are moving from, at best, a once-a-month schedule to a continuous flow. A set, rigid periodic planning cadence schedule is no longer sufficient.

The process of S&OP is rapidly transforming to a far more dynamic, real-time capability. Early versions of S&OP were about balancing supply and demand on an almost entirely tactical basis and, as noted earlier, reliant on spreadsheets. Spreadsheets were the tools most people used to muscle

their way through this onerous tactical process.

Today's S&OP platforms provide sense-and-respond intelligence analytics on both the supply and demand sides of the equation. As Gartner explains in a framework for designing a supply chain strategy and process matrix, this enables companies to gather data and transactions and plan, forecast, measure, decide, collaborate, design, simulate and execute operations.

These better processes, which consider longer-term, strategic goals as well as shorter-term tactical ones, can be much more focused on generating profitable growth. Advanced S&OP technology also empowers supply chain executives to look at the level of risk and take steps to mitigate it.

4 Scenario planning is becoming vital.

Today's S&OP technologies enable effective scenario planning. Companies can "game" different strategic scenarios and, using AI and ML, see how these myriad scenarios will play out in their supply chains. They can operationalize scenarios and aggregate or disaggregate them to see how they might impact performance and profitability throughout the enterprise. This eliminates or greatly reduces the risk factors involved in making strategic business decisions.

Scenario planning creates a proactive means of managing risk and results. Adoption of scenario-based planning moves businesses away from the old paradigm of waiting for something to happen and then responding — hopefully successfully — but always at a cost in the form of lost sales, market share, or business opportunity.

Despite these benefits, scenario planning is still in relative infancy. Gartner reports that supply chain leaders still aren't sure where to begin developing their scenario-planning capabilities. Only 18% of companies rate as "excellent" their ability to use S&OP for running multiple scenarios to understand trade-offs. This represents a tremendous untapped opportunity.

5 External collaboration is becoming a competitive advantage.

Time was that S&OP was largely an internal cross-functional endeavor. Now, leading companies realize that they can be much more agile, efficient and profitable if they extend close collaboration beyond their four walls, to suppliers and customers. S&OP, in effect, is becoming a toolkit for helping to create and enable this end-to-end ecosystem.

The result is intelligent visibility into multiple tiers of the supply chain, thereby reducing the "surprise" factor and creating more predictive resilience. With the massive uptick in the rate of disruption, organizations must collaborate with suppliers and customers to tackle supply chain upsets more strategically and predictively.

AI, ML, scenario planning, pattern recognition and analytics technologies are enabling better supply chain performance across the board and moving supply chains toward a more predictive business model that generates improved financial performance. As McKinsey & Company points out, over time, stronger supplier and customer collaboration can "reinforce an entire supplier ecosystem for greater resilience."

Resource Link:
www.logility.com

How Logility Can Help

Headquartered in Atlanta, Logility is a leading supplier of optimized supply chain and retail planning solutions. Using insights gained from hundreds of successful customer implementations, Logility's supply chain applications enable suppliers, manufacturers, distributors and retailers to collaborate and synchronize their demand management, forecasting, supply and inventory optimization, global sourcing, quality and compliance, product lifecycle management and production operations.

Shipment Consolidation for a Greener Supply Chain

Sponsored by GEODIS

Climate change and the impact of CO_2 emissions are in the news daily. At the United Nations Climate Summit COP27, UN Secretary-General Antonio Guterres said, "We are on a highway to climate hell with our foot still on the accelerator."

The global supply chain exerts a huge impact on the climate worldwide. But the growing focus on finding global solutions presents a timely opportunity for companies to reduce their own carbon footprint. And a smarter, greener supply chain is also a more cost-effective supply chain.

So, what steps can retailers take right now to reduce their carbon footprint?

In the retail supply chain, one simple solution is consolidating shipments to the mass retailer's distribution facilities or retail stores. Following are ways that retailers can easily decrease their supply chain's carbon footprint through shipment consolidation and, at the same time, cut costs and gain greater control of their operations.

The Three Scopes of Sustainability

The U.S. Environmental Protection Agency has identified three "scopes" that retailers can use to evaluate and calculate their emissions impact.

- *Scope 1* emissions are direct greenhouse gas (GHG) emissions that occur from sources that are controlled or owned by an organization (e.g., emissions associated with fuel combustion in boilers, furnaces or vehicles).
- *Scope 2* emissions are indirect GHG emissions associated with the purchase of electricity, steam, heat or cooling.
- *Scope 3* emissions are an indirect result of a company's supply chain and result from assets not owned by the reporting company. These emissions often account for most of a company's total GHG emissions.

Until recently, most companies have focused on measuring emissions from their own operations and their electricity consumption (Scope 1). But what about all the emissions a company is responsible for outside of its own walls — from the goods it purchases to the disposal of the products it sells? In fact, most total corporate emissions come from Scope 3 sources, which means many companies have been missing out on significant opportunities for improvement.

According to a recent study, more than 90% of an organization's greenhouse gas emissions, and 50% to 70% of operating costs, are attributable to other players in its supply chain.

"Acknowledging this, large retailers and their suppliers are making sustainability a top priority," says Chris McGuire, transportation operations manager at GEODIS in Americas. "And it will remain so as retailers continue to step up their sustainability initiatives. In fact, retailers now have specific sustainability goals based on the three EPA scopes. Many directly relate to their supply chains."

For example:

- Target has set a goal to reduce its absolute Scope 1, 2, and 3 GHG emissions by 30% below 2017 levels by 2030. Target also has promised that 80% of its suppliers will set science-based reduction targets on their Scope 1 and 2 emissions by 2023.
- Walmart's target is zero emissions in its own operations by 2040. The retail giant looks to reach 100% renewable energy by 2035. It also is working with suppliers to avoid one gigaton of GHG from the global supply chain by 2030. Since 2017, the company's suppliers have already reported a total of more than 416 million metric tons of avoided emissions.

- CVS plans to reduce Scope 1 and 2 emissions by 67% by 2030, after already meeting its goals of reducing emissions by 36% from a 2014 base year. Additionally, the company aims to reduce its absolute Scope 3 emissions from purchased goods and services by 14% by 2030 from a 2019 base year. In 2020, CVS eliminated 500,000 in empty miles through its backhaul program.
- Walgreens has pledged to achieve total net-zero emissions by 2040, including net-zero Scope 2 emissions by 2030 and Scope 1 by 2035. In 2021, the company cut its global carbon emissions from the baseline of 2019 by 14.9%.

A Smarter Approach to Operations

Retail consolidation is a simple and logical solution to cutting GHG emissions in a meaningful way. Consolidation means transitioning retail supplier deliveries to full truckloads (TLs) from less-than-truckload (LTL). Retail consolidation has its basis in extensive data analysis, with route, procurement, ordering and other kinds of planning optimizations — all based on this analysis.

"There are more touchpoints and stops with standard LTL shipments, resulting in greater fuel consumption," McGuire points out. "A retail consolidation program merges shipments with other brands going to the same location to streamline the transportation footprint. It's a service provided via pooling or cross-docking performed by a third-party logistics service provider."

Then there's the issue of retail compliance expectations and constantly changing requirements, requiring suppliers to continually scan for changes or face penalties for non-compliance.

"A retail consolidation program merges shipments with other brands going to the same location to streamline the transportation footprint. It's a service provided via pooling or cross-docking performed by a third-party logistics service provider."

Every mass retailer is different. Walmart's requirements aren't the same as Target's. Non-stop unique compliance changes make it tough for growing brands to stay updated and compliant, forcing them to absorb the costs of non-compliance.

Additionally, the challenges evident in supply chains today make the job tougher, including external factors such as labor shortages, port congestion, tight transportation capacity and the overall rising cost of raw materials and packaging. The global supply chain remains stressed in this current health and political environment.

Shippers can save on transportation costs and reduce compliance fines by taking advantage of a shared supply chain network which enables brands to combine their LTL shipments with other brands going to the same big-box retailer. This service not only minimizes the shipper's exposure to fines but also reduces the amount of damage and losses and carbon emissions, with fewer trucks out on the road.

Retail consolidation can reduce a retailer's carbon footprint year over year through better network and operational optimization. "It's not unusual to see retailers realize a 10% average reduction in carbon emissions when using a shared network," McGuire reports.

The first step in developing a retail consolidation program is to measure the retailer's total carbon footprint. Some emission producers are out of the retailer's control, but must still be measured. Once measurement is complete, the retailer has a full picture of its carbon footprint and can look for opportunities to affect it positively wherever possible.

This involves partnering with suppliers to agree on strategies and align on requirements and capabilities.

Take retailer ordering habits. "Can a retailer plan its ordering habits to be more efficient, to use fewer trucks, to take advantage of shipment pooling and other techniques?" McGuire asks. "The answer is yes — especially as the retailer's data gets better and more real-time. So instead of having three or four deliveries in a week, a consolidation program can reduce that frequency to once a week, with no effect on service levels, inventory availability or other metrics retailers require to operate." All of this optimizes transportation and reduces costs.

"In a nutshell," says McGuire, "If we have 10 suppliers all shipping to a big box retailer via LTL, we combine those 10 orders into a single TL shipment and make one delivery, versus 10 to the retail distribution center or store." The consolidation system is based on a pull model tied to retailer demand.

Benefits of Shipment Consolidation

Moving to a TL-based consolidation network delivers a host of benefits in addition to reducing the retailer's carbon footprint. It takes multiple trucks off the road, obviously. But it also solves several other problems and issues.

An LTL-delivery model carries risk. It involves multiple stops, transfers of freight and "touches," along with increased risk of damage, labor-intensive deliveries, and failures in supplier on-time delivery (OTD) and on-time in full (OTIF) performance. Retailers levy significant fines for such performance failures. Penalties amounting to 3% of an order aren't uncommon, and fines that eat into suppliers' profit margins can, in worst cases, result in a supplier being dropped by the retailer.

"If we have 10 suppliers all shipping to a big box retailer via LTL, we combine those 10 orders into a single TL shipment and make one delivery, versus 10 to the retail distribution center or store."

A third-party logistics (3PL) consolidation service can work with the retailer to optimize ordering practices, including lead times and number of order drops from the retailer. All of this provides the opportunity for better scheduling and more consistent transportation budgeting for the supplier. It can make a huge difference in the complexity and costs of operations.

In short, a retail consolidation program benefits both the supplier and the retailer, while making a significant difference in carbon footprint.

Resource Link: www.GEODIS.com

GO GREEN AND SIMPLIFY YOUR SUPPLY CHAIN WITH RETAIL CONSOLIDATION SERVICES POWERED BY GEODIS

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Sr. Vice President,
Supply Chain Operations OTC Healthcare Company

Benefits of GEODIS Retailer Consolidation Services

- Reduce cost on LTL by combining with other retailers
- Reduce emissions by an average of 13%
- View and control freight from a single source
- Reduce touchpoints along shipment routes
- Improve on-time performance

Scan For More Information

GEODIS

Five Reasons to Invest in Enhanced Vision Technology for Your Warehouse

Sponsored by LogistiVIEW

Enhanced vision capabilities, with the use of smart glasses, provide warehousing workers and operations with simplicity, efficiency and accuracy that systems based on voice, radio frequency, or paper just can't. Here are five reasons for companies to consider providing these advanced capabilities to their warehousing workers and systems.

1 Enhanced vision capabilities provide augmented reality, not virtual reality.

Virtual reality replaces existing reality with a digital alternative. That may be good for some training applications, but it's not what you want for workers operating dangerous equipment and moving physical goods.

Augmented reality uses sensors and other digital means to overlay information within smart glasses to provide context to the warehouse environment. For example, cameras built into smart glasses read barcodes and QR codes, or absorb information with optical character recognition (OCR), to pinpoint the location of a picker within a facility and provide a signal within the glasses to indicate where the worker is to pick from. Providing greater certainty and clarity increases workers' efficiency and enhances their safety because they aren't distracted by looking at a handheld screen or a paper document.

2 Smart glasses are user-friendly.

Smart glasses provide interaction among warehouse environments, workers and back-end systems. The data that the systems provide to help warehouse workers do their jobs better is displayed within the glasses.

Smart glasses require a short adjustment period for those who have never worn a pair before. Workers often have questions when they're first introduced to the devices, but experience has shown that a quick training program on how to wear and use them properly provides workers with a high level of proficiency within 10 to 15 minutes, and that they are then able to wear the smart glasses comfortably all day.

Smart glasses are lightweight and designed to distribute weight evenly, and they can be worn with corrective lenses. The devices are adjustable to accommodate each worker's dominant eye. Like the information drivers view on their car dashboards, workers quickly glance at the data being displayed without losing focus on the task at hand.

3 Enhanced vision technology helps warehousing workforces.

One of the biggest complaints heard today among warehouse workers concerns the complexity of the systems they're using. These systems often require substantial training to gain proficiency, and the work involves absorbing complex information displayed on a screen. The biggest benefit that enhanced vision provides to warehousing workers is that it simplifies their tasks.

Enhanced vision capabilities simplify instructions for workers, by providing visual instructions such as green and red signals, so that there's as little text involved as possible. Green for "Go" and red for "Stop" are intuitive and universally understood instructions, making end users' jobs easier and allowing them to perform tasks more effectively and efficiently.

Heads-up displays like smart glasses provide workers with instructions in their line of sight, making the instructions easier for workers to process and freeing their hands to perform manual tasks. Visual instructions, which are always in front of workers' eyes, are superior to voice instructions that have to be memorized and may have to be repeated.

Smart glasses provide information and instructions to individual workers. In the case of a pick-to-light system, two workers standing next to each other have no way of knowing for whom a specific light signal is intended. Visual instructions are sent to individual workers within their smart glasses and appear right in front of each worker's eyes, which facilitates efficient work processes.

4 Enhanced vision allows companies to scrap paper systems, and complements RF and voice.

The business world is changing and increasing in complexity, requiring more data collection and visibility. Some companies have found it difficult to commit to implementing technologies that help manage complexity. Warehouses that still operate in a paper world are behind the eight-ball at this point.

Companies that have invested in radio-frequency technologies and voice instruction for their warehouses are in better shape but can do better. RF devices occupy workers' hands and divert their attention to receive data and instructions. Their eyes are focused on their devices instead of on their jobs.

Voice instructions are conveyed through a headset, but there's a limit to the complexity that workers can capture with their hearing and what they can remember. A 20-digit identifier, for example, would be much better captured with the sense of sight.

Vision capabilities put displays directly in line with the work being done so that it's accomplished more quickly and with greater accuracy. Today's vision systems allow voice instructions to complement visual instructions if that helps operations.

State-of-the-art vision systems are more cost-effective than their historical predecessors, relying on newer technologies that are less expensive. The latest technology doesn't require overhauling and rebuilding existing systems. So companies can now consider scrapping their paper systems or investing in a technology refresh without breaking the bank.

5 New vision technology works with a company's current enterprise systems.

Vision software takes data from WMS and ERP systems and converts it into instructions for humans and robots in the warehouse. The system accomplishes this feat without a great deal of time-consuming and costly systems integration.

Advances in data science provide options for establishing data connectivity among enterprise systems. Data languages used by various WMS and ERP apps vary, and today's advanced vision systems build in standard capabilities that enable the vision system to handle data from those other enterprise systems. Self-service workflow engines in advanced vision systems allow users to design and control operational processes without writing any software code, providing a flexible and cost-effective solution.

Resource Link:
www.logistiview.com

LogistiVIEW—Using Vision to Make the Warehouse Picking Process More Efficient

LogistiVIEW is a workforce optimization solution that delivers a vision-driven experience for warehouse workers. "Unlike traditional handheld or voice technologies," explains Seth Patin, the company's CEO, "our Vision+ solution uses smart glasses to provide a visual display. The smart glasses interact with a LogistiVIEW platform server, which acts as a hub for all connectivity and digital messaging inside the warehouse." The system can also connect workers with work instructions in other ways, such as voice guidance, if required.

LogistiVIEW is built around a workflow engine that enables tailored solutions for individual warehouse processes. "The system very quickly gathers and processes information," says David Erickson, LogistiVIEW's chief technology officer. "We're able to capture images and videos and integrate them much more dynamically with how workers perform their jobs."

LogistiVIEW's solution can integrate with legacy enterprise systems without making significant changes to them. "Several of our techniques and some of our patented intellectual property allow users to do that integration with minimal or non-existent changes to the back-end," says Erickson. "We developed a drag-and-drop approach to developing workflows and a creative data-mapping engine that provides data translations without ever going into code."

All of these innovations benefit LogistiVIEW's customers. The solution has been documented to increase picking accuracy by 20%, and costs up to 80% less than pick-to-light systems and around 50% less than voice systems.

LogistiVIEW, says Patin, "makes the warehouse picking process tangibly more efficient."

Supply Chain Visibility Isn't Just a Catchphrase; It's an Imperative

Sponsored by EdgeVerve

The rapid growth of direct-to-consumer (D2C) fulfillment models during COVID-19 has decentralized demand, adding to complexity, cost and volatility. Supply chain visibility isn't just a catchphrase; it's an imperative.

It shouldn't be surprising that better order, inventory, and shipment visibility tops the priority list for 60% to 80% of companies in supply chain surveys.

Where manufacturers and retailers once developed, stocked, and pushed out large volumes of goods to regional markets based on predictable historical and seasonal patterns, D2C e-commerce is accessible to much wider audiences via the internet on a pull basis. An aggregate, near-continuous flow of smaller orders shipped on demand, along with rising overall freight demand, has swamped terminal, warehouse, equipment and vehicle capacity in a tight labor market.

Mutable customer expectations compound the difficulties. Last-mile pressures and costs are vastly different for palletized freight held in a distribution center for gradual release to factories or stores at the shipper's direction, versus time-definite orders with multiple delivery time and location options and a baseline expectation of on-time and in-full delivery.

Whether it's a new pandemic variant, weather event, or containership blocking the Suez Canal, unforeseen circumstances can easily provide a tipping point that throws demand, supply, and capacity out of alignment overnight.

Visibility's Many Moving Parts

Most supply chains still lack adequate visibility on the downstream demand side at the point of sale (POS), upstream in supplier sourcing and production, and in transit during shipment. Sensing demand early is especially critical given ongoing market volatility due to steady D2C growth, amplified by the pandemic, climate, the war in Ukraine, global inflation and other external pressures.

Demand signals, more than any other single influence, drive the supply chain. They dictate what to produce, in what quantities, and where to ship — in short, everything from sourcing to asset and resource allocation to workflow. It seems counterintuitive, then, that most conventional hierarchical supply chain models still don't connect factories and suppliers directly to retailers and customers in a virtuous feedback loop.

Instead, most communication flows from the center outward, and partner input rarely extends beyond one level up or down, trapping critical data inside organizational silos. Third-party aggregator data languishes in marketing, customer relationship management (CRM) data in sales, production data in operations, and in the C-suite. This poses a significant risk of higher costs and lost business in the event of a disruption.

Supply chain complexity compounds the problem, with more than 60% of global consumers now using e-commerce, more than 25 million global retail outlets open, a ten-fold increase in new products coming to market each year over the past decade, and 10% of merchandise experiencing stockouts.

"In emerging markets, global manufacturers ship through distributors, and their visibility stops at that point," explains Suresh Prahlad Bharadwaj, platform head for TradeEdge at EdgeVerve Systems, a wholly-owned subsidiary of Infosys. "They don't know who their customers are, mostly small mom-and-pop stores. Even in modern trade, where manufacturers are selling through a wholesaler or directly to a big-box store like Walmart or Target, they are not equipped to process that point-of-sale visibility coming back to them."

In a decentralized e-commerce environment, Suresh says, points of sale can be dispersed among hundreds or thousands of distributors, retailer, and websites, all with different levels of maturity in collecting and sharing data, and different ways of formatting data and communicating.

"Who are my customers, where are they located, what are they

ordering?" asks Suresh. "To know that, I need to collaborate with retailers to get that aggregate point-of-sale and store inventory information back to manufacturers quickly, so they can make adjustments." Right now, he adds, that process can take three to four weeks, relying on third-party data syndicators like Nielsen or IRI to collect and harmonize data from a panel of stores, and then prepare custom reports for particular clients. "In today's world," he says, "that's too late."

As cloud-based data processing power has increased and costs have come down, Suresh explains, more retailers and intermediaries are cutting direct data-sharing deals with customer companies to disperse primary-source sales data back up the chain. But that's only the beginning.

Finding Needles in Haystacks

Software-based demand-sensing tools, aided by artificial intelligence and machine learning, are gaining attention for their ability to predict near-future demand. These tools model aggregate real-time POS data against internal and external supply chain anomalies such as climate events, port congestion, a rail strike, fuel price moves, interest-rate rises and high unemployment rates — all of which influence purchasing decisions.

In short, understanding in a granular way the conditions under which goods sold yesterday offers short-term insights into how and where the same goods are likely to sell tomorrow under the same or different conditions. As more granular data is collected over time, artificial intelligence and machine learning sense patterns and insights that would be missed by a traditional manual operation running on an enterprise resource planning (ERP) suite. More frequent reporting intervals shorten response time when sudden, more pronounced events occur.

"One of the things we know about forecasting is that it's not going to be accurate, so the question becomes how we plug the gaps. We do it through execution of short-term replenishment decisions across the entire network."

Given the near demise of traditional long-term strategic and demand planning since the onset of COVID, constructing near real-time data in this way can yield important benefits. Suddenly companies are working off yesterday's POS store-SKU sales and inventory data versus weeks-old summary reporting. Sales data also tends to deliver more accurate demand forecasting results than comparable shipment data, since goods may be shipped for a variety of reasons — exchanges or sample merchandise, for example.

Using defined business rules and standards as benchmarks, AI and machine learning map retailer SKU, product, UPC and other coding against manufacturer codes as part of the onboarding process. They can also differentiate among standard and promotional SKUs with, say, small content changes for the same product. An important benefit is the ability of AI and machine learning to analyze and eliminate phantom inventory and display voids in order to predict and reduce stockouts. Using analytics, companies can validate sales trend data within hours.

"One of the things we know about forecasting is that it's not going to be accurate," Suresh argues, "so the question becomes how we plug the gaps. We do it through execution of short-term replenishment decisions across the entire network."

Building the Supply Chain Value Network

Downstream visibility into how markets and customers interact to influence sales, generating valuable demand signals in the process, sets the table for a larger rethinking of the entire supply chain.

Visibility both upstream and downstream, from order to payment in a non-hierarchical, "many-to-many" network model, presents an opportunity for end-to-end, real-time data reporting

and sharing, and for collaboration by all parties in the network.

The process begins with building a single, trusted, shareable source for information across the network. Partners are onboarded with appropriate permissions to access specific types of data for specific uses. Data, including relevant forms, documentation, and communications, are standardized, harmonized and structured in a common database format for ease of use.

So what happens when the demand signals begin flashing? Can production be quickly scaled up or down, or the product mix and sequencing modified to ensure orders are filled on time? Do Tier 2 suppliers have the materials and parts to surge production as needed? If not, can existing inventory in the system be located, redirected, and replenished? If not, should operations and planning teams be rethinking safety stocks, supplier diversification, or product portfolio alternatives? What would be the cost impacts? Time is critical in getting answers to these questions and taking the optimal corrective action.

The important difference with the network model is that suppliers, manufacturers, and retailers can not only sense demand shifts, but also collaborate directly and proactively, in real time, to solve problems rather than each having separate, siloed communications through the principal company, where crucial details can get lost in translation. In addition, AI and machine learning-enabled analytics can run hundreds or thousands of scenarios in minutes, gaming each out based on current and historic shipment and inventory data to formulate an optimal solution.

But as the old tech adage goes: garbage in, garbage out. Network performance is only as good as partner buy-in and an accurate dataset. "It's not just about technology in the cloud," Suresh insists, "it's about driving the compliance of partners in reporting, the volume and timeliness of data, granularity of the information and the frequency with which it's shared."

"It's not just about technology in the cloud, it's about driving the compliance of partners in reporting, the volume and timeliness of data, granularity of the information and the frequency with which it's shared."

Suresh acknowledges that, up to now, it has been mainly very large companies, in the $6 billion and above range, that have driven this level of digital transformation, in part because of their leverage to force and manage change with smaller suppliers, vendors, and customers. But he sees an opportunity in recruiting clients in the $1 billion to $5 billion range.

Where is all of this headed? It will become imperative over time for businesses of all sizes to undertake digital transformation, leading to the interconnection and consolidation of supply chains over time. Look for more operations and processes to be automated, further shortening response times, eliminating error, and compressing the order-to-pay cycle, while freeing up people and resources for more productive, rewarding work. Onboarding and data harmonization will likely become almost plug-and-play for small and mid-sized suppliers and vendors, with network capability emerging as a key differentiator on the way to becoming ubiquitous.

The bottom line: After a brief, at times difficult, period of adjustment, the supply chain is about to get much faster, simpler, and more resilient.

Resource links:
EdgeVerve,
http://www.edgeverve.com
TradeEdge,
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Five Formidable Transportation Challenges Facing Shippers

Sponsored by GEODIS

Supply chain disruption is easing as demand slows. Still, chokepoints persist and costs keep soaring. From labor shortages to downstream congestion, higher parcel and LTL rates, sanctions on Russia, COVID-19 regulations in China and green initiatives, shippers need help with forecasting, strategy and carrier relationships just to stay afloat. Here are five key transportation concerns keeping them up at night.

1 With workers and equipment in short supply, relationships matter.

Inflationary pressures and uncertainty about a pending recession have put consumers in a defensive crouch, ending a two-year spending spree from pent-up COVID-19-related demand. For shippers, the lull offers breathing room to process order backlogs, replenish inventories and retrieve stranded freight. Still, transportation challenges are far from over.

Across modes, carriers are discounting rates to keep assets and equipment utilized, even as downstream capacity remains tight in places, and warehouses and store locations face ongoing worker shortages and limited receiving hours. Drivers wait longer to load and unload, while freight backs up at warehouses and loading docks waiting for delivery. That added dwell time costs money.

There's no easy solution, but gridlock can be managed through strong relationships with asset-based carriers. That requires close communication, finding areas of mutual benefit and keeping rates stable. "We want to stick with them in good times and bad and work with them through it all," explains Doug Frank, senior vice president of logistics, shared services and procurement for third-party logistics (3PL) provider GEODIS. "If they grow with us, we'll have a relationship that keeps freight moving when times are tough."

2 Who pays for saving the planet?

Manufacturers and retailers face growing pressure from customers, shareholders and regulators to support environmental, social and governance (ESG) goals, and they in turn lean on transportation providers to reduce vehicle fuel consumption and emissions. Failing grades can mean reputational damage and lost business. There's a potential competitive advantage for carriers and 3PLs who take part in green initiatives, but it isn't simple.

Limited electric vehicle range and a lack of adequate charging station networks over large distances mostly restrict EVs and clean-fuel vehicles to last-mile. Even there, it takes extensive planning to locate and incorporate more refueling stops into a typical route, burdening transportation-management systems and adding costs for carriers providing the vehicles. Load and route optimization can eliminate truck trips, but that requires significant volumes over time to move the ESG needle.

3 Elephants in the room: FedEx and UPS.

The rise in B2C omnichannel e-commerce has increased many shippers' reliance on leading parcel carriers FedEx and UPS. The higher cost of time-definite delivery, as well as dealing with more and smaller orders, has at times overwhelmed the two carriers as much as it has their customers.

Dimensional-weight (DIM) zone pricing adds cost and complexity to pricing. Rate increases have escalated during COVID-19: 4.9% in 2021, 5.9% this year, and a FedEx announcement of 6.9% in 2023 that will likely be matched by UPS. Tight space has led to capacity allocation, customer and peak surcharges if allocations are exceeded.

Worker shortages contribute to peak service issues for the two carriers, while higher wages drive up rates. Cobbling together reliable parcel alternatives using the U.S. Postal Service and local delivery services remains a challenge.

4 Global supply chain disruption is still a thing.

Port congestion is easing, but numbers can be deceptive. Only 27 ships sat at anchor off Los Angeles-Long Beach in October, but cargo diverted to the East Coast in anticipation of a longshore strike now strains capacity at the ports of Savannah, New York-New Jersey and Houston. According to Drewry Shipping Consultants, congestion still ties up 15% of effective capacity on North America trade lanes.

Uncertainty from the war in Ukraine and Russia sanctions, the possibility of winter COVID-19 outbreaks at Chinese ports, and the outcome of West Coast longshore labor negotiations further complicate matters.

"Customers need to be very proactive right now to make sure they have the product they want when they want it," Frank says. "That's why long-term forecasting is critical. As an industry, we need to be more aware, plan further ahead and have contingency plans in place."

5 LTL trucking costs keep going up.

Less-than-truckload (LTL) occupies a sweet spot in the trucking market. Originally catering to smaller, palletized loads of industrial freight, LTL's nimble model of centralized consolidation and deconsolidation of loads from multiple shippers has also served less time-sensitive e-commerce needs well during COVID-19.

LTL carriers have been disciplined in balancing their cargo mix between higher-value industrial moves and B2C business with low inventory volatility, for a stable revenue stream. Market share is highly concentrated in the top eight carriers; the capital-intensive network structure of drivers, trucks and consolidation facilities keeps out new market entrants. Truck and labor shortages, along with M&A and bankruptcies, have further tightened capacity. The result: steadily rising rates, on the order of 5%-8% annually.

Resource Link:
https://geodis.com/us/activity/transportation-management-solutions-us-en

GEODIS Helps Shippers Navigate Disruption

GEODIS is a third-party transportation and logistics provider, a unit of French state-owned railroad company SNCF. Its origins trace back to 1904 and a rail freight company in Le Havre, transporting passengers and luggage to train stations and final destinations. It was merged with SNCF consolidation business SCETA, rebranded as GEODIS in 1995 and taken private in 1996.

The company has expanded its service offering and geographic reach since 2006 with acquisitions, notably of Ozburn-Hessey Logistics in the U.S. in 2015, PEKAES in Poland in 2021 and Keppel Logistics in Singapore in 2022. Its most recent acquisition, of the New Jersey-based omnichannel, last-mile and contract logistics delivery firm Need It Now Delivers, adds 65 locations and 300 interconnected distribution points nationwide.

GEODIS today has a direct presence in more than 60 countries, with network coverage in nearly 170. Its five business lines — supply chain optimization, freight forwarding, contract logistics, distribution and express, and road transport — offer clients end-to-end transportation and logistics services, with dedicated support teams. It also provides transportation-management solutions, from network design and optimization to cost and service analysis, transportation visibility and analytics, route and load planning, and carrier management and selection.

With a North America workforce of 17,000, GEODIS operates in more than 200 locations totaling 53 million square feet of warehousing, distribution and fulfillment space. Its longstanding relationships with 450 carrier partners build agility and resilience for customers by securing space, adding leased capacity, diversifying modes and gateways, and supporting nearshoring, ESG and other strategies.

Linking WMS and TMS for Smoother Operations

Sponsored by Pierbridge

The past few years have brought a vivid reminder that consumer demand is unpredictable and that all elements of fulfillment are in thrall to it. The question remains: How do you scale operations up and down without risking inefficiencies that threaten the very core of your business?

An important part of the answer lies in the deployment of smart technology. It is increasingly clear that different technologies working in concert with one another is key to a lean, flexible fulfillment operation. In particular, warehouse management systems (WMS) and transport management systems (TMS) must be part of a harmonious whole.

"You need to use technology to maximize physical assets, because you cannot magic them up," says Mark Picarello, managing director of Pierbridge, a WiseTech Global company and provider of multi-carrier, parcel shipping TMS for retailers, 3PLs, manufacturers and other shippers. "This is very much about the marriage of the WMS and TMS, because you are talking about the entire warehouse, and those things really do need to work together."

Creating an integrated WMS/TMS environment helps shippers face up to their greatest challenges in today's fulfillment environment. On the transportation side, they are subject to constantly fluctuating (and usually rising) carrier rates and fees, along with unpredictable carrier capacity. In terms of warehousing, the U.S. and beyond are experiencing record low vacancy rates, as well as crippling labor shortages. Add to that the wild swings in delivery demands of the e-commerce market, and today's fulfillment landscape is harder to navigate than ever.

Many companies are experiencing truly dramatic swings in demand, with monthly order volumes growing from zero to 4,000, then 10,000, then 25,000 and beyond. The challenge then becomes how they can maximize their existing warehouse staff and square footage, while optimizing parcel shipping to meet and adapt to these large fluctuations in demand. Increasingly, these businesses are turning to logistics management technology for solutions.

First off, says Picarello, think about your relationships with your carriers. "When people talk about capacity, it is always about growing, and shipping more and more. But the real key is to deal with the fluctuations — up and down — and continue to spread that transportation out across all the different carriers." The pandemic brought in new tactics for many shippers who previously had only a handful of trusted carrier services; suddenly, the heat was on, and they were forming new relationships with a far wider range of transportation providers. "You cannot just cancel that out," says Picarello.

"Shippers have engaged more and different carrier options and, as their fulfillment volumes fluctuate up and down, they need to have a way to keep all those transportation providers engaged," he adds. "For example, when volume is dropping, it is important to make sure you keep that mix. You don't want to alienate a carrier you might need when volumes go up again."

Needless to say, the greater the number of carriers you are working with, the more complex it is to manage and assign loads in a way that keeps everyone happy. Automating that process through deployment of a TMS is critical.

But that is not going to get you where you need to be if what is coming out of the warehouse isn't trimmed for flexibility and efficiency, too.

Martin Hespeler, vice president, Americas at Microlistics, another WiseTech Global company, says too many companies make the mistake of using their warehouse capacity to park inventory they will not need for a while. Say that you got a deal on snow shovels

in July, or on ketchup in January when you know sales are going to spike around July 4th. It is old-school thinking, he says, and it is important to — at the very least — be aware of the actual cost of these decisions, across business operations. "If I have 100 pallet locations available, and I only need five pallets of ketchup, but I buy 20, I have used up 15% more space than I need to," Hespeler explains. "When you have a WMS, through business intelligence and analytics, you can see what sales looked like last year. When the deal for the ketchup comes around you can look to see when you actually sold it and how much.

"Everyone is tight on warehouse space," Hespeler continues. "But the one thing that's way more critical than running out of warehouse space is being out of stock." He says there is a balance between stock on hand, in order to fulfill normal demand, and then some stock available for an anomaly, a spike in demand. "But with a WMS, you can see if you cannot afford to use that warehouse space because you need it for mustard." In essence, a sophisticated system allows you to combine data flows about buying patterns and demand forecasting in order to make those decisions about whether to stock up and when.

"You are always looking to have visibility into historical movement of product, and inventory levels, without over-committing, taking up too much space and having too much safety stock," says Hespeler. "And, as business grows, it is difficult to manage that.

"There is a lot more to think about than just whether you can afford the space for safety stock," he says, adding that warehousing needs to be organized according to what he refers to as a true product zone hierarchy. Products come in different sizes and packaging, and so does racking: They need to make sense together. Hespeler gives the example of going down an aisle with racks that are designed to have room for only standard-size pallets. Maybe the first level is all filled with pallets. "What we do not want to see is, just above that location, that there is another standard pallet location with just a few cases on it."

"Everyone is tight on warehouse space. You are always looking to have visibility into historical movement of product, and inventory levels, without over-committing, taking up too much space and having too much safety stock. And, as business grows, it is difficult to manage that."

With a good warehouse solution, Hespeler maintains, when you do receive just cases and they are not full pallets, you can pack them more efficiently in certain zones within the warehouse, so you maximize the use of space. For example, you can park cases of different SKUs next to one another because the WMS keeps detailed track of where everything is within the warehouse. "You can only do those things when you have an automated warehouse system," he says. "You have designated locations for each item. You do not just throw it somewhere in the warehouse."

Next, when TMS and WMS are working together, you are able to flow different products or orders through the warehouse at different rates and with varying degrees of urgency, all controlled by detailed and accurate data. Hespeler gives the example of an order for dog collars for a pet store. The order comes in and the WMS knows it has to be picked and shipped the same day, because the pet store needs it by tomorrow morning. Because the WMS system knows exactly where the dog collars are, it sends a picker with an RF handheld device to find the location, scan and pick

the order, and take it to a pack-out station. When the picker gets there, there is an already generated label to slap on the order, which includes the information the dispatcher needs that, in this case, the order needs to be on a 3 p.m. truck. That is when the TMS capabilities kick in and help the dispatcher find the carrier. "You just scan the label, and then everything comes up on a screen, and you can fulfill that order exactly as it needs to be done," says Hespeler. "You just print the label. You do not have to make any decisions."

"Automation of this kind is particularly essential when things are busy," Hespeler continues. "If the warehouse is not busy, it is super-easy to make that 3 p.m. truck. But if it is busy, things start to get missed." There is a lot more manual activity per box required without automation, he points out. You have to rekey in the order, then make the decision about which carrier to use.

"You can make mistakes," he says. "You might pick a bunch of orders that have a lower service-level agreement or are going by ground and will be picked up tomorrow morning, but you end up expediting them. Or vice versa." Hespeler says there is intelligence built into the WMS that will prioritize any given order in terms of when it is picked and taken to the pack-out station, so the company meets its service-level agreements (SLAs). "It could be same-day, two-day ground, or maybe it is free shipping and there is no SLA," he says. "It is critical that the system choose the most cost-effective shipping option."

Fostering a marriage between the WMS and TMS is not just about saving money, says Picarello. It is fundamentally about keeping control. "It is important to scale responsibly," he says. "There is too much focus lately on growth, growth, growth, and the attendant capacity issues. Now we are going into peak season, and it looks like demand is still increasing, but it is not as lumpy as it was. And it looks like the major carriers are more than equipped to handle the volume. So if you are scaling by adding resources or warehouse space, you could be left holding the bag through these uncertain times."

"Now we are going into peak season, and it looks like demand is still increasing, but it is not as lumpy as it was. And it looks like the major carriers are more than equipped to handle the volume. So if you are scaling by adding resources or warehouse space, you could be left holding the bag through these uncertain times."

Ultimately, a well-blended suite of WMS and TMS technologies will help you pull back or ease up on the throttle exactly as needed, Picarello and Hespeler conclude. "Both the WMS and the TMS need to take into account all of the things an organization is trying to do, and balance that as part of fulfillment," Picarello says.

Resource Link:
www.pierbridge.com

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Warehousing is struggling to keep and retain labor while facing low vacancy rates. Shipping is dealing with unpredictable capacity, higher rates, and increased fees. Meanwhile eCommerce's rise has slowed yet is still expected to keep growing.

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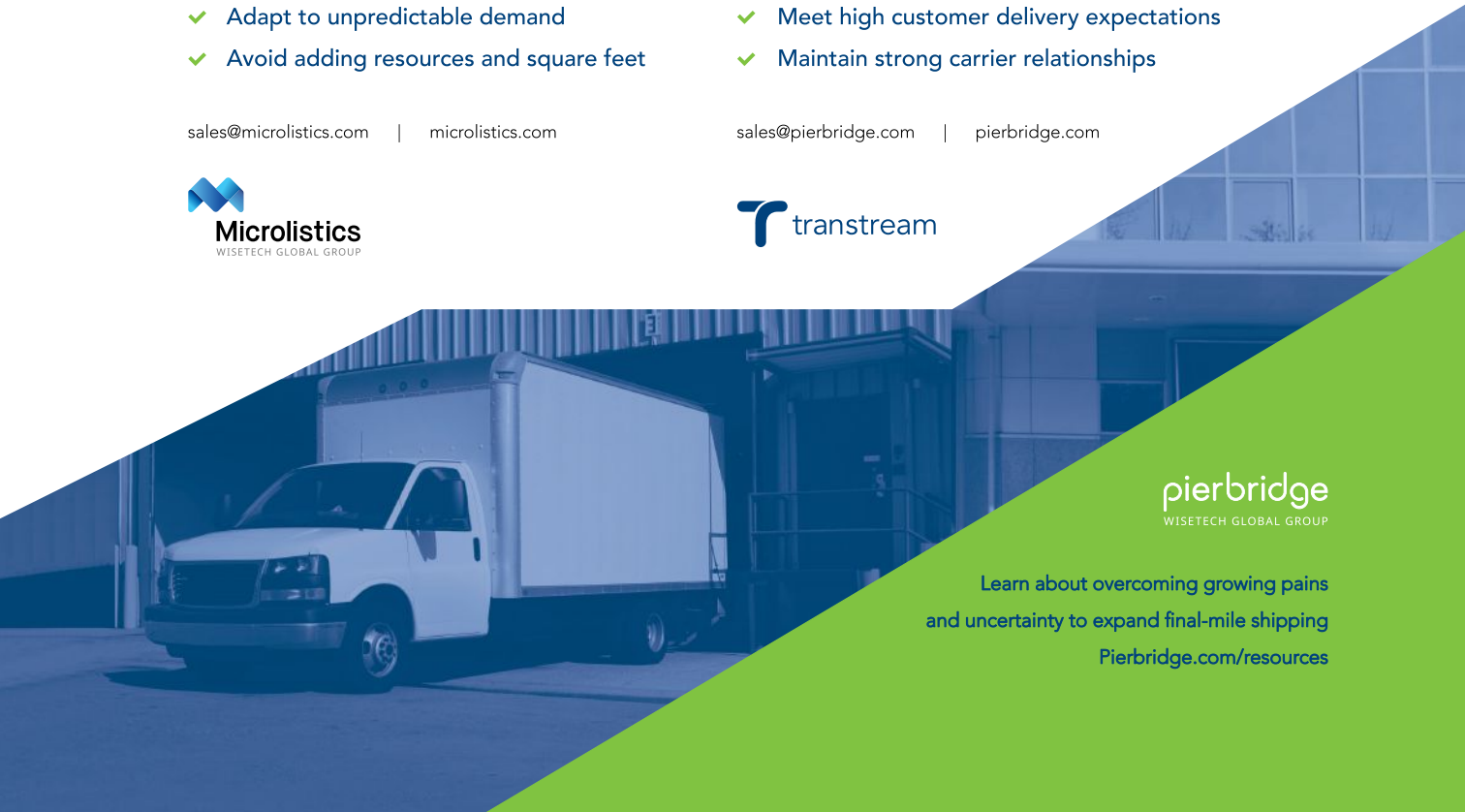

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Five Strategies to Accelerate Warehouse ROI

Sponsored by Microlistics

Supply chain disruptions have been the order of the day for the past several years, with the COVID-19 pandemic, bottlenecks in the Suez Canal and the struggle to find qualified people to perform tasks of all types wreaking havoc on the channel from the first mile through the last mile.

Warehouses play a critical role throughout the channel. Following are five strategies to accelerate the initial return on warehouse investment, and augment the ongoing ROI of these increasingly crucial spaces.

1 Keep the initial effort, duration, and costs down for faster time-to-benefit and ROI.

Moving products from Point A to Point B in the most efficient way possible is key to keeping costs down. Part of that comes from ensuring the global warehouse network is prepared for just about anything.

"Warehouses should seek out a templated solution that aligns 90% with their business workflows and requirements," says Martin Hespeler, vice president, Americas, at Microlistics, an intelligence and software company based in Melbourne, Australia. He explains that companies should look for an out-of-the-box warehouse management system (WMS) that aligns with business needs. That way, they can avoid expensive and time-consuming customizations that are needed to support the business, third-party logistics company, distribution center or retailer.

State-of-the-art software tools are constructed to be modular, offering immediate, additional functionality. These plug-in modules can be selected to support a specific company's business model. As a result, it's easy for a distribution center or warehouse facility to augment its initial investment quickly, efficiently and cost effectively, and allow for adjustments as business changes.

2 Continue to optimize operations to deliver greater returns over time.

After investing in a massive overhaul, businesses must not allow operations to stagnate, if they want to keep warehouses on the cutting edge.

The goal when laying the foundation of a WMS is to position the system to be able to grow with the business. "That way, you will be prepared," Hespeler says, "whether you configure the foundational software in a manner that will support a change in customer dynamics, or to provide support when the business itself is changing — where you're going to be doing things like invoicing for services that you've never done before."

Requirements in regard to visibility into on-site inventory, and adjustments to labor management due to overhead costs and the current labor market, are all factors to consider while making an investment in WMS.

3 Use savings from efficiencies and expanded business revenue to fund continued improvement.

Logistics providers can't just sit on the profits they'll realize from making their operations more efficient.

When a company works with a vendor whose software is largely out-of-the-box and in alignment with the business, that means that the complete implementation process — from initial investment to the time when it sees benefit from that investment — is much shorter. Costs may be higher than the benefits at the outset of a project, but as the project proceeds, there's a crossover. Greater benefits and efficiencies increase, while costs remain stable, and the benefit curve increases quickly.

"So," Hespeler says, "you now have monies and revenues dropping to the bottom line that you didn't have at the beginning of the project. Those dollars can be repurposed into upgraded

order-management systems, a modernized labor module or other efficiencies across the organization." Those upgrades will deliver additional profits that can then be refunneled into further refinements and enhancements, to constantly evolve and improve warehousing.

4 Future-proof warehouses to adapt to disruptions and innovations.

Depending on perspective, changes from the norm can either come in the form of disruptions or innovations. How to prepare for those changes and the willingness to embrace them can determine a business's long-term success.

"If you're positioned properly, a global supply chain issue could actually work to your benefit, because you may be in a prime position to support the shortfall of inventory," says Hespeler. "Nobody can foresee every single one of the disruptions that's going to happen. You can't plan on COVID-19, or the labor shortage, or truckers going on strike in Newport Beach, and you can't plan on Hurricane Irene in Florida or a blizzard or other Mother Nature events. So you just do the best you can to try to forecast what you're going to need and grow your business."

5 Look to cloud-based WMS applications for reduced up-front costs, scalability and flexibility.

The shift of logistics companies, both large and small, to cloud-based WMS operations has been one of the biggest and most important recent changes in the supply chain space. A cloud-based approach eliminates the requirement of having a data center on the premises, as well as servers and technical staff to maintain them, and instead lets logistics providers focus on providing great logistics services.

Resource link:
https://microlistics.com

Microlistics Enables Streamlined Logistics Solutions in a Variety of Sectors

For almost 30 years, Microlistics has been at the forefront of the logistics space, boasting expertise in third-party logistics (3PL), omnichannel retail, cold storage, food and beverage, fast-moving consumer goods (FMCG), fashion and apparel, manufacturing and industrial, and pharmaceutical industries.

Microlistics handles the logistics needs for companies ranging from mid-sized to multi-billion-dollar global enterprises. The company offers myriad services, ranging from material-handling equipment to vision picking, voice picking, robotics and beyond, across North, South and Latin America; the United Kingdom, and Benelux. Microlistics plans to expand into India and make more inroads across Southeast Asia. This growing customer base is supported by an expanding network of Microlistics service partners.

To learn more about these and other strategies, https://www.microlistics.com/fast-track-and-increase-return-on-warehouse-investment/

Supply Chain Trends in 2023

Sponsored by HERE

Location data, digitization and sustainability initiatives will contribute to accuracy, predictability and carbon efficiency this year.

The past three years have seen supply chains coping with the dislocations brought on by the COVID-19 pandemic. Those problems may not be completely behind us — and more have been added to the menu, notably, the supply chain implications of the war in Ukraine. But a shift in demand from goods to services and the ramping down of stress levels on transportation and logistics systems show that supply chain conditions are improving.

That means that in 2023 supply chain leaders will have the opportunity to pick up supply chain initiatives that may have been sidelined during the crisis years — including data and digitization programs that precisely orchestrate supply chain activities, as well as sustainability efforts that reduce companies' carbon footprints. The connective tissue that ties these efforts together is the integration of location data with supply chain operational data.

Companies are sitting on ever-growing volumes of data generated by their logistics operations and supply chains. But, especially when it comes to coordinating supply chain activities, that data lacks context if location data is not included. Companies that endeavor to blend logistics and operations data with location data, on the other hand, will find improvements in the efficiency, accuracy and reliability of their supply chains. According to Bart Coppelmans, director and global head of industry solutions at HERE Technologies, "Machine learning in the context of location analytics can identify transportation patterns and provide a confidence level with regard to, for example, the likelihood of delays, and apply those to future planning."

In an ever-changing and volatile supply chain environment, the speed of decision-making becomes a key factor in supply chain success — and the use of location data is important to that effort. "The faster you can get access to data and use it to sense what's going on in your supply chain, the faster you're able to make decisions," says Manish Govil, global segment lead, supply chain at Amazon Web Services (AWS). "Resiliency in the face of supply chain disruption requires ingesting a large amount of data in real time and being able to analyze that data in near-real time to come up with predictions that inform supply chain leaders of the implications downstream."

The application of location data and its integration with other enterprise data to derive supply chain insights is the best way to tie together all of these developments at the technology and data levels. Integration of data sets from multiple sources, together with data from commercial vehicles and positioning devices, yield real-time intelligence on current supply chain conditions and insights into future supply chain planning.

"This information can provide insights on different transport lanes and around distribution centers," says Coppelmans. "Location intelligence will play a role in providing context on the current state of the supply chain and for predicting the future, to the benefit of planning processes."

Predictive Supply Chains That Improve Decision-making

Predictive analytics, one key to effective planning, has a hefty appetite for large volumes of disparate categories of data. "Getting more accurate predictions requires learning from the current state," says Coppelmans. "Understanding how, when and why certain supply chain problems occur is important in designing better networks." Tying location data with logistics data provides more accurate and predictive estimated times of arrival, adding a confidence level that benefits logistics operators, shippers and their customers by promoting certainty and inspiring confidence.

While logistics delays can have cascading effects on supply chains, the analysis of data reveals implications for downstream operations.

"If a truck is going to be delayed," says Govil, "they need to know what's being carried on the truck and what operations are going to be impacted. It's also going to have an impact on labor schedules."

At a fulfillment center, a message indicating a late truck arrival might spur managers to look at worker schedules. "Do they need to adjust their labor numbers?" asks Govil. "Managers will also need to consider how the delay will impact inventory positioning."

In the case of a manufacturer, an inbound shipment, perhaps containing raw materials, might be delayed an hour or two if it's on a truck, or a week or two if it's on an oceangoing vessel. "Manufacturers need to know the impact on their bills of materials and on manufacturing activities," says Govil. Understanding the precise position of materials and products, by analyzing location data, allows manufacturers to sharpen their contingency plans.

From a planning perspective, artificial intelligence plays a crucial role in mitigating potential delays with better route planning. "It's possible to learn from an analysis of location data," says Govil, "that a truckload leaving at 9 a.m. will take longer to arrive than one leaving at 11 a.m. because the earlier shipment can get held up in rush-hour traffic. AI and machine learning play a part by predicting future conditions based on past behavior."

The same capabilities can also help supply chain operators manage in the moment, by taking into account changing conditions in real time. For example, current weather information can be integrated to understand the possibility of delay. "By using AI," says Govil, "you can create models which will come up with predictions based on the interaction of all this data." The integration of location provides clarity to these predictive processes.

"Now that the pandemic is subsiding, we're moving away from spending mainly on goods and starting to spend on services again, thus easing the pressure on the supply chains and leaving some space to think again about sustainability."

Building More Sustainable Supply Chains

Sustainability considerations in transportation and logistics hit the big time only about two years before the pandemic struck. That's when many shippers began to require carriers to provide information on their carbon efficiency as part of their bidding processes.

Many companies put sustainability issues on hold during the pandemic and will now want to catch up. "After a short break during the pandemic, where securing transportation capacity was the top issue keeping everyone busy, sustainability is coming back to the top of the agenda," says Tomas Robenek, transportation and logistics industry solutions manager at HERE.

"Now that the pandemic is subsiding, we're moving away from spending mainly on goods and starting to spend on services again," Robenek added, "thus easing the pressure on the supply chains and leaving some space to think again about sustainability."

The resurrection of sustainability programs will also serve to enhance company efforts to increase supply chain efficiency and customer service. As will be the case with other supply chain initiatives, location intelligence will play an important role in these efforts.

The Paris Agreement aims at getting the globe to a state of carbon net zero by 2050, but many companies have their own accelerated schedules as their customers, shareholders, employees and suppliers become more aware of the implications of climate change. A 2019 study of U.S. consumers showed that 70% considered environmental impacts when shopping. A more recent study showed similarly high levels of concern among consumers around the globe.

Location intelligence can play a key role in getting supply chains to their sustainability goals by supporting navigation applications, which can be used by companies to audit their carbon footprints. Among other things, supply chain managers can use location data to plan routes to minimize truck idling, thereby reducing emissions. Technology tools have already been introduced that perform just those tasks.

The move to electric vehicles will also require access to location intelligence when it comes to route planning and battery recharging. In these early stages, since the recharging infrastructure is sparse, routes need to be planned so that delivery vans can return to depots to recharge.

"In the future, when the density is higher, you will still need to know where the recharging stations are located," says Robenek. "Even then, it's expected that many delivery vans will charge at the depots by default, rather than somewhere on the road, because in many cases it won't make sense for a delivery driver to sit for two hours while the van recharges."

The more accurate ETA predictions afforded by location intelligence will also contribute to sustainability goals. "You can more efficiently optimize your operations by combining loads to burn less fuel and to make decisions about modes of transportation," says Coppelmans. "Many supply chains want to shift from road to rail, which is more sustainable, but you need to know when and where you can do that and for which products, and how to manage customers' expectations."

Organizations that don't focus on sustainability risk being left behind, according to Robenek. "Demand for clean services is going up," he says, "and those that aren't climate neutral will receive fewer orders. They also risk higher costs, because governments are considering emissions pricing and increasing fossil fuel taxation, and they risk becoming non-compliant with regulations as they evolve." A growing body of regulations also deals with the sustainable sourcing of raw materials, and location data is important to verify their points of origin.

"Some countries are already introducing bans on the production of internal combustion engines," Robenek adds, "so being proactive about the transition is the more sensible thing to do to be prepared."

"Demand for clean services is going up, and those that aren't climate neutral will receive fewer orders."

Digital Twins That Deliver Value

Supply chains in 2023 will become ever more flexible, thanks to the increasing use of predictive analytics, according to Coppelmans. One use case is the digital twin, which applies AI and machine learning to create virtual supply chain models that analyze problems, predict future impacts and suggest reaction plans.

"Logistics operators can use digital twins to provide a controlled overview of what's happening with their shipments," says Coppelmans. "Location intelligence is introduced to provide shipment tracking and predictions about when certain shipments will be arriving. With the control-tower approach provided by digital twins, shipments may be redirected or moved to other transportation options if problems arise."

Integrating enterprise data with location intelligence will help enterprises more efficiently manage their operations. ETA accuracy and efficiency can specifically improve last-mile operations, according to Coppelmans. "Incorporating location intelligence into last-mile delivery operations is going to create huge operational efficiencies for companies in the logistics space," he says.

Besides ETAs, actual times of arrival are also gaining importance. Location systems provide electronic timestamps for shipment arrivals, which streamlines the processes surrounding penalties and claims for late deliveries, and for defending against them. "A lot of this is now being done by e-mail and with manual processes," says Coppelmans.

The optimization of production and transportation processes brought about by merging operational and location data will ultimately generate higher levels of customer satisfaction for logistics providers and their customers. "It's all about delivering a confidence level to the customer base," says Coppelmans. "Optimizing production, operations and logistics processes is going to create additional revenue streams for manufacturers and logistics operators alike. Combining operational data with location data will deliver a most valuable impact to efficiency and sustainability in the future."

Resource Link:
www.here.com/logistics


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Five Ways That Service Spares Logistics Improves your Bottom Line

Sponsored by Flash Global

All supply chains — including the service spares supply chain — have been transformed by the ripple effects of the past few years' catastrophic events. Headlines are filled with news about the havoc still underway in the manufacturing supply chain. Stumbling blocks include factory manufacturing supply shortages, cargo capacity shortfalls, rising costs, termination of carrier service contracts, labor shortages and delays of all kinds. Cars, computers, MRI machines, telecommunications equipment — and much more — either can't be manufactured at all or face long production lead times.

Many corporations focus primarily on the sell side of their business — getting new products to market, which is the critical source of funds for any manufacturer. But it's become essential for business operations to factor in their ability to service their customers' assets with service spares. This is a critical aspect of the supply chain, especially in industries like high tech (e.g., telecommunications and computing assets, lifesaving medical diagnostic equipment, power grid monitoring equipment). Downtime for these assets gets very expensive very quickly, yet the service spares supply chain is often treated as an "afterthought" supply chain — that is, until a critical asset breaks.

The service/spares/replacement supply chain is not as straightforward as the manufacturing supply chain. It is not simple. Budgeting for, and procuring, service spares inventory is often under-measured, under-tracked and financially complex. Return on investment, cost of outage, cost of asset downtime and brand impact metrics are often absent.

However, companies that ignore the service supply chain may be squandering a 30% return on inventory investment annually by not effectively servicing products in the field. This investment constitutes inventory that companies already hold or may have on order. Assets may be poorly tracked, improperly positioned to meet predicted market demand, and reside in sub-optimal locations, tying up funds while collecting dust and becoming obsolete. The result is an inadequately visible inventory pool called on to perform in a highly reactive manner, a far cry from a predictive, analytics-based supply chain.

Following are five key concepts for transforming this "afterthought" global service parts supply chain from a loss leader into a profit center.

1 Build out visibility and management.

Excellence in service spares logistics requires visibility across the installed base, and management of service spares or hardware in regard to maintenance or end-of-life disposition. The above require tapping into manufacturers' databases, and strategically pre-positioning spare parts or equipment based on customer locations, as well as predictable asset lifecycle expectations and customer usage patterns.

All this centers on predicting demand and failure rates based on the manufacturers' installed base, and creating a supply chain and inventory strategy to align with these analytics. State-of-the-art platforms can now enable a predictive service parts supply chain model that anticipates failure and repair requirements.

2 Focus on predictive speed.

Speed matters in the service parts logistics world. If an asset sits idle for three or four months awaiting repair or replacement, the business loses the revenue that asset would produce.

"Often big tech companies rely on the other giant tech companies to fix their assets in the field," notes Kris Michel, chief operating officer of Flash Global. "They wait until something breaks, panic and call one of the giant tech repair firms. But it may take a company months to get your equipment scheduled and repaired. You're at their mercy, so to speak."

This is where analytics can help. In the manufacturing supply chain, companies typically know everything about every single component that goes into producing a final product. They can calculate immediately how much and how fast they need those components. They know their lead times. They can predict their production output.

In contrast, in the service parts supply chain, companies apply far fewer — if any — analytics to predicting item failure, demand rates and volumes. As a result, they operate in a reactive mode.

By using better analytic tools to predict failure rates, companies could manage their service parts supply chains just as well as they manage their manufacturing supply chains, make better business decisions and ensure that parts get to where they're needed on time and in full.

3 Stay current on trade regulations.

Regulatory, social, consumer, investor and financial pressures are re-shaping the asset service and recovery side of the supply chain. Trade rules are tighter than ever, so a solid, up-to-date understanding of trade implications for service spares and returned products is mandatory. "This is a completely different animal than the original sale trade rule regulatory environment," says Michel, "especially now in the COVID-19 era."

Many companies or trading blocs — the European Union for example — are concerned about parts or equipment disposal regulations and are now keeping strict compliance records and databases on products and parts. The computer sector, for one, has long had strong regulations in this area, including the Restriction of Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive in the EU, and Waste Electrical and Electronic Equipment (WEEE) legislation.

Considering environmental, social, and governance (ESG) regulations — which include sustainability and carbon neutrality — is increasingly important, not only among businesses and consumers, but among investors and regulators as well. By some estimates, supply chains make up 90% of all carbon emissions globally, so many companies are making commitments regarding reductions, especially around carbon footprint. ESG is fast rising as a vital part of a company's overall business strategy and operations.

And finally, many countries now require that maintenance activities be performed locally. "The countries want the jobs and the commerce to stay in-country," explains Kris. "Export-import regulations and classifications vary by country and must be abided by."

Taken together, these regulations will continue to reshape the compliance landscape for the service parts logistics industry.

4 Invest in inventory visibility.

New systems and analytics capabilities are increasing visibility for the service spares supply chain, and can also track assets in the field.

5 Build out visibility and management.

The service parts supply chain has been under-measured in terms of performance and ROI. Good, current, accurate data enables analytics to see the economic impact of either repairing or replacing an asset, which includes calculating downtime. Rigorously applied ROI metrics can show the benefits of bringing service parts logistics up to the same standard of performance as all other supply chain activities: This can eliminate the 30% waste incurred when parts sit idle, age out or are in the wrong place.

Savvy spare part management improves the bottom line, boosts service to customers and creates better risk management — all of which are certainly worthy of C-suite attention.

Resource Link:
www.flashglobal.com

Flash Global: Local Solutions for Global Problems

Headquartered in New Jersey, Flash Global designs and implements end-to-end service supply chain strategies for rapidly expanding companies, including many of the world's top high-tech companies. Flash Global creates global solutions that are locally fueled, which enables companies to efficiently scale in countries all around the world.

Companies leverage in-region and in-country expertise throughout Flash Global's worldwide infrastructure of global service centers, customer response centers, distribution centers and forward stocking locations, to seamlessly move products across international borders and serve their customer bases.

Control Towers and Managing the Supply Chain of the Future

Control towers provide a dynamic, graphic visualization of orders, shipments, inventory and assets across the supply chain, for a single, trusted view shared by all parties in real time.

Sponsored by Infor

The Basics

Global supply chains remain rattled by the fast rise of more complex, demanding e-commerce fulfillment in an environment of ongoing supply-demand dislocation and increasing rates of disruption. Building in agility and resilience to manage disruption and demand volatility has become a top priority.

Control towers collect and standardize a range of cross-functional internal and external data — real-time inventory and shipment location and status across the network, point-of-sale and market data to capture demand signals, supplier production and carrier capacity data, and "situational" traffic, roadway and weather data for updating ETAS.

Visualization tools display the end-to-end network operation in at-a-glance, graphic form with configured views to support user specificity. Analytics measure performance, spot potential exceptions, recommend response options, and optimize workflow and processes against established business rules and priorities. This real-time, shared end-to-end network view enables parties to track, prioritize and allocate freight, orders and inventory, predict and manage exceptions, and make more informed operational and strategic decisions.

The Future

A control tower isn't simple plug-and-play software. Typically, it can be an entry point, or an end goal, in a larger digital transformation process that relies on continuous, networked data and reporting from partners and vendors, from sourcing to point-of-sale. The more granular, current and complete the data, the higher degree of trust in the data and the more detailed, insightful and actionable the visibility.

Towers can be built in stages, initially designed around specific visibility needs — shipment tracking and ETA accuracy, supplier and carrier management, inventory controls to ensure on time and in full (OTIF) delivery and avoid stockouts and production delays, or end-to end system performance and planning — adding capabilities later as needed.

Large manufacturers, retailers and 3PLs have been early adopters, because of both the complexity of their operations and their ability to leverage volumes and buying power to compel data standardization and reporting compliance from upstream and downstream partners. But as the technology has become more accessible and costs have come down, it has attracted interest from small and mid-sized companies grappling with demand volatility, supply or capacity issues and worker shortages.

Change management among supply chain partners remains a challenge. But as a critical mass of smaller suppliers, niche retailers and warehouses, last-mile logistics and fintech service providers plug in, and as supply chains consolidate and interconnect, control tower integration will likely become industry standard. Expect digital transformation to accelerate as adoption shortens order-to-pay cycles and exception response times beyond the capabilities of a conventional manual operation and enterprise resource planning (ERP) software.

Widespread introduction of artificial intelligence and machine learning will make networks and their control towers more predictive and prescriptive. The endgame: automation of most supply chain processes and refinement of governing business rules for a faster, frictionless supply chain, freeing up scarce people and resources from repetitive, mechanical functions for higher-value work.

You can almost sense the demand lights flashing.

Resource Link:
www.infor.com/products/infor-nexus-control-center

Expanding Apparel Brand Scales Seamlessly with E-Commerce Technology

Challenge: A rapidly scaling e-commerce apparel brand struggled to meet customer expectations and required a flexible fulfillment strategy.

Solution: Omnichannel logistics provider Ryder E-commerce by Whiplash leveraged its dedicated e-commerce technology for real-time inventory control, giving the brand the ability to launch flash sales at short notice. The fulfillment solution included customized value-adds such as promotional packaging for the very best customer experience — every time.

Results: One week into its new fulfillment operation with Ryder E-commerce by Whiplash, the apparel brand fulfilled more than 1,000 orders on time. The result? Almost all of its customers — 99.5% — reported they were satisfied with their order and delivery experience.

About the Solution Provider: **Ryder E-commerce by Whiplash** is a leading direct-to-consumer fulfillment and retail logistics provider, offering end-to-end customer care, transportation, distribution and value-added warehouse services. Operating 24 distribution centers nationwide across more than 10 million square feet of space, Whiplash brings emerging and established brands the scale they need to grow and succeed.

Web: https://whiplash.com
Email: fulfillment@whiplash.com
Phone: 877-901-6472

Convenience Store Client Maximizes Profit and Improves Customer Service

Challenge: Despite significant growth, a major convenience store (c-store) chain had inventory management challenges.

Solution: C-stores have retail challenges such as limited shelf space and SKU velocity variation. This is particularly difficult for short-lifecycle items such as candy and tobacco. 4R's Intelligent Inventory Optimization solutions enabled the client to scale while targeting the most profitable approach for inventory management. 4R's convenience retail inventory solutions take advantage of advanced analytics, leveraging improved predictions and delivering an optimal profit improvement across the c-store's supply chain.

Results: 4R's logic forecasted each SKU in store so the client could stop recalibrating store tiers by sales velocity. 4R's recommendations considered shelf factors of items so manual manipulations due to space constraints ended, thereby reducing waste. The client was offered options to increase the aggressiveness of orders taking advantage of rebate timing. 4R's Planning Team allowed our client to focus on other initiatives.

About the Solution Provider: **4R** offers Intelligent Inventory Optimization Platform and Planning Services. Our prescriptive analytics solutions leverage AI strategies that help businesses optimize supply chain and merchandising decisions. Our team of expert planners brings supply chain planning leading practices to optimize your inventory investment.

Web: https://4rsystems.com
Email: optimize@4rsystems.com
Phone: 610-644-1234

A Digitally Native Footwear Brand Finds Rapid Fulfillment

Challenge: A rapidly growing D2C footwear brand required an agile fulfillment operation that could scale just as quickly as their business was growing — without being bound by geography.

Solution: Ryder E-commerce by Whiplash leveraged its vast distribution network to ship across the United States within 48-72 hours at the cheapest carrier rate. After a seamless integration into the brand's existing e-commerce platform, the Ryder E-commerce by Whiplash interface provided real-time inventory management for the brand to keep track of its SKU counts, no matter how far they might be from the warehouse.

Results: The footwear brand's launch saw the first orders leaving the warehouse within 24 hours of being placed — a rapid turnaround that would not have been possible without the Ryder E-commerce by Whiplash technology.

About the Solution Provider: Ryder E-commerce by Whiplash is a leading direct-to-consumer fulfillment and retail logistics provider, offering end-to-end customer care, transportation, distribution and value-added warehouse services. Operating 24 distribution centers nationwide across more than 10 million square feet of space, Whiplash brings emerging and established brands the scale they need to grow and succeed.

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How a Global LSP Scaled Its Security Program and Won More Business

Challenge: A Global logistics service provider (LSP) wanted to provide its customers with a solution for preventing cargo theft and pilferage while boosting carrier compliance.

Solution: The customer partnered with Overhaul to meet its security and risk management goals and received the tools needed to quickly scale its existing program. The LSP continues to expand its internal security monitoring with Overhaul, unlocking more volume and business opportunities.

Results: By enhancing its security capabilities, our customer expanded its program to more customers. Overhaul has helped them track, monitor and secure over $600 million in shipment volume with a 100% delivery rate. With one customer, location expansion led to a more than 150% increase in shipments. Our customer significantly reduced the risk of full-truckload (FTL) cargo theft and pilferage for its high-value, theft-attractive customers. Across over 2,000 shipments supported by Overhaul, the client has reported zero total FTL cargo thefts to date.

About the Solution Provider: Founded in 2016, **Overhaul** is the only data-agnostic supply chain visibility and security solution. Overhaul transforms real-time visibility into risk management, compliance and insurance solutions for its partners. Its software-based approach offers high configurability and efficient time-to-value to supply-chain organizations without heavy tech.

Web: www.over-haul.com
Email: info@over-haul.com
Phone: 800-203-1649

New Revenue for Cloud-Based TMS that Embeds Orderful's Modern EDI Platform

Challenge: A leading cloud-based transportation management software (TMS) company for asset-based trucking needed a way to take on customers who require EDI without dedicating additional technical resources and taking months to go live.

Solution: The TMS provider embedded Orderful's EDI Platform within their solution to expand their service to customers who require EDI capabilities. New and existing customers can self-service onboard to their platform and easily integrate, test and validate their EDI transactions instantly with limited support. "We don't think we could have built a native EDI offering without Orderful." Sr. Product Manager, Leading TMS System.

Results: The TMS company has a new revenue stream and can stop saying "No" to prospects who require EDI capabilities. Their new modern EDI solution allows them to onboard and go live with new customers in days instead of months with limited technical resources.

About the Solution Provider: **Orderful** is EDI Done Right! Logistics providers, retailers, manufacturers and technology companies are onboarding and going live with new trading partners in days using Orderful's Modern EDI platform to simplify integrations, manage connectivity, transform data to X12, and pro-actively validate and correct errors in real-time.

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