

FEBRUARY 2021

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THE MAGAZINE FOR DEMAND-DRIVEN ENTERPRISES

SPECIAL REPORT

**SUPPLY CHAIN
EDUCATION:
REWRITING
THE TEXTBOOK**

WAREHOUSE AUTOMATION

THE RISE OF THE ROBOTS



ALSO IN THIS EDITION
MARITIME FINDS ITS SEA LEGS
SPOTLIGHT ON PUERTO RICO



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Info SNACKS

BITE SIZED SUPPLY CHAIN/LOGISTICS INFORMATION



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Year-over-year (2019-2020) increase in consumer online spending. Consumers spent \$861 billion online with U.S. merchants last year — the highest annual U.S. e-commerce growth in at least two decades. It's also nearly triple the 15.1% jump in 2019. —*Digital Commerce 360*

WORKING IT

The top supply chain jobs that will continue to help essential businesses meet demand while ensuring worker safety and supply chain strength and resiliency include:

- Vaccine-related work (including distribution and logistics)
- Logistics & transportation coordinators
- Food production & packaging associates
- Returns, packing & sorting workers
- Janitorial, hygiene & housekeeping staff
- Assembly line & production workers
- Forklift & machine operators
- Product quality control
- Materials handling & distribution associates
- Warehouse associates

—Staff Management, SMX and SIMOS Solutions

INVASION OF NON-INVASIVE TECHNOLOGY

Through 2023, demand for robotic goods-to-person (G2P) systems will quadruple to help enforce social distancing in warehouses. With G2P systems, the robots deliver the goods to a person who remains in one place. And 50% of supply chain organizations will invest in applications that support artificial intelligence and advanced analytics capabilities. —Gartner



CALLING THE SHOTS

Sourcing for several product categories related to the COVID-19 vaccine has increased massively year over year (YoY), quarter over quarter (QoQ), and month over month (MoM). Notable categories, as tracked by Thomasnet.com, include:

DRY ICE

- Up 1,138% YoY
- Up 695% QoQ

ULTRA-LOW TEMPERATURE FREEZERS

- Up 835% YoY
- Up 571% QoQ

SYRINGES

- Up 187% YoY
- Up 182% QoQ
- Up 403% MoM

DISPOSABLE SYRINGES

- Up 61% YoY
- Up 33% QoQ
- Up 175% MoM

PHARMACEUTICAL PACKAGING

- Up 17% YoY
- Up 123% QoQ



ROOTS CANAL

By offering a shorter route for ships, the Panama Canal reduced more than 13 million tons of carbon dioxide-equivalent emissions in 2020, compared to the most likely alternative routes. These savings are equivalent to the greenhouse gas emissions of 2.8 million passenger vehicles driven for one year or the carbon sequestered by 217 million tree seedlings grown for 10 years.

Atlanta was the top city to find spot van and refrigerated truckload freight in 2020, according to DAT Freight & Analytics. A spot load is transactional freight not under contract that a shipper or broker makes available on load boards. The pandemic led to an explosion of spot market activity in 2020. In a normal year, 12% to 15% of all truckload shipments are transacted on the spot market. In 2020, that figure was nearly 23% as spot rates climbed to all-time highs.



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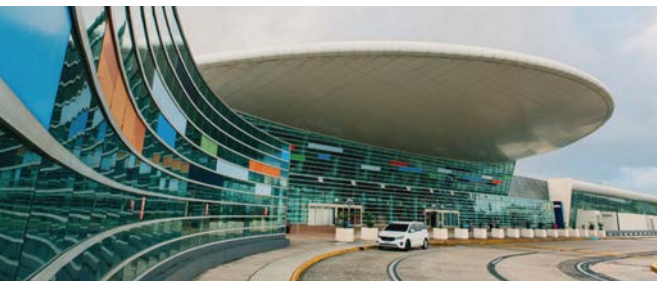
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Supply chain education has transformed with the pandemic, and there's no looking back. New programs focus on digitization, diversity and inclusion, and omnichannel strategies.

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PUERTO RICO: GO WITH THE FLOW

The "Made in America" initiative, a highly skilled workforce, and transshipment capabilities make the island a can't-miss spot for U.S. manufacturers.



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PHOTO COURTESY OF
BOSTON DYNAMICS

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Boston Dynamics' Handle autonomous robot prototype uses deep-learning vision software to locate boxes. It also unloads trucks, and palletizes and depalletizes boxes.

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Buddy, Can You Spare a Can?



Keith Biondo, Publisher

According to a CNBC investigation, shipping lines rejected U.S. export containers worth hundreds of millions of dollars during the last quarter of 2020. Empties were loaded and shipped back east to be filled with Chinese exports.

But press reports blaming “congestion” are off the mark. Those empties are getting moved and loaded on ships somehow.

In mid-October, carriers notified agricultural exporters they would not accept their orders and instead prioritize empties. Other export products also have been impacted.

“This data and the impact on our economy is potentially very troubling, but unfortunately not altogether surprising,” says Carl Bentzel, commissioner of the Federal Maritime Commission (FMC). “These numbers track pretty consistently with the complaints that we have been receiving at the FMC for the last four or five months.”

More than 300,000 containers were rejected, according to some estimates. Has anything been done during the past five months?

YUAN TALKS, CONTAINERS WALK

Many trade and supply chain experts offer ways to mitigate this crisis—use air, start a tender management program or use a partner that has one and gives you access, get better visibility, book space based on projections before your transportation management system gets the data. Some large forwarders are chartering small container ships. Here’s a good one—pay the premium or you will be priced out of the market.

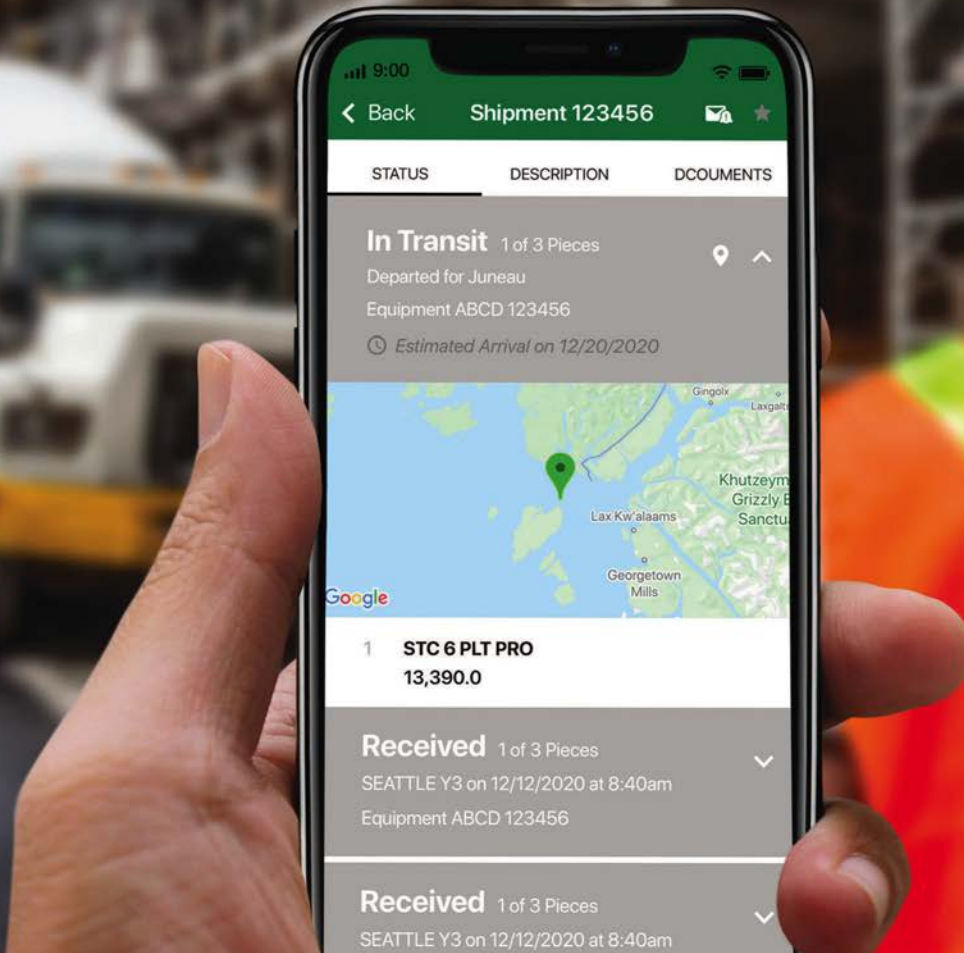
But all that, while true, is just icing on a rotten cake and will not have a material impact on this long-term problem. Oh, and blaming the shipping lines for the rejected shipments, as many do—also true—is like blaming the messenger.

The bigger picture points elsewhere. China is obviously cornering the market to flood global zones with product, even forgoing Lunar New Year celebrations in some areas to keep the exports flowing. As the U.S. economy opens up, demand for Chinese goods will continue to grow. That means that this blunt force trade policy of using containers to suppress imports and boost Chinese exports will likely worsen.

Bentzel is right. This trend is not surprising, troubling, and will have an impact on the U.S. economy. But it goes further than that.

Hmm, I wonder: Will this policy impact reshoring plans? It might be a little tough to ship product from the United States if China controls container access. It must be a coincidence, but if you keep your plants in China at least you’ll have access to global markets, right?

Will the current U.S. administration take action to protect U.S. export enterprises? Surprise us.



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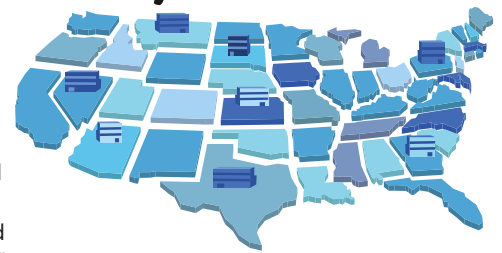
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GOODQUESTION

Readers Weigh In

Do you expect a resurgence in reshoring to the United States? Why or why not?



NO. I don't expect a significant increase in reshoring. I do expect a significant increase in multi-sourcing of key products in the supply chain. Reshoring to a significant degree requires huge infrastructure changes that I do not believe today's consumer is ready to fund in price increases and reductions in convenience.

—**Bill Denbigh**
Senior Director, Product Marketing
Tecsys

YES. I do expect a reshoring of manufacturing in the United States, though the process will be arduous and expensive. First, I expect this process will be spurred by federal and state lawmaking. There are some industries—most notably defense and pharmaceuticals—in which the United States has sensibly decided it needs

more control over the supply chain. Those industries will be reshored first, because they have to be.

The second wave of reshoring will likely be a reaction to the growing trade imbalance between the United States and China—not for any specific policy or principled reason, but rather because that imbalance has made the logistics of procurement from China less reliable.

The third wave of reshoring will once again likely be legislatively inspired, as I suspect federal, state, and local governments will start contemplating giving tax incentives to reshoring initiatives. Conversely, however, some tech products and industries have come to be literally exclusively made in China. These will be the most difficult to reshore.

—**Sarah Rathke**
Partner, Squire Patton Boggs

NO. Reshoring has not turned out as advertised. A booming China suggests while some things have changed, many supply chains are still the same or in a slow transformation process. A trend toward regional supply chains is intact but may take years to play out.

—**Rich Bolte**
Chairman & CEO, BDP International

YES. We will continue to see more U.S. companies move manufacturing closer to their U.S. market—reshoring to the United States and nearshoring to Canada and Mexico. Shorter supply chains will reduce freight costs and time to market. Increasing levels of automation in manufacturing will further accelerate this trend.

—**Marcus Karten**
Vice President Global
Business Development
Arvato Supply Chain Solutions

NO. Reshoring will slow. While President Biden enacts legislation supporting American manufacturing, the United States will attempt to re-enter international trade agreements. These countervailing effects will make companies reconsider how aggressively to reshore manufacturing—especially given that the country has proven as susceptible as many other industrial nations to the COVID outbreak.

—**Cullen Hilken**
CEO, 3Diligent

YES DEFINITELY...

Reshoring manufacturing back to the United States has been steadily growing for the past 10 years, but since March 2020, reshoring has dramatically accelerated. The latest Thomasnet.com survey shows more than 60% of U.S. manufacturers are actively pursuing reshoring some or all of their manufacturing. Over the past 30 years, ongoing investment in advanced manufacturing technology and innovation has helped make U.S. manufacturing competitive on the global stage.

The massive supply chain disruptions caused by the pandemic forced almost every company to reevaluate their supply chain risk and as a part of this analysis many companies found that reshoring is a smart, cost-effective alternative. Reshoring will continue to accelerate, creating the strongest market opportunity for North American manufacturers and the related ecosystem in the past 70 years.

—**Tony Uphoff**
President and CEO, Thomas™
Thomasnet.com

IT DEPENDS...

There is a lot of talk about nearshoring of supply chains to avoid the supply chain disruptions we saw in 2020. This won't be the case for some industries—with cost returning as a decisive factor in many supply chains quicker than you might expect and lean inventory once again being favored by some industry sectors due to competitive pressure from other regions.

But for strategically important sectors such as life sciences and healthcare, there will be a marked shift to nearshoring. This will push companies and their supply chain providers to seek higher efficiencies through technology, leaner inventory, and network design, to offset the increased costs in warehousing and labor. For North America, this will likely also benefit competitive labor markets such as Mexico.

3PLs will have an important role to play in this process. The expertise they bring in change management and process re-engineering will help companies adapt their networks and operations to the new configuration. They can offer access to infrastructure, resources, technologies, and an established supplier base to ease the transition closer to home.

And perhaps most importantly, they can help achieve productivity improvements and identify cost saving opportunities to offset the likely impact of carrying more stock, having higher labor unit costs, and sourcing from local suppliers at less competitive rates.

—**Scott Cubler**, *President, Life Sciences & Healthcare, North America*
DHL Supply Chain

YES. Supply chains will compress. With the need for agility and nimbleness in an ever-changing marketplace, moving production closer to consumption will be an increasingly popular strategy. Control over employee and product safety will also be prioritized, which further suggests a resurgence in reshoring.

—**Eric Lien**
EVP of Strategic Accounts
Arrive Logistics

YES. Several factors will drive reshoring: the need for supply chain stability, uncertainties about global trade, and increasing automation that is lowering the cost of manufacturing in the United States.

—**Chris Nicholson**
CEO, Pathmind

NO. I don't believe U.S. companies will invest in reshoring anytime soon. The COVID-19 pandemic has revealed gaps in our global supply chains and while some may think reshoring production to the United States could alleviate these challenges, focusing on end-to-end optimization of current

supply chains could be more efficient and cost effective. Implementing technology such as material requirements planning solutions to existing supply chains would provide better management and increase visibility into all production planning, scheduling, and inventory controls from a centralized location.

—**Scott Deakins**
COO, Deacom

YES. As COVID-19 caused numerous shutdowns, some shippers found themselves high and dry, with no operational facilities. Supply chains that relied mainly on sourcing and

manufacturing from China and nearby regions faced huge challenges. By reshoring to the United States, supply chains will diversify their sourcing points, allowing for more robust solutions and effective responses to disruption.

—**Rajiv Saxena**
SVP of Supply Chain
Solutions and Innovation, Kenco

YES. Looking at global economic trends, a new U.S. administration, foreign policies, or incentives the United States may offer, manufacturers or brands may look at their total landed cost and decide if it is in their best interest to reshore. Industry clusters will need to be existing to support these moves.

—**Katia Axberg**
Regional Director, Sales and Marketing
Dimerco Express (USA) Corp.

YES, BUT... We may see nearshoring behavior along with a resurgence of domestic headline items. We anticipate most CPG business will remain domestic. To avoid delays at ports, suppliers may bring in goods earlier and build inventory domestically. Potential tariffs from President Biden's proposed "Buy America" plan may also become a factor.

—**Kevin Williamson**, *CEO, RJW Logistics*



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[INSIGHT]

DIALOG

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Quick TIP

Evaluate your use of shelf space. Retailers should have consumer-centric assortment evaluation and planning processes. Having the products that meet the needs of your most valuable shoppers always in stock supports sustainable sales performance and increased shopper satisfaction.

—Kevin Sternecker
Chief Marketing Officer, Symphony RetailAI

and scrutiny. These challenges also act as a forcing function to distributors and carriers to accelerate their digital transformation.

—Mathew Long
Head of Product Success
Verizon Connect

Re. 3PLs Play a Pivotal Role

bit.ly/pivotal_3PLs

3PLs are looking to expand beyond their traditional customer base

to improve the bottom line. Third-party logistics warehouses may consider leveraging their cloud-based platforms for systems such as warehouse, order, and transportation management where they can more easily address future needs.

This may help to connect people, processes, and technologies to better utilize a company's core strength in efficient inventory management and product delivery to consumers, and improve the customer experience.

—Kevin Fletcher
Director of Van Services
Atlantic Logistics



Re. Are We Ready to Deliver the COVID-19 Vaccine?

bit.ly/vaccine_delivery

Cold chains matter more than ever, as they transport crucial COVID-19 vaccines with temperature precision and

timeliness. We understandably expect to see a heightened level of shipments and logistics activity. Yet, this expectation does not do justice to the immense coordination between manufacturers, distributors, drivers, and technology that is central to ensuring viable vaccine delivery.



low-temperature range, making it a complicated industry to maintain product integrity. Specialized drivers are needed who have familiarity with refrigeration systems.

Data points, such as temperature, humidity, vehicle vibration, and tilt, among others, are tracked and monitored at every step along the supply chain. This is working in parallel with GPS fleet management solutions that are helping to ensure safe routing and ease of navigation from start to finish.

Cold chain logistics providers are up against some of the steepest demands

The cold chain relies on a network of refrigerated activities that constantly keep inventory at the correct

Fast TAKE

It's significant that Locus Robotics is the first autonomous

mobile robot (AMR) vendor to reach "unicorn" status, granted to privately held startups valued at over \$1 billion.

The AMR industry had already been growing rapidly prior to COVID-19, and a large number of companies emerged following Amazon's acquisition of Kiva Systems. Retailers have been adopting AMRs to fulfill growing e-commerce orders amidst an acute labor shortage in many areas.

COVID-19 acted as an accelerant, not only because it caused a massive spike in e-commerce, but also because of the social distancing measures it forced on e-commerce retailers, to which additional automation has been a crucial solution. One thousand customer sites globally had adopted AMRs by the end of 2020—close to double the number from the year before.

—Ash Sharma
Senior Research Director at consultancy firm Interact Analysis, on warehouse automation company Locus Robotics hitting "unicorn" status with a \$1-billion valuation.





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10 TIPS

Developing Supply Chain Resiliency

A single fault line in the supply chain can disrupt events farther down, including the all-important last mile. Here's how to develop and maintain a supply chain that is resilient, and easy to scale and optimize.

1 DIGITIZE YOUR SUPPLY CHAIN.

Logistics is full of estimations that make it challenging to offer a consistent customer experience or to allocate resources effectively. Use delivery orchestration technology to leverage your business logic and operational data for better, more efficient processes. Digitize and unite your data points across a single source of truth for actionable insights and the knowledge to make better business and operational decisions—from assigning the optimal fleet or vehicle for a specific delivery to choosing where to expand operations. Better decision-making results in greater efficiency and reduces the chance of unexpected events disrupting the flow of the supply chain.

2 INTEGRATE YOUR FIRST-, MIDDLE-, AND LAST-MILE SYSTEMS.

If the flow to a warehouse or from a warehouse to a distribution center is affected, it can disrupt operations farther down the supply chain. Investing in open and integrated systems makes it easier to track and manage exceptions quickly.

3 ENABLE REAL-TIME VISIBILITY.

End-to-end visibility into product inventory, tracking, and delivery prevents shippers and providers from accepting orders that they don't have, or service-level agreements (SLAs) that they can't fulfill. It also makes it easier to pinpoint and isolate any issues as they arise and quickly find alternatives to get orders out on time.

4 EMBRACE AUTOMATION.

Streamlined supply chains have fewer weak links to break. Once your operations are digital, apply automation software to speed and optimize manual processes such as delivery and service scheduling and routing.

5 INVEST IN TECHNOLOGY TO MANAGE RETURNS.

Few supply chains are equipped to handle returns at the level that e-commerce throws at them. Invest in technology that turns returns into a channel of your last-mile operations that you

can optimize for efficient processes alongside delivery.

6 FOCUS ON SAFETY.

Have warehouse workers, drivers, and other staff work in capsules. This way, even if someone in a capsule shift tests positive for COVID-19, another capsule can take over. Products continue passing smoothly into and across the last mile without impacting capacity. Provide drivers with tools for contactless delivery and hands-free applications to keep them safe and prevent service disruptions.

7 STAY ADAPTABLE.

Engineer adaptability into service plans and the types of products you can deliver. Businesses with an array of services and customers—B2B and B2C delivery, next-day and scheduled delivery, or service plans with multiple tiers—are well placed to capture larger market share and weather changes.

8 GET AGILE.

Agile supply chains don't break; they bend. Engage multiple contractors, regional carriers, or crowdsourced fleets to inject agility into your operations and decrease the liabilities of working with a single provider.

9 LOCALIZE THE SUPPLY CHAIN.

Build multiple hyperlocal options for fulfillment, as well as regional fulfillment centers, to keep delivery from grinding to a halt when something strikes one location.

10 INVEST IN FUTURE RESILIENCE.

Get technology that enables you to change, enhance, or add services to existing operations and lets you maintain resiliency based on current operational size and projected growth.

SOURCE: GUY BLOCH, CEO, BRINGG

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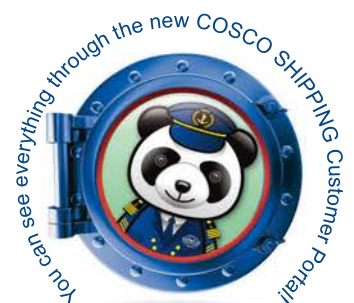
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Conversations with the Captains of Industry

Steering ArcBest with Values and Trust



Judy R. McReynolds
Chairman, President,
and CEO, ArcBest

To achieve her goal of aligning the resources of a 100-year-old company to better meet customers' evolving needs, Judy R. McReynolds draws on her strategic and value-driven leadership skills.

by Merrill Douglas

If Judy R. McReynolds could talk to her 18-year-old self, she'd tell that young woman to be open to change. "But make sure you embark on that change with people who share your values and whom you can trust," adds McReynolds, chairman, president, and chief executive officer of ArcBest in Fort Smith, Arkansas.

The words "change," "values," and "trust" figure prominently in McReynolds' business philosophy. For example, she has led a major initiative to broaden ArcBest's focus to better match its customers' evolving needs. She credits the company's values-driven culture for the success of that transformation.

In a recent conversation with McReynolds, we dug deeper into her leadership approach.

IL: You started your career as an accountant. How did you find your way into transportation?

During part of my public accounting career, I worked for Ernst & Young in Little Rock, Arkansas. My client base there consisted largely of less-than-truckload (LTL), truckload, and flatbed carriers. As I learned about the industry, I observed the hard work and dedication of the leaders and leadership teams in those companies.

I also appreciated the entrepreneurial spirit of many of those companies. ArcBest (then called Arkansas Best Corporation) was one of my clients. Working in the tax area, as I saw the leadership team's approach and integrity, I grew more interested in the business. I first joined ArcBest in the accounting and finance area.

IL: What did you learn early in your career that helped shape you as a leader?

In my public accounting days, and later when I joined this company, I came to appreciate the importance of a values-driven culture when you're trying to develop strategies and get things done. To move fast as a leadership team, you have to be able to collaborate and trust one another.

IL: How have values and trust helped you get things done?

When I first came to ArcBest, more than 90% of our revenue came from the LTL part of our business, ABF Freight. But many customers were evolving, spending on other transport modes.

We wanted to evolve to reflect our customers' changing needs. So in 2017, we launched what we call the enhanced market approach. We merged the siloed sales teams across our business units into one organization to enable our sales team to serve the

customer across the entire supply chain. Additionally, several key functions—talent development, pricing, customer service—operated in silos. We began to integrate those functions to align our resources with the way our customers wanted to do business.

In a company that's nearly 100 years old, change on that scale takes courage, along with a strong focus on change management. It takes a values-driven culture to develop the level of trust needed to accomplish that kind of change in an organization.

IL: What keeps your customers awake at night?

They're trying to work through the effects of COVID-19. Many customers had their supply chains disrupted. The issues are different for nearly every customer. One by one, we've been working to help them normalize their supply chains and look at creative ways to endure the pandemic.

IL: How would your team describe your leadership style?

I get characterized as courageous, because of some of the changes we've made in our business; strategic, because I love strategy and planning; and values-driven.

One example of my strategic focus is the quarterly meeting of our Horizon Growth committee, which I started early in my tenure as CEO because I wanted to make sure we were looking to the future. I saw how we could get absorbed in the whirlwind of current concerns and not spend time on the next three to five, or even 10, years.

Our Horizon Growth meetings include the leaders who report directly to me and a few others who work in areas critical to our planning. Throughout the process, it's important that I hear from other leaders; I don't want to be the only one talking.

IL: What three things do you check first in the morning?

I check my messages for anything urgent I need to address. I look at the previous day's activities—revenues, shipments, and key operating statistics—to see how we've done in all our businesses. I also review news about the industry and our customers.

IL: How do you give criticism or correction?

I like to discuss a leader's strengths but also mention areas where there's room for improvement. Most of the time, our leadership team is aligned. But when I see that things aren't working well, I try to jump in and address the issue quickly.

How About If We Try This?

"We get curveballs thrown at us daily," says Judy R. McReynolds at ArcBest. And unusual requests can spark creative solutions.

In one recent example, a customer was arranging deliveries to its storefronts, which had no receiving docks. "Our people would bring the product in, set it up in a particular room, and remove all the materials at the end of the delivery," she says. "As you can imagine, this kind of delivery is typically more expensive than a regular one."

But while it was asking for special services, the customer also wanted to reduce its costs.

"We asked to review their entire supply chain, so we could suggest portions of the process that could be reduced," McReynolds says. "They ended up asking us to manage their business in this area, so we could ensure that the right carriers were in the right places based on their needs."

The customer loved that solution, noting that no other third-party logistics company in their experience had ever taken such an approach. "We are willing to roll up our sleeves, try to understand the steps in the process, and then make recommendations," she says.

IL: Who is a business leader you find particularly inspiring?

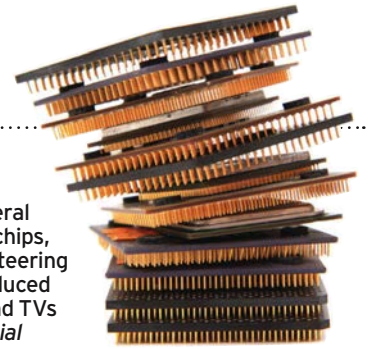
It's not often I see all the characteristics I admire in one leader—inspirational leadership, great communications skills, willingness to take risks, and appropriate balancing of the needs of customers, employees, and shareholders. But I do find all those traits in Tim Ogilvie, chief executive officer of innovation firm Peer Insight, a company we have worked with.

Ogilvie is a small-business owner and leader with a mission to help other businesses succeed by deeply understanding their customers' desires. He's an entrepreneur and has taken appropriate risks. But he also sees the value in developing employees, and he has a strong desire to help businesses meet customers where they are.

IL: How do you like to spend your time outside of work?

My husband and I enjoy any opportunity to get together with our grown kids. We all love the beach, and we love to travel in Europe. I like to stay fit and be healthy. I play the piano. I love reading to absorb new information or just for pleasure. ■

Automotive



FROM iPADS TO eCARS

Apple is moving forward with self-driving car technology and plans to produce a passenger vehicle equipped with its own battery technology by 2024, Reuters reports. Central to the company's strategy is a new "monocell" battery design that could radically reduce costs and increase the vehicle's range, the report says.

However, making a vehicle is a huge supply chain undertaking, even for an electronics giant like Apple. The company will likely use a manufacturing partner to assemble the vehicle, or even pursue an autonomous driving system integrated with a traditional automaker's car, Reuters says.

The road to Apple's car of the future may run through China, a Bloomberg report says. China makes more than 70% of cathode material, a key part of all batteries, and has 70% of global capacity and 80% of the materials needed for battery-powered products.

"With global auto markets navigating rough terrain, this much is clear: Whoever succeeds will



be all but reliant on China's booming electric-vehicle parts makers," says Anjani Trivedi, who covers industrial companies in Asia at Bloomberg.

WHERE WILL THE CHIPS FALL?

Automakers such as Volkswagen, General Motors, and Honda face a shortage of chips, which control everything from power steering to antilock brakes, as the pandemic-induced demand for game consoles, laptops, and TVs overwhelms chipmakers, says a *Financial Times* report.

Chip shortages halted the production of 280,000 vehicles, and as many as 500,000 vehicles could ultimately be affected, says AutoForecast Solutions and IHS Markit.

With many workers furloughed, carmakers seek government support to accelerate their supply of chips. Because only 10% of semiconductor fabrication plants are used for automotive parts, carmakers do not have the same negotiating power as consumer electronics. With no immediate solution, the shortage is expected to last at least six months, the report says.

Toyota avoided the issue by diversifying its supply chain and keeping more inventory following the Tohoku earthquake and tsunami in 2011. Hyundai Motor avoided shortages because it did not cancel any chip orders when the pandemic forced factories to shut in early 2020.

Most carmakers, however, rely on just-in-time delivery of components to keep costs low. The number of intermediaries in the supply chain also varies, with some relying on their parts makers to secure chips, while others prefer to negotiate directly.

The shortage raises questions as the auto industry becomes more dependent on chips as electric vehicles grow in popularity and autonomous driving develops. Some carmakers and automotive chip specialists may take more manufacturing in-house. New entrants to the car market, such as Apple, may use their existing negotiating power in chips to gain an advantage, the report says.

"THIS EPISODE OF CHIP SHORTAGES HAS ONCE AGAIN SHOWN HOW URGENT AND NECESSARY IT IS TO HAVE AUTONOMOUS AND CONTROLLABLE SUPPLY CHAINS."

—Chen Shihua, Senior Official, China Association of Automobile Manufacturers

BATTERIES INCLUDED

The shift to electric cars is boosting investment in lithium-ion batteries. As automakers spend billions to build more electric models in the United States, investors set their sights on firms looking to expand the supply chain for batteries in North America, which has long relied on imports.

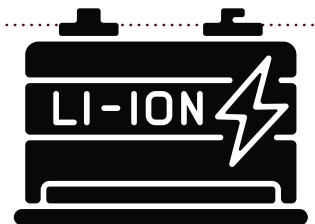
Sila Nanotechnologies, a startup that makes silicon anode materials used in batteries, has attracted

Wall Street backing and is building a factory in the United States. It is expected to make enough materials to supply batteries in more than 1 million cars annually.

The United States needs to reduce its reliance on China to lower costs and remain competitive, a Fox Business report says. U.S. battery-making capacity is expected to increase in the next decade, rising more than sixfold from

60 gigawatt hours of production in 2020 to about 383 gigawatt hours in 2030, says Benchmark Mineral Intelligence.

Battery manufacturing giants such as South Korea's LG Chem and SK Innovation are building factories in the United States to expand stateside production of electric-car batteries. Tesla is also expanding its battery-making capabilities in-house.



While consumer demand may not materialize as expected, increasing U.S. battery production will help automakers and their suppliers lower costs, which will help consumers to adopt electric vehicles more widely, Fox says.

10 TRENDS ON THE ROAD AHEAD

Automotive supply chains should keep these 10 trends in mind for 2021 and beyond, *Forbes* says:

1 Shift to computing power. Every automaker will have to digitize in 2021 as more tech-centric competitors enter the ring. Many automakers will bring software development in-house or even build their own operating systems.

2 Circular economy. With waste from end-of-life vehicles becoming a massive problem, automakers will embrace circular economy concepts and incorporate design-and-dismantle principles earlier in the supply chain.

3 Automotive e-commerce. The pandemic has shown consumers how easy it is to buy everything online. Online marketplaces also offer extremely competitive prices. Automakers may turn to digital marketing to attract more test drives, or accept bookings on third-party e-commerce platforms.

4 In-car shopping. Internet of Things platforms, such as in-car marketplaces, will allow consumers to shop from their cars. This will transform the user experience and push the boundaries of personalization.

5 Subscription models. New models, such as vehicle subscriptions, offer flexible contracts, short commitments, and easy vehicle swapping. For subscriptions to be successful, this model should cover not only the premium needs of the market, but also affordability and accessibility for the mass market.

6 In with the old. The growth of used car sales will advance with the rising appeal of online used car retail, which will maintain a compound annual growth rate of 9% until 2025. Demand for used electric and hybrid vehicles will also pick up.

7 Pandemic purchases. By purchasing compact cars, first-time car buyers will boost revenues in markets like China and India. This reflects global trends of consumers avoiding public transport in favor of personal transport modes as the pandemic continues.

8 Wellness features. From purifying in-vehicle air to seats with massage functionalities, vehicles with health and wellness features will increase at a compound annual growth rate of 25% between 2019 and 2025.

9 Electric vehicle platforms. Electric vehicles will continue to roll out in big numbers, powered by emission regulations and shifting consumer preferences. Automakers will build scalable, dedicated electric vehicle platform architectures.

10 Fuel-cell electrification. Fuel-cell electric vehicles (FCEVs) may pull ahead of battery electric vehicles (BEVs). FCEVs have up to five times the range of BEVs, recharge faster, and are truly clean in that water makes up their tailpipe emissions.

WHILE ELECTRIC VEHICLE SALES CURRENTLY ACCOUNT FOR 3% OF THE U.S. AUTO MARKET, THEY ARE EXPECTED TO GROW TO 10% BY 2025.

—Morgan Stanley

DRIVING DOWN EMISSIONS

General Motors (GM) plans to phase out all its petroleum-powered cars and trucks and sell only vehicles that have zero tailpipe emissions by 2035. The decision is part of its broader plan to be carbon neutral by 2040, GM says.

Electric cars are the fastest-growing segment of the auto industry, but they still make up only 3% of total global car sales. Sales jumped in 2020 in Europe and China, but they remain niche products in the United States, says a *New York Times* report.

GM plans to increase the use of renewable energy as well as eliminate or offset emissions from its factories, buildings, vehicles, and other sources. The automaker says it will spend \$27 billion during the next five years to introduce 30 electric vehicles, including an electric Hummer pickup truck.

Several automakers have taken smaller steps in the same direction. Daimler, which makes Mercedes-Benz vehicles, says it will have an electric or hybrid version of all its models by 2022, and Volkswagen promises an electric version of all its models by 2030.



BMW RACES AHEAD WITH QUANTUM COMPUTING

Tracking the pricing and availability of car components from multiple suppliers can be a complex task for traditional computers. To streamline the process, BMW plans to use Honeywell's quantum computing technology to buy parts for its vehicles without disrupting production.

BMW is testing different Honeywell machines to determine which of its components should be purchased from which supplier at what time to ensure the lowest cost while maintaining production schedules.

The automaker says quantum computing could eventually be used to improve battery chemistry in electric vehicles and determine the best places to install charging stations. It could also help streamline manufacturing requirements such as safety and aerodynamics.

BMW will first test quantum computing speed and ensure small-scale computations match results from its traditional machines. In the next couple years, quantum computers will be able to handle optimization issues traditional computers cannot.

Quantum computers work with multiple variables simultaneously, narrowing the possible outcomes in a very short time. As quantum computing helps businesses perform faster and more accurate analytics, it could open up growth opportunities across several industries.



[IN FOCUS]

NOTED

The Supply Chain in Brief

> SEALED DEALS



- Third-party logistics provider **FM Logistic** was awarded a contract from **Pepperfry**, a furniture and home products marketplace in India, to provide omnichannel logistics services in the country's western region. FM Logistic will handle warehousing operations at Pepperfry's Bhiwandi warehouse.
- To help **The Ocean Cleanup** map harmful plastic, **Maersk** will deploy scientific sensor technology aboard its fleet that maps plastic floating in the world's oceans to enhance visibility of the problem. Maersk will also provide shipping, airfreight, special transport, customs clearance, and warehouse management services for the nonprofit.
- **Current Health** selected **SEKO Logistics** to handle worldwide fulfillment and shipping for its wearable medical devices, which help diagnose, monitor, and treat patients. The recyclable kits are returned to SEKO for decontamination and shipment, and SEKO's inventory management system provides a traceable history of each device's life span.



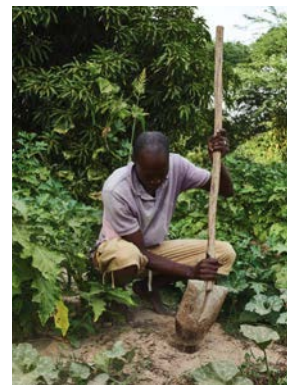
- North American supply chain management provider **Transportation Insight** is partnering with **Feetures**, a performance sock brand, to provide value stream mapping and supply chain consulting. Transportation Insight analyzed Feetures' fulfillment and transportation processes, sourcing, and small parcel auditing to help cut packaging costs.

> MILESTONE

Technology solutions provider **Avnet** celebrates its 100th anniversary in 2021. Since its origin on Radio Row—the Manhattan warehouse district known for its post-World War I electronics shops—to its current position as a global distributor, Avnet has remained resilient in an evolving technology landscape.

> GREEN SEEDS

Working with Trees for the Future, a nonprofit that trains farmers to regenerate their land, **ATA Freight** helped plant 100,000 trees in Senegal to sequester 5,786 metric tons of carbon during the next 20 years as part of the Kaffrine 7 Forest Garden Project.



Swiss design firm **Yasava** plans to offset its carbon footprint by sourcing materials used for aircraft interiors, such as leather and wool, from eco-conscious producers. It will also use recycled aluminum instead of newly mined metal, which will reduce its environmental impact immediately by 80%.

Internet Fusion Group, an e-commerce retailer, created a sustainable packaging process that is more than 99% plastic-free. It invested in two **Quadient CVP-500** automated packaging machines and switched to corrugated fanfold material, which is recycled and fully recyclable, from Ribble Packaging.

> SHOVEL READY

Majestic Realty plans to build a \$1 billion distribution and manufacturing space in Laredo, Texas, to meet the demand for facilities near the U.S.-Mexico border.

Walmart is building an \$800 million site in Lancaster, Texas, to support e-commerce growth. The project includes a 1.2-million-square-foot fulfillment center and a 700,000-square-foot cold storage facility.

> M&A

■ Canadian trucking and logistics company **TFI International** agreed to acquire North American less-than-truckload company **UPS Freight**.

■ **East Coast Warehouse & Distribution**, a temperature-controlled logistics provider for the food and beverage industry, acquired transportation and warehousing provider **Temp-Distribution**.

■ Condition-monitoring solutions provider **SpotSee** acquired **TMC Hallcrest** and **LCR Hallcrest**, two global providers of temperature-monitoring products and indicators.

■ Digital supply chain network **Elemica** acquired **ProcessWeaver**, a multicarrier parcel transportation management solutions provider.

■ Third-party logistics provider **Terra Worldwide Logistics** acquired international and domestic freight solutions provider **Connect Global Logistics**.

■ Supply chain management company **Magnate Worldwide** acquired non-asset freight forwarding services provider **Hybrid International Forwarding**.

■ Connecticut-based **XPO Logistics**, a provider of global freight transportation and logistics services, acquired the majority of **Kuehne + Nagel's** contract logistics operations in the U.K. and Ireland.

> UP THE CHAIN



DeeDee Cox was promoted to vice president of human resources at **Old Dominion Freight Line**. A 13-year veteran with the company, Cox leads the regional human resources teams and oversees talent acquisition.

David Hatch was named senior director of business development at **Saddle Creek Logistics Services**. Hatch brings more than two decades of warehousing and systems experience, and recently led the team that implemented warehousing and order management solutions.

> GOOD WORKS

• **cargo-partner** teamed up with local organizations and donated 12 containers to assist people who were left homeless after an earthquake hit central Croatia. Each container is equipped with basic furniture and facilities, including four beds as well as a kitchen, heater, and bathroom.



• Through a \$500,000 grant from Darden Restaurants and support from its partners **Penske Truck Leasing** and **Lineage Logistics**, five Feeding America food banks will each receive a 26-foot

refrigerated box truck to increase access to food in areas with high levels of food insecurity.

• **RLS Logistics**, a third-party logistics provider specializing in temperature-controlled logistics, donated 365,291 plates of food to charities in New Jersey, Pennsylvania, and Utah through its Pallets 4 Plates program.

• Transportation and logistics services provider **Schneider** donated a refrigerated trailer to Feeding America Eastern Wisconsin. The 53-foot trailer will be used to transport fresh produce and other perishables.

> RECOGNITION

Reddaway received Johnson Controls' **2020 Regional Freight Carrier of the Year** award for its on-time performance, ease of doing business, damage claim ratio, EDI compliance, and invoice accuracy.

The **Maryland Department of Transportation Maryland Port Administration** received the American Association of Port Authorities' **Award of Excellence for Environmental Mitigation** for a project that removes excess nutrient pollution in Baltimore Harbor.



[IN FOCUS]

TAKEAWAYS

Shaping the Future of the Global Supply Chain

You've Got Drone Mail



Many drone delivery services involve dropping packages on the ground outside of homes and businesses, making them vulnerable to theft and bad weather. That's where the smart drone mailbox comes in.

These new mailbox concepts, developed by startups Valqari and DRONEDEK, involve a technology-enabled container that receives and

stores packages in a secure, climate-controlled box accessible only by the recipient, who does not have to be present to receive a package securely.

Packages are loaded into a container, then flown to the location guided by GPS coordinates. Once the drone is within 100 feet of the smart mailbox, it begins an authentication process. Then the drone lands on the mailbox, delivers the package, and notifies both the shipper and the recipient. The recipient communicates with the smart drone mailbox via a phone-based app.

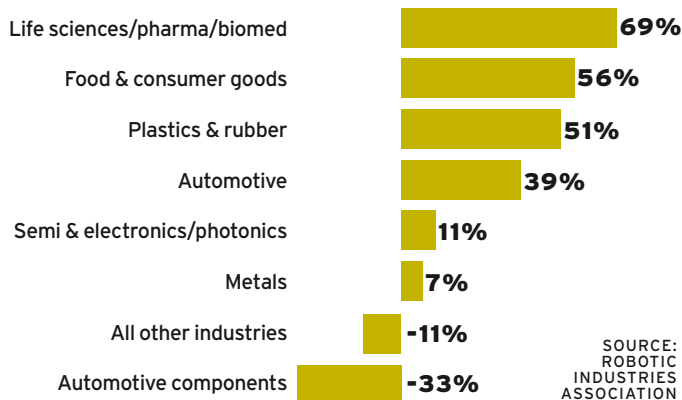
The mailboxes are "drone agnostic" and compatible with traditional delivery

services from FedEx, Amazon Prime, or the U.S. Postal Service.

Valqari and DRONEDEK are in the early stages of developing their mailbox concepts. To address potential COVID-19 contamination of package surfaces, both companies say they may include an ultraviolet package sterilization feature.

Valqari is focusing initially on community boxes that serve many customers and handle multiple deliveries. It is also developing a stand-alone residential unit and a window-attached unit for high-rise apartment buildings.

2020 ROBOTICS ORDER GROWTH YEAR OVER YEAR



NONAUTOMOTIVE ROBOT ORDERS ROVE AHEAD

Supply chain disruptions and workforce challenges are causing industries to accelerate their automation strategies (see chart). For example, yearly robot orders from nonautomotive sectors surpassed automotive robot orders for the first time, with sales of robotic units in North America increasing 3.5% in 2020 from 2019, according to the Robotic Industries Association.

Growth was driven by a strong fourth quarter—the second-best quarter ever for North American robotic sales—with a 63.6% increase from the same period in 2019. North American companies ordered 31,044 robotic units, valued at \$1.5 billion, in 2020, the report says.

Neiman Marcus Splurges on Digitization

Luxury department store Neiman Marcus is banking on a digital future, investing \$85 million to make immediate changes to its supply chain and technology operations after erasing more than \$4 billion in debt with a successful bankruptcy.

To help improve its digital customer service, the retailer hired Apple veteran Bob Kupbens as its new chief product and technology executive vice president. The department store also created a new position called general manager of brand partnerships and merchandising, which will be led by Paolo Riva, Victoria Beckham's former chief executive.

Kupbens, who most recently served as president of home security firm ADT, will work with Neiman Marcus' senior leadership to develop digital capabilities that enhance its in-store, online, and omnichannel experiences, the company says.

The undertaking also involves implementing a new order management system and warehouse system, as well as improving the Neiman Marcus Group (NMG) Pinnacle Park distribution center in Dallas, Texas.

"As demand for luxury products continues to grow, so does our supply chain network and infrastructure," says Willis Weirich, chief supply chain officer. "These investments ensure that NMG can quickly deliver the luxury products our customers want."



Port of Long Beach Loads Up on Business

As cargo volumes surged in the second half of 2020, essential workers at the Port of Long Beach in California moved 8.1 million cargo containers—its busiest year on record. The port ended the year with a 6.3% increase from 2019.

Imports rose 6.4% to more than 3.9 million TEUs, exports increased 0.2% to 475,888 TEUs, and empty containers increased 9.9% to 2.6 million TEUs at the port. It exceeded the previous annual record set in 2018 by 22,292 TEUs.

The Port of Long Beach also achieved its busiest month in December 2020 and the most active quarter in its 110-year history, processing 2.4 million TEUs from October 1 to December 31, a 23% increase from the fourth quarter of 2019. Dockworkers and terminal operators moved 815,885 cargo container units in December alone.



WALMART GOES LOCAL

Walmart plans to increase the number of local fulfillment centers across the United States, which it will build inside or near existing retail locations. This localized approach mirrors Amazon's strategy, as both companies face off amid surging demand for online orders.

Walmart opened its first fulfillment center in 2019 in New Hampshire when the retail giant piloted the concept. These facilities use wheeled robots, called Alphabots, to pick items and prepare online orders.

While the Alphabots retrieve boxed or frozen items, Walmart's human employees pick fresh meat and produce, as well as larger items.

TAKEAWAYS

Coping With Blank Sailings, Surcharges & Spikes

From its position as a global third-party logistics provider, SEKO has unique insight into air and ocean trends. For one, global restocking is lowering the odds of a slack season in 2021, says Brian Bourke, the company's chief growth officer. In a media call, SEKO execs shared their perspective on the following challenges facing manufacturers and shippers:

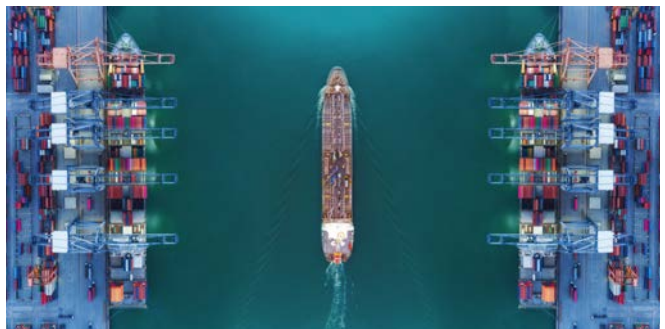
Blank sailings in China. Only 42 blank sailings were announced for Chinese New Year because ships have been sitting in the United States and Europe due to congestion. Another 21 sailings will be blanked in 2021, but that number is significantly lower than in 2020, says Akhil Nair, vice president of global carrier management and ocean strategy. Things could get worse before they get better in China unless congestion abates, he says.

Volume in the United States. Volumes have escalated since June 2020. COVID-19 impacted labor and caused vessel berth delays. On the East Coast, 60 or so vessels are stacking up in the ports, creating equipment shortage issues, says Kevin Krause, vice president of ocean services.

Surcharges. In July, companies started offering guaranteed load premiums just to get container space. Those premiums are \$1,700 to \$4,000, which has effectively become the market rate, says Chris Capodanno, vice president of product development.

Air freight demand. Demand has increased month over month, especially in e-commerce, and it's not slowing anytime soon, says Shawn Richard, vice president of global airfreight. Capacity is continually a challenge. Many airlines executed freighter conversions, which helped ease delays. Until passengers start booking flights, carrying freight provides air carriers with an influx of cash that keeps them going, Richard says.

E-commerce spikes. As e-commerce continues to surge, SEKO is "operating 8 days a week, 36 hours a day," says Rick Lee, chief operating officer, but everyone is vying for the same labor and dealing with constraints. SEKO is looking into robotics and automation, he says, to keep up with demand.



TAKEAWAYS

4 New Rules for Retail

While the grocery and home improvement sectors benefited from changes in consumer behavior during the pandemic, apparel and department stores struggled. Consequently, the following new rules will come into play for retailers in 2021, says a Deloitte report:

1 Digital investment should go beyond differentiation. Many retailers have jumped on the digital bandwagon (see *chart*), and rightfully so. Retailers can create connection and convenience with the right portfolio of digital assets. They will have to improve on anticipating demand to deliver true value. To safeguard shoppers, retailers should be transparent about their data strategy and able to rapidly resolve problems. They need to look beyond on-premises talent plans, which are mostly suited for stores and warehouses, and invest in attracting digitally savvy talent.

2 Supply chain, inventory, and digital experience can't operate in silos. The ideal inventory system is integrated end to end from production to last-mile delivery. Retailers should have clear visibility across their workforce, vendors, suppliers, distributors, warehouse operators, and delivery partners. Every stakeholder should have incentives for identifying issues early on and responding promptly. Blending in-store and digital inventory systems will require better digital platforms and technology.

3 Continue to prioritize health and safety. Retailers need to infuse health and safety throughout their operations. It is critical for retailers to go beyond standard sanitation practices to make shoppers and employees feel safe in the physical space. This could include alternating work shifts or using dark stores to pull buy online, pick up in store purchases. Virtual showrooms, mobile returns, and cashierless stores may seem temporary or futuristic, but could be key in beating out the competition in the long run.

4 Couple cost realignment with fresh takes on profitability. While typical cost cuts, such as reducing travel, are a good start, they are part of the old retail model. New rules of profitability will require new ideas. Retailers should explore alternative ways to engage customers, such as using showrooms instead of stores. Developing alliances for store-in-store models can hedge against being nonessential. Work-from-home platforms offer an opportunity to rethink talent acquisition, opening the opportunity to attract a more diverse set of leaders who reflect geographical, ethnic, racial, and other societal differences and lead to increased profitability.

RETAIL INVESTMENT PRIORITIES FOR 2021



MATCHING BUYERS AND SUPPLIERS

Finding global suppliers can be challenging not only amid travel restrictions, but also because of the U.S. government's entity list designations, human rights-related sanctions, and other trade blacklists for Chinese firms. Hong Kong-based startup International Compliance Workshop (ICW), which acts as a matchmaker for suppliers and buyers, aims to make sourcing easier, TechCrunch reports.

ICW vets suppliers for compliance, product quality, and accreditation. It gathers the information into its database of more than 40,000 suppliers and recommends them to customers based on their needs. To overcome complex compliance hurdles, it relies on third-party certification institutes to verify suppliers.

With sourcing shifting away from China, ICW sees more customers diversifying their supply chains. However, the transition has some limitations. In Southeast Asia, which is replacing a great deal of Chinese manufacturing, each country has specific specialties. While Vietnam is chock full of wooden furniture suppliers, Thailand focuses on plastic goods and Malaysia on medical supplies, the report says.

"There is a type of qualification standard that verifies whether a supplier has fulfilled its corporate social responsibility, like whether the factory fulfills the labor law, the minimum labor rights, or the payroll," says Garry Lam, co-founder of ICW.

Sail Like the Wind

The *Frisian Sea*, a Dutch cargo ship, made its maiden voyage using two compact wind-assisted propulsion units that can be easily moved into position or stowed. The technology has the potential to improve operating efficiency and environmental performance in the shipping industry.

The 388-foot vessel, owned by Boomsma Shipping, was retrofitted with eConowind's VentiFoil wind technology as part of a pilot program. Installation was completed during a port call in Harlingen.

The VentiFoil is designed as optimal compact wing profiles, creating superior thrust via boundary layer suction, where ventilators are mounted inside the VentiFoil. The thrust of the propeller can be reduced to maintain the same speed, leading to fuel savings and lower emissions.

"We now expect they will give optimal results on our ship," says co-owner Ton Boomsma. "Once the crew gets some experience, we expect no trouble in handling the systems using our hatch cranes."



The wind technology requires limited installation time and can be used on several vessels. With this system, the units can be positioned just in front of the

superstructure during loading. The project was funded by the Interreg North Sea Europe program, part of the European Regional Development Fund.

Automated Warehouse Solutions for Fulfillment and Delivery

Engineering Innovation, Inc. provides solutions that apply technology, software, and hardware to create workflow efficiency from induction to delivery.

Eliminating issues that arise because data systems don't talk to each other, our solutions organize complex business logic into simple operator workflow creating new saving opportunities for order fulfillment, shipping consolidation, reverse logistics, and distribution. Process and ship multiple package types efficiently with equipment and software that can handle inbound and outbound packages. Our customizable parcel solutions utilize automated scanning, dimensioning, weighing, printing, and sortation technology to optimize your operation.

Receiving & Reverse Logistics

Storing Goods

Shipping Orders

Delivering Packages





[INSIGHT]

E-COMMERCE

by *Jamin Dick*

Head of Supply Chain, North America, Alibaba Group
jamin@service.alibaba.com | www.alibaba.com

It's Time to Upgrade Your Tech Capability

Many manufacturers and business-to-business (B2B) companies are built around large volumes, making them traditionally slower to adopt e-commerce; yet, it's becoming imperative to do so. Customer expectations are evolving, and the pandemic highlights the need for more supply chain flexibility and visibility.

Here are some considerations as you contemplate the transition to e-commerce:

Take a customer-centric approach. Business-to-consumer (B2C) purchasing has significantly evolved in recent years. As a result, customers expect as much from their B2B purchases at work as they do from their B2C purchases at home.

Customers expect to make purchases online, track shipments, and have products delivered same-day. These expectations apply to B2B buyers domestically and internationally as well.

Amazon first raised the bar by offering next-day shipping, and then same-day shipping, both at no extra cost to the consumer. That has quickly become the industry standard for consumer expectations.

This increased B2B customer demand for shorter shipping times raises the stakes on the volatility of profit margins, both on the expense side and its effects on demand elasticity. Companies need to take as much care as possible in managing the various expenses, putting an increased priority on transparency and visibility—both of which are built into e-commerce platforms.

Among those and other benefits, e-commerce allows you to focus on cash-flow management and more closely match expenses with income, shorten cash conversion cycles, and possibly adjust payment terms. This allows manufacturers to more fully focus on the needs of their customers, while staying true to traditional B2B best practices, such as goods being delivered not early, but on schedule.

Digitize as much of the logistics chain and processes as possible. Otherwise, you run the risk of acquiring partial visibility, effectively taking half measures that incur expenses. Companies that shift to an e-commerce or multichannel approach will distinguish themselves and fare better in the future.

Implications for the industry. While digitizing cross-border freight reduces complexity, it is not yet a turnkey solution. Rather, the incremental rollout shines a light on preexisting issues throughout the supply chain that were previously unmanaged or glossed over.

With increased transparency comes heightened awareness and

scrutiny. While this transition period to e-commerce can be somewhat uncomfortable, it is crucial.

Why? Because today's B2B buyer has a higher standard of execution and wants answers: Where exactly are my goods? Who currently has ownership of them? What are the taxes and duties? What's the current situation with customs?

And while supply chains run best when change happens slowly, the pandemic has revealed the virtue of moving to an e-commerce platform more rapidly.

Pricing is still uncertain, air rates are up, and capacity utilization is down on ocean freight, increasing the likelihood of your shipment being deprioritized. The upstream supply chain from China is backlogged, and Customs is struggling to keep up.

E-commerce tools help you manage through these uncertain times. After this significant adoption event, e-commerce will quickly become the industry standard, as B2B participants increasingly demand these services from their counterparties.

Smart manufacturers will use the pandemic as a catalyst to accelerate the adoption of an e-commerce platform, and demand their counterparties throughout the supply chain do the same. The network effect of increased adoption will begin to kick in and the system will reap key efficiency benefits, such as flexibility, transparency, and predictability. ■



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[INSIGHT]

LOGISTICS MGMT

by *Richard G. Piontek*

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4 Strategies for Effective Cross-Border Logistics

With a wave of overseas supplier disruptions due to COVID-19 and resulting supply shortages that bottlenecked operations across the supply chain, many companies are considering nearshoring to Canada and Mexico to minimize risk and potential disruptions.

To ensure that you can effectively transport goods across borders, consider these four cross-border strategies:

1. Establish warehouses near borders. Whether shipping northbound or southbound, establishing warehouses near borders provides greater flexibility when managing congestion, transit time, and capacity.

For instance, border congestion can create delays that limit the number of daily trips a truck can make—and even fewer if drivers need to travel considerable distances to and from a warehouse. If that warehouse was located close to the border, the number of potential cross-border moves increases, even with congestion.

Shorter distance also means shorter transportation time, enabling just-in-time logistics. Parts or materials from the United States that are required for final production in Mexico can be ready to go in hours rather than days, improving lead times and overall efficiency.

Moreover, a strategically placed warehouse can serve as a distribution hub,

allowing you to source virtually any carrier and overcome capacity constraints.

2. Work with bonded or C-TPAT-certified carriers. Bonded carriers streamline the flow of goods because they do not pay duties on shipments and do not require U.S. customs clearance. Products reach their destinations faster, and without added costs.

Likewise, it is advantageous to work with C-TPAT-certified carriers who have been screened and deemed low risk for security issues. They benefit from fewer inspections and access to the Free and Secure Trade lanes.

3. Determine an optimum shipping model based on product. Depending on the product, it may be better to utilize transloading services—where trailers are sent to a nearby warehouse and unloaded from one carrier to another from the destination country—or a door-to-door model, where a single carrier transports the trailer from end to end.

Most companies can benefit from the flexibilities of transloading. For

instance, for underutilized trucks bound for Mexico, the warehouse can serve as a consolidation point for combining cargo into one trailer. For U.S.-bound trailers, products can be unloaded and put on different carriers, creating a hub-and-spoke model that minimizes costs and mitigates tightening truck capacity.

For time-sensitive products in industries with stringent regulations, such as pharmaceuticals or certain foods, door-to-door is often the best and only option.

4. Utilize a transportation management system (TMS). A TMS provides enhanced visibility that can help monitor loads and KPIs, and can find ways to optimize transportation across a network. Real-time information helps identify opportunities to dynamically improve routes, trailer space utilization, and costs.

With numerous solutions on the market—each with their own learning curve—it can be beneficial to partner with a third-party provider that already has a TMS solution that they can configure, integrate, and optimally apply to North American transportation requirements.

The best providers can implement effective strategies to optimize your cross-border logistics and ensure your goods flow seamlessly across borders, allowing you to focus on your core business. ■



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LTL is not an industry of broad brush strokes; supply chain professionals need a pointillistic understanding of the logistics of LTL in order to excel in the industry.

If there's one immutable truth in the world of logistics, it's this: LTL is an inherently complex form of transportation. Tariffs, rates, DIM weights, transit times – it's enough to confuse even seasoned logistics professionals.

The solution to this knowledge gap has historically been on-the-job training or university supply chain education, but for a variety of reasons there is now a pressing need for third-party, remote LTL training that prepares logistics workers for transportation success.

Global Scope Can Overlook Local Intricacies

In the past, professionals looking to move into a supply chain career learned about the basics of supply chain from universities. However, many of these college supply chain programs are now global in scope, focusing on worldwide supply chain management instead of the intricacies of specialized domestic transportation.

And even these programs, which used to be widespread, are becoming less common. LTL is not an industry of broad brush strokes; supply chain professionals really need a pointillistic understanding of the logistics of LTL in order to excel in the industry.

Accelerating Need for Dedicated LTL Education

This lack of specified training puts the onus on employers to prepare new hires with the LTL knowledge needed to do their jobs. Dedicated LTL study is a necessity, not a luxury.

At the same time, changes in LTL and the broader supply chain world are accelerating. The reliance on e-commerce has ballooned since the start of the pandemic, and last-mile LTL shipments and related e-commerce strains on the supply chain won't diminish once social distancing abates.

That genie isn't going back into the bottle. So supply chain employers need logistics workers that are fully versed in all aspects of the industry, ready to solve unique shipping and delivery problems based on their extensive supply chain knowledge.

But why care about LTL? It's been reported that some shippers in today's world are no longer concerned with what mode is used to ship their goods.

A Multimodal Approach Ensures On-Time Delivery

This mode agnosticism means supply chain stakeholders have to be well versed in all modes of transportation. As unforeseen weather events and other disruptions, such as protests, become more common, savvy logistics employees will need to be armed with familiarity of all modes, not just the most popular, to ensure that freight is delivered on time, without damage, and in the most financially expedient way possible.

Offerings like SMC³'s LTL online education courses cover a wide range of topics from LTL basics and operations to more advanced concepts like pricing analytics and transportation law. The company also has plans to continually refresh content, adding new expert presenters and taking the feedback of students to make the courses even better as time goes on.

Register today for a special live LTL203: Carrier Pricing and Costing session beginning April 15, featuring industry experts from around the supply chain industry who will discuss the fundamentals of LTL pricing, factors affecting costing, and more.

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SMC³ offers the industry's only path to LTL certification, available through Logistics Training Center. SMC³ partnered with Logistics Training Center to produce five LTL courses, as well as an optional certification exam (CLTL). These seasoned logistics and supply chain management professionals, as well as leading university-level instructors, deliver up to 40 hours of content.



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Thought Leaders

29 2021: NEXT-GENERATION IN-TRANSIT VISIBILITY

By Krenar Komoni
CEO and Founder, Tive

Collecting and sharing critical shipment data across different platforms, the Open Visibility Network supports 100% visibility across shipments and transportation modes. While it starts with technology providers, it ultimately benefits the end consumers of visibility data.

30 ROBOTIC AUTOMATION: NOW IS THE TIME TO DEPLOY

By Karen Leavitt
Chief Marketing Officer, Locus Robotics

The use of robots in distribution and warehouse operations is more imperative than ever. Here's why automation is on the fast track and how your company can achieve sustainable and significant productivity gains.

2021: Next-Generation In-Transit Visibility

To optimize visibility for all customers using in-transit visibility solutions, Tive has launched the Open Visibility Network (OVN) starting with project44 and FourKites.

Q: *What is the Open Visibility Network? Is it open to anyone (tech providers, carriers, shippers, etc.)?*

A: The Open Visibility Network is the collection and sharing of critical shipment data across different platforms. OVN benefits the end-consumers of visibility data. It starts with tech providers collaborating to get the desired result: 100% visibility across all of their shipments and all modes of transportation.

As collaboration within the tech industry grows – shippers, carriers, and logistics service providers will clearly see the benefit of an extended data set and continue collaborating to increase supply chain efficiencies further.

In the last decade, load-matching, the ELD mandate, and visibility have reduced the empty miles for over-the-road (OTR) loads, enabling carriers to fill their backhaul more efficiently. Now zoom out on a global level – that's what we'll achieve with OVN.

Q: *How does the data sharing work? Is there a single dashboard/platform? Is the data integrated into each participant's own systems?*

A: Tive data is streamed to the project44 and FourKites platforms and, from there, integrated into analytics dashboards. This data is available in aggregate for mutual project44, Tive, and FourKites customers and attached to shipments. The data is available via

Tive, project44, and FourKites' platforms or APIs.

When we use the words integration and collaboration, we mean them in their truest sense: two-way communication between the parties. Customers want flexibility looking at either their own dashboards or another tech provider's dashboards. For example, a customer that uses a TMS that is fully integrated with project44 will gain complete visibility through Tive's tracker data streaming into their TMS, using the integration between Tive, project44, or FourKites. Conversely, customers using Tive's visibility platform will gain insights from data from project44 leading integrations with carriers and FourKites' leading ETA solution. We are adding more partners every day, which means an exponential growth in visibility data for all customers.

Q: *How is the Open Visibility Network different from other in-transit visibility solutions? How does it advance visibility?*

A: It's all about the next level of customer satisfaction. If you can add an extra layer of visibility data on shipments, whether it is ELD/Telematics data from trucks, location data from vessels, transactional information at ports/terminals, or direct data from the Tive trackers – why not offer that to all customers? To achieve 100% visibility across all modes of transportation, across all geographies, across all types of carriers, and across all various nodes (ports, borders, terminals) of the network, collaboration is the pathway. It's an inevitable part of bringing the best visibility to the customer in the shortest amount of time.



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THOUGHT LEADERS

Robotic Automation: Now Is the Time to Deploy



Karen Leavitt

Chief Marketing Officer
Locus Robotics
locusrobotics.com

Q: *Are you seeing growing interest in the use of robots in distribution and warehouse operations?*

A: Absolutely. Since the early onset of the pandemic last year, there has been a notable increase in the number of companies looking into adding robotics and automation to their fulfillment operations. The pandemic caused a dramatic shift to online behaviors, changing not only the

way retail consumers shop, but also the operations of the B2B industrial segment.

Companies that were previously shifting slowly toward a digital warehouse strategy are now rushing toward it. While labor has been a major concern in the past, the pandemic has exacerbated it with lockdowns and social distancing for health safety requirements that impact recruiting and retention, while volumes continue to increase exponentially. The only viable way to cost-effectively mitigate this problem is through automation.

Q: *How can distributors justify the cost of investing in robotics technology?*

A: Locus Robotics offers a Robots-as-a-Service (RaaS) model that allows warehouses to add autonomous mobile robot (AMR) automation to their existing operation at a reasonable cost while delivering an ROI that is obtained in months instead of years, and sometimes weeks. RaaS lowers the upfront costs by reallocating a single capital expense into recurring operational expenses.

The RaaS model gives operators the flexibility they need to meet changing demands; when volumes grow due to seasonality or sudden demand spikes, they can simply rent more bots to cover the increase in work and send them back when volume levels return to normal – without requiring extensive reconfiguration or complicated setup. Frankly, if operators are not implementing robotic automation now, they risk falling further behind.

Q: *With nearly 95% of warehouses relying on manual labor now, how is Locus helping companies realize the need for automation, and ultimately take the step of adopting robotics?*

A: For brownfield applications, Locus is helping companies achieve more productivity using the same footprint of space and workers by digitizing the process of order fulfillment and material movement. For greenfield applications, Locus works with companies to design the fulfillment space around digital fulfillment technology to achieve the maximum throughput possible.

Our solution engineers have over 30 years of experience running distribution centers and use this knowledge to create simulations that prove the business case before it's implemented. The secret sauce is in the multi-bot approach: Workers pick higher rates by staying within zones while a fleet of robots travels between pick destinations and the packing station.

Robots are only half of the automation solution Locus provides. Our total solution includes a robust execution platform that orchestrates intelligent robot and labor direction, as well as provides full visibility of operational performance data to facilitate forecasting, labor planning, and real-time workflow optimization. Our unique multi-bot solution has helped the leading industrial manufacturers, retailers, and distributors gain the flexible automation needed to meet today's demands and position themselves for growth to achieve a sustainable 2x to 3x increase in productivity.

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WAREHOUSE AUTOMATION

THE RISE OF THE ROBOTS

ONCE THE STUFF OF
SCIENCE FICTION, TODAY'S
MOBILE ROBOTS EMPOWER
COMPANIES TO ACT MORE
FLEXIBLY AND NIMBLY. HERE
ARE SOME EXAMPLES FROM
RIGHT HERE ON EARTH.

BY KAREN KROLL



Boston Dynamics' Handle mobile robot is designed to move boxes in the warehouse. Handle's small footprint, long reach, and vision system enable it to unload trucks, build pallets, and move boxes throughout a facility.



GE APPLIANCES, a Haier company, has added about 2,000 new employees across nine U.S. manufacturing plants during the past several years and has invested more than \$700 million in technology to build out its supply chain.

The investment included 17 Raymond Courier 3020 automated tow tractors that employ vision-guided technology developed by Seegrid Corporation—a producer of self-driving, vision-guided vehicles—to autonomously navigate four of the company’s plants.

Several objectives drove these investments. One was to replace forklifts that operate near people with tools that would enhance safety and allow greater flexibility. Another was to minimize the “three Ds”—dirty, dull, or difficult jobs. Finally, automation provides a more precise understanding of where products are located across the supply chain.

“We’ve been driving end-to-end supply chain visibility,” says Harry Chase, director, advanced manufacturing, strategic materials, for GE Appliances.

GE Appliances uses the automated tractors in numerous ways, including moving parts from within the facilities to assembly or paint lines, and transporting finished goods, such as cook tops, to shipping docks. The company is also starting to use the vehicles to feed products into the picking area and to move picked parts to shipping docks.

The tractors offer several advantages over other types of automation. They were operational within about one week, compared to months-long implementations for other types of automation. Once they’re up and running, rerouting the tractors can be accomplished in an afternoon. Training is similarly rapid.

“The autonomous mobile robots (AMRs) have been a game-changer,” Chase says. Along with boosting throughput and quality on the assembly lines, GE Appliances uses them to automate material flow. “We’re trying to push the boundaries of the technology,” he adds.

GE Appliances isn’t alone. The market for automated guided vehicles (AGVs) and AMRs will grow by about 35% annually and reach \$13.2 billion by 2026, predicts ResearchAndMarkets (*see sidebar, p. 37*).

One reason is the need for supply chain resilience, which the pandemic highlighted. About 80% of retailers responding to a recent Deloitte survey indicate they’re investing for supply chain resilience.

“The past year reduced resistance to robotics and automation, both of which can help build supply chain agility,” notes Barb Renner, vice chair and U.S. consumer products leader with Deloitte.

As consumers demand more choices, lower prices, and faster deliveries—and can shift their spending habits with a mouse click—it has become clear that businesses “can’t solve problems the way they solved similar issues in the past,” says Jeff Christensen, vice president, product, with Seegrid. They need to transform their logistics operations “to

EXPANDING IoT THROUGH RFID

Along with robotics, advances in other technology solutions help companies and 3PLs automate.

One example is Plexus, a global manufacturing and engineering services provider. Its manufacturing process requires managing high volumes of goods and assets—such as work-in-process and trolleys—with great attention to detail.

Plexus tried several approaches to reduce the sorting, tracking, and misplacement of goods, including the 5S workplace organization methodology. It also employed a barcoding system for data collection and manual logs for physical tracking.

“But these methods are all manual and require multiple touch points before data can be used effectively,” says John

Rau, customer director with the Neenah, Wisconsin-based company. In addition, data typically isn’t available online in real time.

Seeking a better way, Plexus worked with Impinj, a provider of Internet of Things (IoT) connectivity through its RAIN RFID devices and platform. RAIN RFID, a battery-free, wireless technology, works without line-of-sight connections to identify, locate, and authenticate items. Workers gain real-time visibility to asset location.

“The Impinj platform helps automate the monitoring of goods throughout product development,” Rau says. It also eliminates manual searching and scanning.

To accomplish this, RAIN RFID tags with Impinj chips are attached to each item. Impinj gateways and



readers track the items throughout the production area. Plexus developed an application that delivers this data in real time to the shop floor.

“Once online, it was amazing how swiftly we were able to reduce unnecessary movement of stock, driving increased warehouse operation productivity,” Rau says.

Among the benefits Plexus has seen are complete accuracy of customer shipments and a 97% reduction in time spent searching for products.

find the magic path,” he adds, where they can be cost-effective, flexible, and resilient.

The relatively modest investment required to implement robotics—many providers will lease robots for several years—tends to fit most contracts between third-party logistics (3PL) providers and their clients, says Joe Couto, CEO of Körber Supply Chain Software for Latin America, Asia-Pacific, and Africa. Leasing the equipment also allows companies to scale up or down as needed.

Here are some real-world examples of companies experiencing the benefits of deploying robotics and other types of automation.

ROBOTICS SUPPORTS E-COMMERCE

National Logistics Services (NLS) works with many brands that saw e-commerce sales spike during the pandemic, says Gordon Brown, director of engineering and process innovation with the Canadian logistics provider for fashion, footwear, activewear, and general merchandise companies. NLS operates 12 facilities in the Toronto area, as well as a Vancouver location.

To support its clients, NLS implemented 27 full-time robots, named Chuck, along with 15 seasonal Chucks from 6 River Systems. “We’re looking for common-sense automation that works for the most part within our existing infrastructure,” Brown says. The Chucks fit the bill.

Chuck automates the picking of “eaches” for e-commerce orders and in doing so, accelerates the pace of work. While the act of picking a product from a shelf and placing it in a package remains generally the same, Chuck reduces the time between picks.

Rather than a picker taking items to the processing areas, Chuck handles this task. And Chuck, rather than employees, moves the carts, reducing walking time and further boosting productivity.

The artificial intelligence within the Chucks also boosts efficiency. Each Chuck knows the layout of the facility and can identify optimal picking and packing sequences. NLS can also



Chuck robots from 6 River Systems use machine learning and artificial intelligence to help warehouse associates work faster by minimizing walk time and helping them stay on task.

easily move Chucks between its sites as needed.

When 6 River initially indicated NLS might see 50% to 75% increases in picking productivity upon implementing the robots, Gordon says he was skeptical. No more. “We saw those numbers,” he says.

ROBOTICS MAKES THE DIFFERENCE

Several years ago, The Gold Bond Group, an Israel-based logistics provider, decided to make e-commerce logistics core to its mission. The move was a way to differentiate itself from its competitors, many of whom focused on pallet logistics for factories and retail stores, says Yotam Ben Ari, manager of the e-commerce initiative.

With Ben Ari’s software background, he recognized the importance of software to automation. He notes that while many companies can

create robots to move goods from one point to another, fewer can develop algorithms that enable the robots to work intelligently with other systems, such as a warehouse management system, as well as with people.

Ben Ari worked with Grey Orange, which uses artificial intelligence to drive its Ranger series of intelligent robots. In the first phase of the implementation, which occurred during lockdowns resulting from the pandemic, The Gold Bond Group tested the technology with a client whose logistics needs largely focused on palletized materials. It was a way to assess the solution in a less complicated environment than the single picking that characterizes e-commerce.

After the technology proved itself, Ben Ari and his team installed half the robots and pick/pack stations that would eventually be installed. They again tested the solution with one client.



With autonomous mobile robots from Locus Robotics, warehouse workers don’t have to push heavy carts or walk behind slow-moving carts that limit productivity. They can process more orders faster.

AGV vs. AMR

Automated Guided Vehicles (AGVs):

Movement is highly structured and monolithic in static environments with the help of magnetic strips or wires. Any obstacle in the path has to be removed to set the AGV in motion again. Redeployment of guided technology like magnetic strips or wires is required, with an additional cost if the facility changes through a renovation, upgrade, or shift in location.

Autonomous Mobile Robots (AMRs):

Work in dynamic environments with autonomous navigation. AMRs create and save the locations or map of the facility to find the alternative path if there is an obstacle in the defined route. They also require minimum resets if there is any change related to the facility, as AMRs can be unboxed and put to work within one hour if they are already mapped with the facility. AMRs are extremely flexible to deploy.

In late 2020, The Gold Bond Group brought on board the remaining robots and pick-pack stations. The benefits were apparent right away. “Some days, we delivered thousands of packages with multiple SKUs and close-to-zero picking mistakes,” Ben Ari says.

Now, The Gold Bond group plans to use the technology to help achieve its goal of same-day delivery for many of its customers. “That provides further competitive advantages,” Ben Ari says.



To replace forklifts and minimize the “three Ds”—dirty, dull, or difficult jobs—in its manufacturing plants, GE Appliances invested heavily in automation technology.

ADDRESSING LABOR SHORTAGES

Quiet 3PF provides inventory solutions for digital and omnichannel brands. As many retailers shifted to e-commerce, demand for additional capacity soared, while wages shot up and labor availability shrunk.

“Quiet Logistics simply could not staff our facilities to meet capacity demands,” recalls Brian Lemerise, president and chief operating officer with the Devens, Massachusetts-based company.

Quiet identified order picking and inbound replenishment as functions where it could drive efficiency and capacity improvements. Lemerise and his colleagues considered several solutions, such as goods-to-person systems, but were dissuaded by the high investment and limited warehouse functionality and scalability.

Instead, they deployed autonomous mobile robots from Locus Robotics (formerly part of Quiet; it was spun off in 2015) and 6 River Systems. The AMRs, which use a virtual map to autonomously navigate, “are able to deploy in our existing infrastructure quickly with great efficiency,” Lemerise says. The logic in advance order pick sequencing embedded within the solutions has more than doubled productivity, he adds.

The rapid learning curve was also a draw. Typically within two weeks of deployment, employees achieve about 95% of the department average



The Raymond Courier 3020 automated tow tractor employs vision-guided technology to pull cart or trailer loads in batch picking, parts-to-line, and end-of-line applications.

productivity. “That’s critical during promotional periods when seasonal employees are needed for a short time,” Lemerise says.

The boost in productivity means former pickers can shift to providing value-added services, such as wrapping orders in tissue paper or handling custom monogramming and embroidery. “Since implementation, productivity has improved, employee turnover has been reduced, accuracy remains high, and our capacity has increased,” Lemerise says.

COUNTERING MISPERCEPTIONS

While implementations of robotics and other automating technologies have become more numerous, a few misperceptions remain. One is the idea that “robotics are still not ready for prime time,” Christensen says.

The growing number of successful implementations, however, demonstrates that robots aren’t confined to laboratory experiments, but are on the job today.

Some assume that bringing in robots inevitably means removing racking or other infrastructure and cutting staff, Couto says. Often, however, robots can work with a company’s existing layout and employees can be redeployed.

And even though warehouse robots are often best known for their picking ability, they can handle a range of functions—including returns, replenishment, and sorting.

AGVs & AMRs: ENABLING THE NEW NORMAL

The automated guided vehicle (AGV) and automated mobile robots (AMR) market is expected to reach

\$13.2 B

by 2026 with a growth rate of around 35%, finds ResearchAndMarkets' latest research.

Both AGVs and AMRs collectively will cross an installed base of

1.5 M

in the next five years, making mobile robots a new normal in day-to-day operational activities.

Mobile robots enable warehouse facilities to optimize space and reduce the need for new and costly greenfield fulfillment and distribution centers.

Companies are building new facilities with robots and other automation in mind. These robotic systems are flexible and can be added or removed as needs change.

Among the top factors and challenges facing the robotics and automation market:

- **Automation** is the key focus in the manufacturing and logistics sectors as a part of Industry 4.0 and Supply Chain 4.0 initiatives for continuous growth and sustainability. Robotics is

an important aspect of this automation.

- **Growth in e-commerce**

is the main driver for AGV/AMR demand in warehouse automation.

- **Personnel costs and wages**

are especially high in developed countries. A forklift operator's annual salary can reach \$50,000. If a forklift has to be operated around the clock, then at least three to four drivers are needed. Add the \$10,000 investment cost for a forklift truck to the personnel cost, and the annual costs for one forklift total more than \$200,000.

- **Artificial intelligence** and deep learning are at a tipping point and are



already disrupting multiple industries.

In 2017, RightHand Robotics unveiled a solution called RightPick that can pick items at a rate of 500 to 600 per hour, on par with a human worker. Machine learning and artificial intelligence will impact logistics automation well beyond machine vision's benefits to picking technology by greatly enhancing the flexibility and ease of use of a wide range of automated systems.

SOURCE: RESEARCHANDMARKETS

"Robots in warehouses can be used wall to wall," says Fergal Glynn, vice president of marketing with 6 River Systems.

ENSURING SUCCESS

When deploying robotic solutions, a few steps are essential. One is identifying the right solution. "It's not one robot fits all," Couto says. Different challenges can call for different robots.

Rather than focus on perfection from day one, "companies should identify workflows and design to automate them with the goal of continuous improvement," Christensen says. The technology vendor should enable this, while also ensuring reliability.

Effective solutions should allow for do-it-yourself changes where reasonable. Say a company needs to change the material flow on the third shift. If doing so requires a call to the vendor to reprogram the robots, an employee may be dissuaded from making the change, Christensen notes.

To truly test a solution, it needs to be placed into operation, with mock data deployed as needed. It can't be tested if it's relegated to a back corner and remains apart from the primary workflow.

"You have to put it into operation, run it, see how it works, and tweak it as necessary," says Jeff Cashman, chief operating officer with Grey Orange.

TALK IT UP

Communication is also key. Those leading the charge can't effectively direct the initiative from their offices.

"My engineers talk to the operators and understand their needs," says Chase of GE Appliances. At the same time, they can answer operator questions about the new equipment.

To facilitate user adoption, Chase and his team emphasized the ways in which the tractors are tools for workers, and not the other way around.

Some workers even attach smart watches to the tractors, which allows the

tractors to send alerts, such as "I'll be at the picking station in three minutes."

The growing interest in robotics and other automation technology notwithstanding, it's "still early innings," Cashman says.

HOLDING ON TO TRADITION

And even as the robotics deployments appear poised to continue their growth, opportunities for more traditional systems will likely remain, although they'll probably be less numerous than in the past.

Traditional systems make the most sense when operations are very linear. "But this business is less and less linear," Cashman notes.

The rapid and profound changes in the ways in which business is conducted are helping to drive robotics and automation. Both allow companies to act cost-effectively, and operate more flexibly and nimbly—all key to success in a rapidly changing world. ■



**MARITIME
LOGISTICS:
WATER YA
GONNA DO?**

2020 CREATED SOME CHOPPY CONDITIONS FOR THE MARITIME INDUSTRY. BUT INCREASING VOLUMES AND NEW STRATEGIES AND TECHNOLOGIES POINT TO A SHIP-SHAPE FUTURE.

The changes the maritime industry experienced in 2020 promise to shape the sector for some time to come. It started with demand plummeting in the spring, as countries around the world implemented lockdowns to halt the spread of COVID-19. Demand rebounded in late summer as consumers ramped up online shopping.

Record volumes continue, driving interest in digitization—or converting paper records to digital ones to streamline processes. Before digitization can take effect, however, the industry needs to come together on a set of standards.

The global lockdowns are prompting more organizations to consider developing regional supply chains, either to replace or supplement their global ones. Discussions of reshoring, which would also shorten supply chains, are picking up as well.

In the United States, interest in a “marine highway,” or greater use of inland waterways to transport goods, is growing. This could help mitigate the truck driver shortage and reduce emissions.

Similarly, to avoid the crowding and wait times prevalent at some larger ports, some shippers are considering smaller ports they may have overlooked previously.

Together, these shifts are changing the maritime world. “Shipping is getting more dynamic,” says Tray Anderson, logistics and industrial lead for the Americas with real estate firm Cushman & Wakefield.

No longer will a company make one decision about, for instance, port selection and run with it indefinitely, he says. Instead, organizations will constantly reevaluate the time, cost, and sustainability of different

options to identify an optimal one for each shipment.

Early on, it looked like the pandemic was ready to decimate global shipping. One global container shipping index shows throughput dropping from 114.7 to 94.6 between January and February 2020.

That changed by late summer. Consumer demand for everything from rowing machines to video games to new furniture, particularly in Europe and North America, took off.

The Port Authority of New York and New Jersey, for instance, saw cargo volume jump by double digits starting in September.

While the growth may moderate, it’s not dissipating. “We have to get our arms around it and plan for a structural shift in the demand curve,” says Sam Ruda, port director for the Port Authority of New York and New Jersey. One option: extending gate hours.

BALANCING SUPPLY AND DEMAND

This demand rebound came on the heels of ocean carriers canceling sailings, notes Gordon Downes, chief executive officer of the New York Shipping Exchange. As a result, carriers and ports experienced massive bottlenecks, while freight rates climbed to all-time highs. Going forward, carriers will likely continue to cancel sailings to keep supply and demand more balanced, he says.

The capacity reductions were unusual. “Big carriers have traditionally chased revenue at all costs,” says Joshua Brogan, vice president in the strategic operations practice of AT Kearney, a global consultancy. Historically, at least one carrier would reintroduce capacity, aiming for a

BY KAREN KROLL

bump in market share. However, the carriers held firm and rates jumped.

The clout of the shipping alliances does raise questions for the future. Together, three alliances—the 2M Alliance, Ocean Alliance, and Transport High-Efficiency (THE) Alliance—account for more than 80% of the market, S&P Global reports.

“What does the current situation bode for the limited anti-trust immunity enjoyed by carriers in many jurisdictions?” Brogan asks.

The rise in rates may also prompt the business community to rethink carrier discussion agreements. More frequent negotiations with carriers and forwarders might be a new normal.

Index-based pricing is gaining wider adoption as well. Shippers and carriers have long flirted with the idea but were hampered by a lack of fair indices on which to base their contracts. Today, more indices are available for shippers to use to manage and hedge contract rates.

GOING REGIONAL

The power of the pandemic to shutter, almost overnight, factories across Asia has compelled more organizations to look at shortening their supply chains by reshoring and/or organizing supply chains by region. Either could reduce the number of ocean shipments.

For instance, in December 2020, stationary-bike company Peloton

announced it was acquiring Precor, a Seattle-based maker of fitness equipment. With the acquisition, Peloton said it would establish U.S. manufacturing capacity.

The pandemic isn't the only force behind this thinking. As manufacturing becomes more automated, the savings possible when producing in low-wage areas drops. Add in the time required to transport goods across oceans and the vagaries behind tariffs and trade wars, and bringing operations closer to home looks even more appealing.

Changing manufacturing locations is rarely a quick decision. “Moving to another market requires identifying new suppliers, raw material sources, and skilled employees,” says Rick Gabrielson, an advisor with consulting firm New Day Advisors. Companies have to evaluate the costs and benefits, and balance both against risk.

The current focus on distribution resilience within the trucking and parcel sectors will infiltrate the ocean network during the next few years. One result might be a move toward precision scheduling to drive better performance.

A NEW LOOK AT PORTS AND WATERWAYS

A growing number of organizations are reconsidering their maritime strategies within North America. Some are considering smaller ports to cut their reliance on the biggest—and often most crowded—ports, Anderson says.

Walmart, for example, broke ground on a new distribution center in South Carolina in December 2020. Once operational, it's expected to boost volume at the Port of Charleston by about 5%.

Talk of a U.S. “marine highway” has also been renewed, Gabrielson says. The term refers to leveraging coastal activity, transit in the Gulf, and river systems such as the Mississippi River as part of an organization's logistics networks.

For instance, trucks might transport goods part of the way to their destination, after which they'd move over the water, before returning to trucks. Europe already does this extensively, and a more robust marine

HAPAG-LLOYD GOES LNG

Technological advances continue to help the maritime industry operate more sustainably. One example: Liner shipping company Hapag-Lloyd, with a fleet of 222 modern vessels and a total transport capacity of 1.6 million TEUs, is the first to convert large containerhips to liquid natural gas (LNG).

Hapag-Lloyd will retrofit its 15,000-TEU ship *Sajir* to operate using LNG. In the future, the ship's engine system will be able to function using one of two types of fuel: LNG or low-sulfur fuel oil (LSFO).

The shipping line signed a contract for the retrofitting with Hudong HONDHOA Shipbuilding (Group). The company will carry out the conversion at Shanghai-based Huarun Dadong Dockyard.

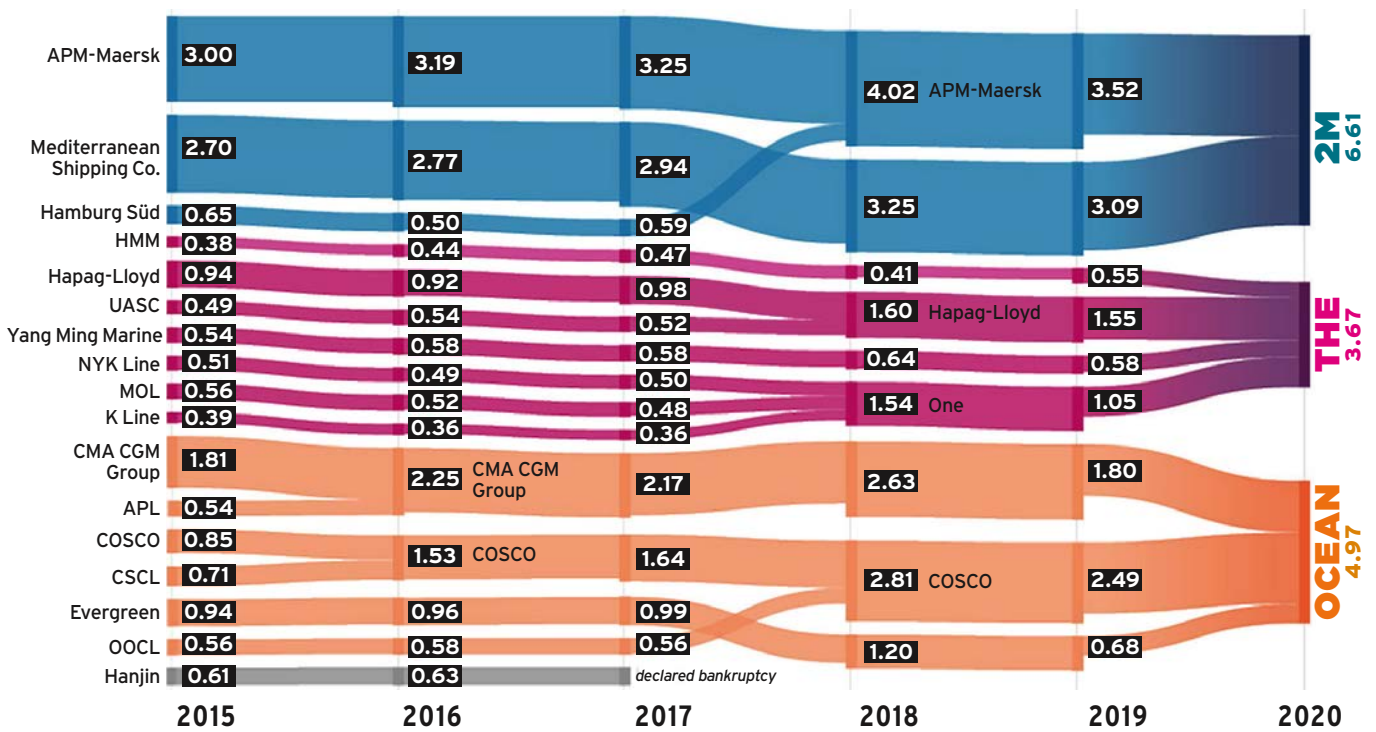
During its time in the shipyard, the *Sajir*'s fuel system and existing heavy fuel oil-burning engine will be converted into a dual fuel engine. The plan is to operate the vessel using LNG, but to use LSFO as a backup.

Using LNG in the shipping industry could potentially reduce carbon emissions by 15% to 30% and sulfur dioxide and particulate matter by more than 90%. The *Sajir* is one of the 17 vessels in Hapag-Lloyd's fleet that were originally designed to be LNG-ready; its 16 sister ships are also technically prepared for retrofitting.



CONTAINERS IN CONTROL: FLEET CONSOLIDATION SUPPORTS FREIGHT RATES

THE ROUTE TO CAPACITY MANAGEMENT (MILLION TEU)



highway could help mitigate the truck driver shortage in the United States, relieve highway congestion, and reduce emissions.

In fact, the goal of the Marine Highway program within the U.S. Department of Transportation, established by the Energy Independence and Security Act of 2007, is to expand the use of America’s navigable waters.

“America has a versatile and expansive network of navigable waterways, including rivers, bays, channels, coasts, the Great Lakes, open-ocean routes, and the Saint Lawrence Seaway System,” but they’re underused, according to the Department of Transportation, Maritime Administration.

TECHNOLOGY BECOMES KEY

The pandemic helped accelerate thinking within the industry around concepts such as autonomous shipping, big data, and analytics, says Sean Maharaj, managing director in the transportation, logistics, and distribution practice with consulting firm AARete.

Going forward, technology — and particularly digitization — will be essential to the success of the maritime industry.

The ability to electronically move information between shippers, carriers, and other participants in maritime transport will unleash a “tremendous amount of efficiency in organizations,” Gabrielson says.

Shippers will be able to track their products from loading at origin to a vessel’s arrival. Operators at the ports, terminals, drayage firms, and warehouses will be able to plan more accurately, creating widespread efficiencies.

Before the maritime industry can leverage technology, however, it needs standards that are system agnostic and neutral. One example comes from the financial industry, which developed the SWIFT messaging network to transmit information, such as money transfer instructions, between institutions.

As ships become more connected, cybersecurity becomes a greater concern. The cost of a single cyberattack on

COVID-19 sent seismic waves through global trade and all the goods transported around the world on container ships. However, carriers moved quickly to remove volumes and reduce overcapacity in the face of weaker demand, which has supported freight rates throughout. This is thanks to consolidation in the carrier industry in recent years, which culminated in three key shipping alliances: the 2M Alliance, Ocean Alliance, and Transport High-Efficiency (THE) Alliance.



To establish U.S. manufacturing capacity, Peloton acquired Precor, a global commercial fitness equipment provider with a significant U.S. manufacturing presence.

15 ports across the Asia-Pacific, such as a computer virus that scrambled cargo databases and disrupted operations, was estimated at about \$110 billion, according to a 2019 Lloyd's report.

The Digital Container Shipping Association, along with its carrier members, is working with industry stakeholders, as well as industry and intergovernmental organizations, to establish digital standards for several initiatives that are top priorities in the coming three to five years.

These priorities include data and interfaces, the Internet of Things (IoT), electronic documentation, and cybersecurity. "Nine competitors sit down together with us to tackle industry-wide problems," says Thomas Bagge, chief executive officer and statutory director for the Digital Container Shipping Association.

CONTINUED FOCUS ON SUSTAINABILITY

Technological advances in both information systems and fuel promise to help the maritime industry operate more sustainably. It's estimated that approximately 10% of new builds are "smart ships" that leverage multiple sensors to optimize routing, sense weather patterns, and closely monitor vessel performance, Maharaj says.

The use of liquid natural gas (LNG) to fuel ships could potentially reduce carbon emissions by 15% to 30%, while cutting sulfur dioxide and particulate matter by more than 90%, according to Hapag-Lloyd. The carrier is the first to convert a large containership so it can operate on LNG or low-sulfur fuel oil (see sidebar, p. 40).

Efforts are also underway to find new fuels altogether. The Hydrogen Program Plan, which the U.S. Department of Energy issued in November 2020, says "opportunities for hydrogen and hydrogen carriers are also emerging across the transportation sector, including in marine applications. The use of hydrogen in various marine vessels and at ports for drayage trucks, shore power (electricity for ships while docked), and cargo equipment all offer



Use of a smaller port was attractive to Walmart. The retailer recently broke ground on a 3-million-square-foot import distribution center near the Port of Charleston. The facility is expected to increase port volumes by 5%.



After an initial drop in volume at the start of the pandemic, consumer demand, particularly in Europe and North America, took off. At the Port Authority of New York and New Jersey, cargo volume jumped by double digits starting in September 2020.

the potential to reduce both carbon dioxide and other emissions."

The upheaval that occurred during 2020 shows no signs of stopping and could produce a maritime industry that looks very different in a few years. Organizations that fast-track digitization efforts will gain a competitive edge, similar to what's happened in retail and other industries.

PEOPLE POWER

Even as advances in technology, fuel, and business practices change the maritime industry, 2020 also highlighted another enduring value: humans working together to meet challenges.

The pandemic showed the interconnectedness of all parts of the industry, says Ruda. Events at one port could impact other ports and carriers thousands of miles away. Terminals felt

the effect of bottlenecks at warehouses.

Meeting these challenges requires working together. Ruda and his colleagues at the Port Authority of New York and New Jersey, along with representatives from trucking, railway, and carrier organizations, participate in several ongoing forums. These meetings accelerated from quarterly before the pandemic to weekly early in 2020, and now are held biweekly.

The discussions provide everyone with real-time updates and allow for collaboration. "We're all working together to plan ahead," as well as manage the jump in volumes, Ruda says.

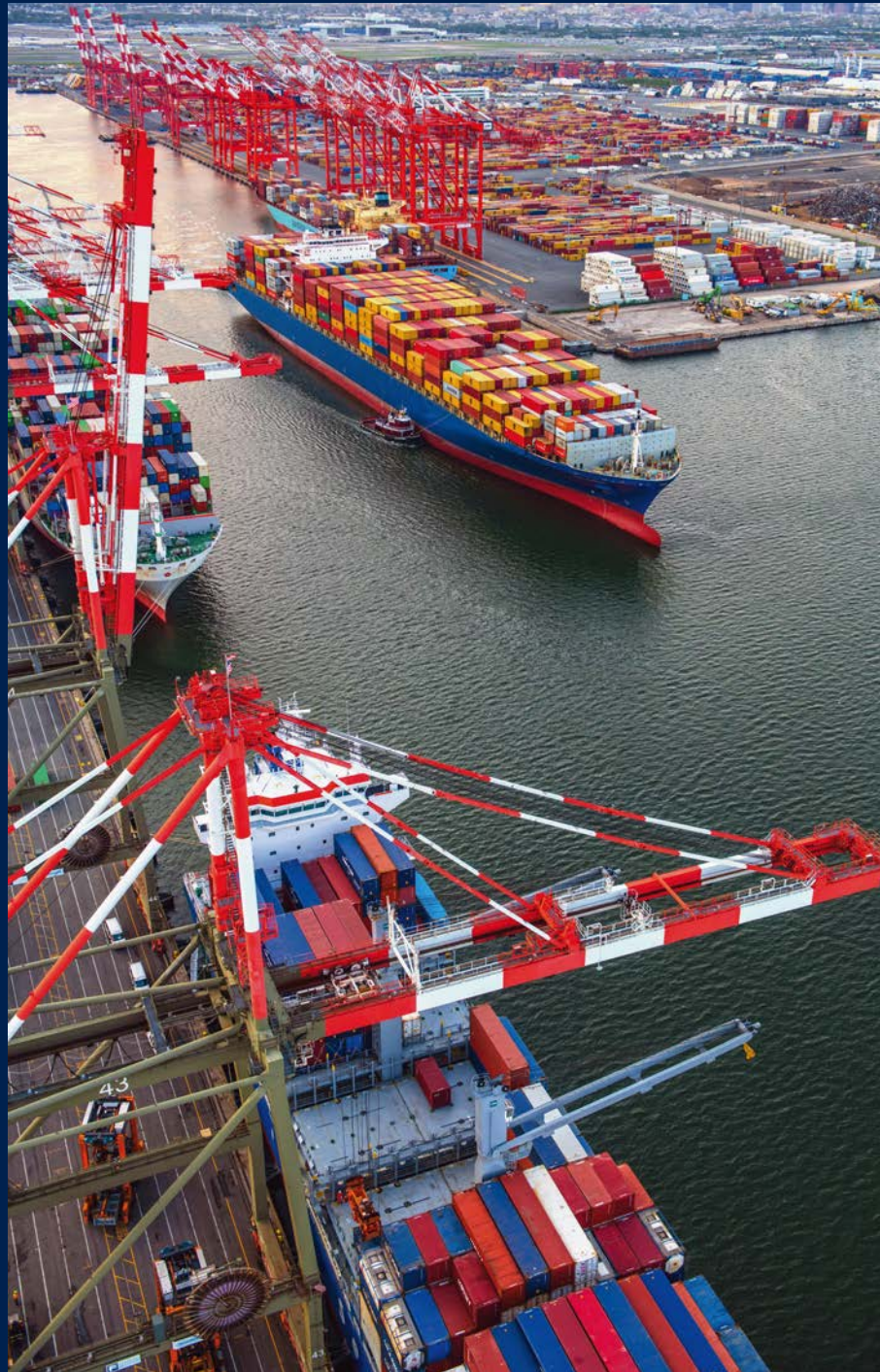
The importance of stakeholders collaborating to reach a common goal isn't new. "But the pandemic brought us together even more as a port community," Ruda says. ■

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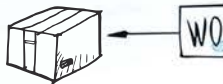


SUPPLY CHAIN EDUCATION

Keep the Change

Events of the past year impacted supply chain education in ways that appear likely to endure even after the pandemic subsides.

BY KAREN KROLL





FOR SEVERAL YEARS,

Rudolf Leuschner, Rutgers University associate professor in the department of supply chain management, has taught a class on risk mitigation. The 2021 course focuses exclusively on the pandemic.

Each week, guest speakers from different organizations virtually discuss challenges they've faced during the past year. Students break into groups to brainstorm potential solutions, and then the presenter discusses the approach the organization actually took.

When developing this version of the course, Leuschner and his colleagues "didn't know if 10 students or 100 students would attend," he says. As it turns out, enrollment was the highest it has been, at about 60. Most are current Rutgers students. They're joined by about a half-dozen alumni and several prospective students auditing the course.

Students say they appreciate learning firsthand the challenges encountered by supply chain professionals working through the pandemic.

Just as COVID-19 has altered supply chain organizations, it's also having a lasting impact on supply chain education.

GROWING AWARENESS OF SUPPLY CHAINS

To start, interest in supply chain programs at many universities is growing, one positive byproduct of the degree to which the subject of supply chains captured headlines during the past year. More students—and as important, their parents—now know what a supply chain is.

"Supply chain doesn't have a history like accounting or finance," says Jake Dean, director of the Grainger Center for Supply Chain Management at the University of Wisconsin-Madison. "You don't have parents telling their kids to go into supply chain."

The pandemic has changed that, and programs are noticing an uptick in interest.

The value of strong supply chains has also become apparent to students in a range of disciplines. Since 2017, Kingshuk Sinha, chair and professor within the supply chain and operations department at the University of Minnesota, has taught a course in supply chain management in the health and medical devices sector. It attracts students from a range of disciplines within the university, including business,

medicine, public health, and science and engineering.

In 2020, the course focused entirely on the pandemic. Students examined shortages of personal protective equipment (PPE), ventilators, testing, staff, and intensive care unit capacity, among other topics. "It was a very engaged class and the most lively course I've taught," Sinha says, noting that enrollment has grown even in the past year.

CURRICULUM REBOOT

The concepts of risk mitigation, resilience, and agility, while always important, are gaining prominence. Supply chain students will spend more time identifying, assessing, and responding to risk, predicts Caroline Chumakov, principal analyst with Gartner; she covers supply chain talent strategies. "We'll see more of this woven into functional course work," she says.

While many in academia have been discussing the need for supply chain professionals to prepare for disruptive events, whether a natural disaster or pandemic, the benefits of doing so aren't as easy to quantify as, for instance, cutting inventory costs. COVID-19 may change that.

"Students and companies may be more accepting of the benefits of proactive risk mitigation," says Sean Handley, chair of the management science department at the University of South Carolina.

"To bring the concept of risk into the classroom, professors might combine discussion and case studies," says Kevin Lindeman, chair of the supply chain and information systems department and professor of logistics and supply chain management at Pennsylvania State University.

For instance, students might complete a case study showing how a firm developed a playbook to manage a disruption, like the H1N1 virus from 2009. Then, they might discuss how COVID-19 differed from that disruption, and the response changes that are needed. This could lead to a broader discussion about managing different

LEAN UNDER FIRE

The supply chain shortages that arose during the pandemic have prompted discussions about the role lean logistics or a just-in-time approach to inventory might have played. "It's a hot topic: Is lean the culprit?" asks Brian Fugate of the University of Arkansas.

While lean itself isn't to blame, the pandemic has highlighted how the press and some companies misunderstand it, Fugate says. Supply chain courses can now use the pandemic to emphasize what lean is and isn't. By evaluating companies' responses during the pandemic, students can compare and contrast companies that had developed a lean culture of

respect for people and continuous improvement, and so could respond effectively, versus companies that view lean as a set of mechanistic, tool-based techniques focused only on efficiency and waste removal.



types of disruptions, such as COVID-19 versus a hurricane.

“By classifying disruptions into related types of disruptions, we can better understand how to manage them,” Lindeman adds.

Supply chain resilience has also become an increasingly integral part of research and teaching, says Vedat Verter, chair of the department of supply chain management at Michigan State University. In teaching, this would be covered as a function of the level of redundancy and flexibility that can be built into the supply chain through choices made by policy and/or decision-makers.

The pandemic also hammered home how uncertain the world is, and how future supply chain professionals need to hone their ability to solve problems even amidst uncertainty. To that end, Brian Fugate, chair of the supply chain management department at the University of Arkansas, intentionally introduces changes to some project work.

Say students are developing a supply chain for a company. Several weeks into their work, they learn one division has been sold off, impacting all the requirements. “It’s more ambiguous and tough on students,” he says. But it helps students learn to thrive in a changing environment.

A FOCUS ON DIGITIZATION

The role of technology and digitization in supply chains and supply chain education continues to increase. “I cannot emphasize enough how much technology comes up in conversations regarding supply chain talent,” Chumakov says.

While this has already led to a greater focus on advanced analytic techniques at the graduate level, she expects to see more of these types of courses at the undergraduate level. Successful programs will continue to emphasize the relationship between business and technology, she adds.

Michigan State University added a supply chain analytics course as a requirement for all supply chain majors,

A recent Rutgers class on risk mitigation drew its highest enrollment ever from students interested in learning how supply chain professionals are working through the pandemic.



Faculty at the University of South Carolina see COVID-19 as a teachable opportunity for supply chain students, especially in proactive risk mitigation and resiliency.



The University of Minnesota Carlson School of Management recently hosted an informational session that outlined how the principles of supply chain leadership contribute to addressing the many challenges raised by the pandemic.

Verter says. The course dives into data science and optimization methods for tackling supply chain challenges.

Another quality many supply chain leaders are looking for within candidates is experience examining global business challenges or problems within global supply chains. The best ways to acquire

this are through hands-on work, projects, case studies, or internships abroad, Chumakov notes.

While many graduate programs already offered applied project work, it’s becoming more common at the undergraduate level, she adds.

Continued on page 49

COVID-19: A REAL-WORLD LEARNING OPPORTUNITY

Experts all over the world are studying the devastating impact of COVID-19 on national and global supply chains. It has also presented research opportunities for supply chain professors in Rochester Institute of Technology's (RIT) Saunders College of Business, and created a robust discussion between RIT students and faculty.

Assistant professor Steven Carnovale and his colleagues study logistics trends and developments. Based on their research, they created the Logistics Managers' Index, which uses logistics metrics such as transportation, warehousing, and inventory to predict potential movements in the economy. Carnovale drew upon this research to explain to students the impact of COVID-19-related supply chain issues.

"At the point where COVID-19 became a global phenomenon, I was able to relay to the class how supply chain is the center of gravity when it comes to sourcing, manufacturing, and distribution. Everything is interrelated," says Carnovale, who teaches supply chain fundamentals, an A-to-Z understanding of how supply chains work. "COVID-19 is inducing a bullwhip effect where manufacturing decisions, the demand for supply, and disorganization results in one of the most common problems in supply chain management."

Carnovale and his colleagues tweaked their curriculum to reflect what balances the flows of inbound and outbound materials, how manufacturers have had to move facility operations to domestically based operations, and how companies are reconsidering sourcing decisions in the midst of COVID-19.

"In the recession of the early 1990s, retailers kept about 60 days of inventory, which is a lot of inventory," he explains. "COVID-19 created a giant supply chain disruption and the inflow of materials essentially stopped.

"As a result, it's important for our students to understand topics like the total cost of ownership, pricing of products and shipping, supplier discounts, the impact of moving operations domestically, and the USMCA, which is conducive to trade," Carnovale adds.

While COVID-19 has made the world realize the risks involved in supply chain management, faculty members have always taught students to recognize

patterns and disruptions, and to be integrated team members who are involved all the way from supply chain planning to understanding and mitigating risks, according to Zhi Tang, professor and graduate program director in Saunders College.

"We are consistently creating data-driven decision-makers who understand strategy," says Tang. "The courses that we offer are designed to face the new, long-lasting challenges of supply chain. We aren't simply being reactive. Our response is based on the assessment of faculty and industry partners that COVID-19 has likely upended the traditional notion of how supply chain was managed. So, the changes in the curriculum are responsive to these changes."

Ironically, just before COVID-19 became a global pandemic, RIT discussed logistics and supply chain challenges with corporate partners and advisory board members from CooperVision, Constellation Brands, and Wegmans. These companies and others have provided insight on the formation of the supply



chain curriculum, including the development of relevant courses and capstone projects that embed planning and resolutions into learning.

"COVID-19 is unlike anything that our generation of students have faced," says Tang. "This event has created a great opportunity to study supply chain management, which can position them for a successful career post-COVID-19."

*—by Vienna McGrain,
Rochester Institute of Technology*

NOTE: Saunders College of Business is launching a master's degree in global supply chain management in 2021.

Continued from page 47

OMNICHANNEL EDUCATION

Like most other disciplines, supply chain classes largely moved online in the spring of 2020.

As professors get used to working online and video technology advances, the quality of the presentations continues to improve. For some classes, such as lecture courses with hundreds of students, the difference between online and in-person courses is often modest.

And many professors find that classes focusing on quantitative problems, such as developing a spreadsheet with a demand forecast, work well online. Online courses can also better accommodate students with work or other responsibilities.

For classes that bring in guest speakers, an online format expands the pool of potential presenters because it eliminates travel time.

At the same time, it's unlikely in-person classes will completely disappear. Converting classes that focus on strategy or more qualitative concepts to an online format presents a more interesting challenge, Leuschner says.

And, many students long for a traditional college experience. "Students love to come to campus," Handley says.

What seems likely is a shift to "omnichannel learning," Fugate says. Different ways of teaching will allow universities to tailor the media to the subject, and also accommodate students' differing needs.

DIVERSITY AND INCLUSION

While some assumed the urgency of the pandemic would push other social and environmental concerns to the background, the reverse occurred. "The pandemic highlighted inequities in society, and brought those issues to the forefront," Handley says.

This is prompting many professors to allocate more focus and time to issues of diversity, equity, and inclusion (DEI). Many are integrating discussions on these topics with other content, recognizing that these are

The Department of Supply Chain Management at Michigan State hosts a popular webinar series to discuss the impact of COVID-19 and outlook for specific industries, including transportation, pharmaceuticals, and healthcare.



It's unlikely in-person learning will completely disappear. Instead, supply chain education will evolve to omnichannel learning to accommodate students' differing needs.

not stand-alone issues, but are core to operations.

For instance, in the procurement course at Michigan State, instructors discuss issues around giving priority to suppliers who implement and prioritize DEI. They also discuss advantages of procuring from women- or minority-owned businesses, as well as avoiding conflict minerals.

Companies are also partnering with universities to support DEI initiatives. For example, a goal of the scholarship program at Gebrüder Weiss (GW), a global freight forwarder, is to "support a diverse workforce in logistics and to support educational opportunities for those with economic struggles," the company says.

GW offers supply chain scholarships at three universities: Rutgers in New Jersey, the University of Illinois, and Loyola University in Chicago.

In the Loyola program, preference is given to students who are first in their family to attend college and/or are involved in activities that promote

women in business. "Our goal is to provide opportunity to those who don't have as much opportunity," says Mark McCullough, chief executive officer at GW.

The issue of sustainability has also risen in prominence in the past year. "There's more interest because people see that it's a global and interconnected supply chain," Fugate says.

In fact, many organizations are focused on developing "purpose-driven" supply chains, Chumakov says. These supply chains look broadly at their impact both within and outside their organizations, and incorporate sustainability and DEI, along with efficiency and cost reductions, within their strategies.

One example from early in the pandemic was the shift by some apparel companies to make masks and PPE. As the concept of purpose-driven supply chains gains attention and interest, it's likely more university programs will incorporate this concept into their programs as well. ■

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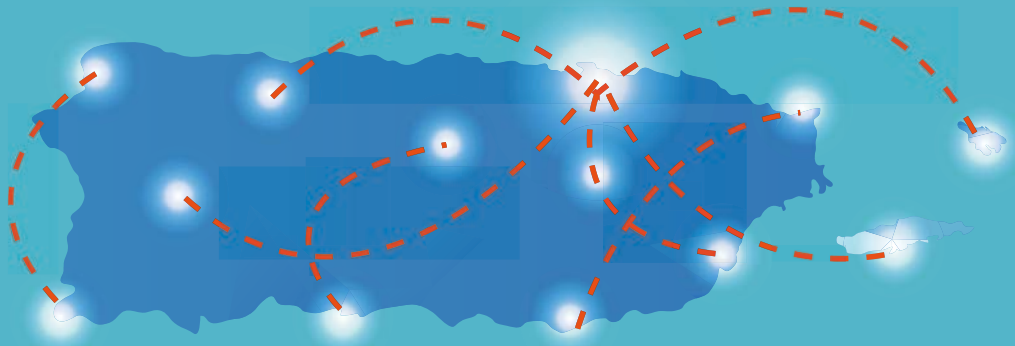
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PUERTO RICO



GO WITH THE FLOW

The “Made in America” initiative, a highly skilled workforce, and transshipment capabilities are beckoning shippers to take advantage of the flow of commerce to the island—a sometimes-overlooked domestic market for U.S. manufacturers.

BY RICHARD OSBORNE

LUIS MUÑOZ MARÍN INTERNATIONAL AIRPORT, GATE A



IT HAS BEEN SAID there are no harmless misconceptions. Puerto Ricans—U.S. citizens all—can attest to that statement when it comes to their island home. For manufacturers and shippers, the most harmful misconceptions about Puerto Rico may cause them to ignore a potentially important market for their products.

Officially an unincorporated territory of the United States, the Commonwealth of Puerto Rico enjoys free flow of travel and goods with all 50 U.S. states, not unlike that between the states themselves.

“It’s no different than shipping products from Atlanta to Miami,” says Gail Nolan, chief strategy officer for Invest Puerto Rico, the island’s marketing and business-development arm.

Despite Puerto Rico’s status as a U.S. territory, many Americans continue to mistakenly view the area as a foreign country and therefore falsely believe it is subject to border-crossing restrictions that could stifle trade. “It is a huge misconception,” Nolan says. “It is domestic commerce, not trade.”

RICH IN OPPORTUNITIES

Puerto Rico—Spanish for “rich port”—represents great opportunities for commerce unencumbered by the logistics challenges associated with foreign trade.

Invest Puerto Rico works collaboratively with partners in the private sector, government, and academia to promote a unified strategic message to highlight Puerto Rico’s assets and attract business opportunities and job growth in critical industries.

Part of its mission is to convey the attitude of U.S. Customs and Border Protection, an agency of the Department of Homeland Security, which treats commerce on the island of Puerto Rico as it does in any other U.S. port, considering any products from the mainland to be domestic. As such, goods receive no additional inspection.

The island is “a connected hub” with logistics assets that are not so



SAN JUAN BAY PORT TERMINALS

much individual as they are collective, says Nolan.

Puerto Rico has assets that correspond with or exceed other geographical areas of its size—including nine regional airports and three international airports, and a highway system connecting internally with an extensive temperature-managed warehouse system.

Likewise, shippers would be smart to explore the advantages of Puerto Rico’s Foreign Trade Zone, the largest noncontiguous FTZ in the United States. The FTZ consists of three ports—San Juan, Mayaguez, and Ponce.

“There are also external marine highways so goods can travel around the island both internally and externally in very effective ways,” Nolan says. “The density of logistics capabilities is impressive.”

For all its logistics advantages, Puerto Rico is not merely standing in place, and savvy manufacturers and logistics professionals are taking notice.

MADE IN AMERICA

In January 2021, President Biden signed an executive order to support American manufacturers, businesses, and workers. Referred to as the Made in America Executive Order, it directs agencies to utilize the Manufacturing Extension Partnership—a national network in all 50 states and Puerto Rico that supports small and mid-size manufacturers—to help agencies connect with new domestic suppliers who can make the products they need while employing America’s workers.

The Made in America order will benefit Puerto Rico specifically because

of the territory's access to low-cost commodity manufacturing in regions covered by the Caribbean Basin Initiative and CAFTA, a NAFTA-style deal with five Central American nations as well as the Dominican Republic.

The order is expected to provide Puerto Rico a boost by providing increased "American-made" labeling for products coming from the island.

Once precise guidelines are established, manufacturers may wish to reevaluate the cost of goods for every

component part of their products to determine whether Puerto Rico presents viable options. Invest Puerto Rico can serve as a partner in navigating that process, notes Nolan.

"We align companies with our experts to work through what makes sense in terms of using our location and proximity to the Caribbean Basin and some of those other labor pools, while still being mindful of the Made in USA label," she says.

Meanwhile, cabotage constraints are

being eased, Nolan says. Cabotage refers to trade or transport in coastal waters or airspace or between two points within a country.

STREAMLINING SUPPLY CHAINS

"Right now, we're very excited," Nolan says. "We have a transshipment waiver that opens up opportunities on the island for goods and passengers to offload and reload on the island of Puerto Rico."

Advocates for Puerto Rico hope to work with the new Administration in Washington to extend the transshipment waiver and further release cabotage restrictions.

"The other piece that's important to us is the Jones Act," Nolan adds. The Jones Act is a federal law that regulates maritime commerce in the United States. It requires goods shipped between U.S. ports to be transported on ships that are built, owned, and operated by U.S. citizens or permanent residents.

"The Jones Act requires some navigation in terms of how entities look at the origin and destination of goods, and incorporating Puerto Rico into that," Nolan says.

Currently, when goods are shipped from manufacturers in the states to Puerto Rico, they require an extra step: Electronic Export Information documentation specifying what the cargo is, similar to the process needed for exports.

While the step is more of an inconvenience than an obstacle, Nolan says, Invest Puerto Rico is working to eliminate the extra paperwork step. "All indicators are that it doesn't serve a purpose," she says.

HUB OF ACTIVITY

An emerging hub for business opportunity, the island already is home to companies from around the world that are maximizing their growth opportunities by venturing into diverse industries and relying on Puerto Rico's skilled workforce.

"The talent in Puerto Rico is exceptional," Nolan says. "It's number six globally in concentration of scientists





LUIS MUÑOZ MARÍN INTERNATIONAL AIRPORT

IN APRIL 2020, THE U.S. DEPARTMENT OF TRANSPORTATION GRANTED A WAIVER FOR AIR CARGO TRANSFER FOR PUERTO RICO'S THREE INTERNATIONAL AIRPORTS. THE WAIVER LETS AIR CARGO SHIPPERS CUT COSTS AND TRANSIT TIMES.

and engineers, it has more than eight times the concentration of experts and personnel in the pharmaceutical industry, more than five times in the medical device industry, and almost four times the number of experts in the shipping industry. All this talent adds opportunity.”

Invest Puerto Rico’s goal is to align, facilitate, and enhance the promotion efforts of private, public, and non-profit organizations that historically have supported government initiatives and drive economic development within their sectors.

The organization also provides services to help businesses establish operations on the island and helps them link with local companies to acquire goods and services in collaboration with the Department of Economic Development and Commerce, other government agencies, trade organizations, and industry partners.

POWERHOUSE POSSIBILITIES

Although only 100 miles long and 35 miles wide, Puerto Rico is something of a powerhouse for certain products, most notably pharmaceuticals.

The island is the largest exporter of biopharmaceuticals in the United

States and producer of eight of the top 15 biopharmaceutical products in the world. It has the highest concentration of both pharmaceutical manufacturing and medical device experts in the nation.

For bioscience companies looking to better connect to the global supply chain, the value proposition of locating in Puerto Rico grew stronger last spring.

INCREASING EFFICIENCIES

In April 2020, the U.S. Department of Transportation (DOT) granted a waiver for air cargo and passenger transfer services for Puerto Rico’s three international airports—Luis Muñoz Marín, commonly known as San Juan International Airport (SJU), located in the municipality of Carolina on the northeast of the island; Rafael Hernandez Airport located in the municipality of Aguadilla on the island’s west coast; and Mercedita/Ponce International Airport in the south, three miles from the central business district of Ponce.

The DOT waiver allows foreign and domestic flights that stop in Puerto Rico to transfer cargo or passengers to another flight, allowing shipping companies to cut costs, reduce shipping times, and increase profit margins.

This advantage blends well with the island’s geographic location along high-growth trade routes between Europe and the Americas. The island already ships to more than 83 destinations worldwide and is a global leader in transportation and logistics. It has the talent, R&D, and infrastructure to support specialties such as cold chain and climate-controlled shipping, which is essential for life-critical manufacturing.

NETWORK STRENGTH

Meanwhile, Puerto Rico has secured a position in a four-location network for 5G technology development. “I call it the north-south-east and west network,” Nolan says.

In addition to Puerto Rico, the network consists of Texas A&M University, Purdue University in Indiana, and the University of Hawaii. It is connected through the National Spectrum Consortium with funding from the Department of Defense.

“Basically, it creates a boundary around the U.S. border and each different node will be connected to a high-density computational core at Texas A&M,” Nolan says. Each area will have a research focus, with Puerto Rico concentrating on manufacturing and logistics.

“We will be *the* national center for evaluating efficiency around logistics as it becomes very data dense,” Nolan says. “That’s an important differentiator for Puerto Rico moving forward.”

It’s one of many differentiators that should reinforce Puerto Rico’s rightful place in the U.S. logistics landscape. ■

IN THIS SECTION: 3PL - Education

3PL



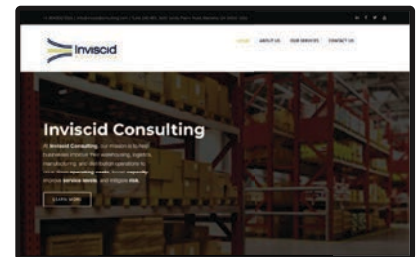
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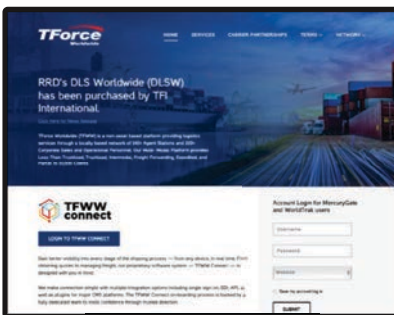
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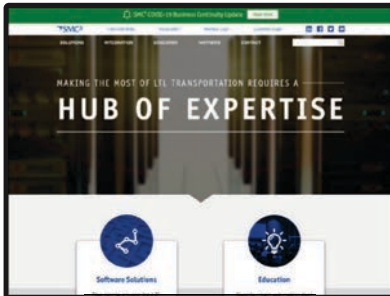
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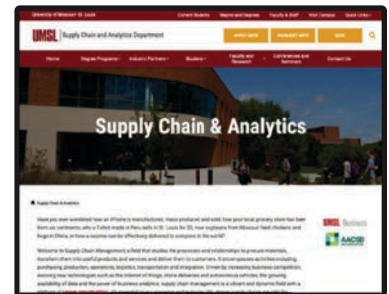


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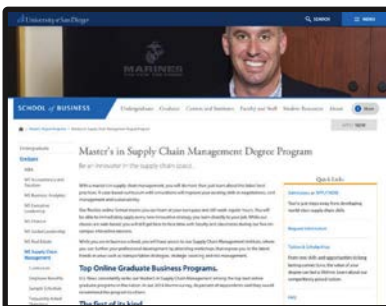
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Why Blockchain Will Create Extreme Supply Chain Management Optimization

Offered by Cerasis and GlobalTranz

Learn how applying blockchain in supply chain management can help you do more with less in this free whitepaper. Blockchain offers an opportunity for shippers to redefine standard procedures, leverage new technologies, and enhance cybersecurity. Demand for third-party logistics services could increase, and even 3PL-based platforms can become more useful.



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Enabling Today and Differentiating Tomorrow: Supply Chain Best Practices

Offered by Infor

Those tasked with managing complex supply chains must recognize a shift in which the traditional lines between planning and execution are blurred. With visibility at the forefront, openness and connection can thrive across networks, allowing organizations to witness events in real time and proactively respond. Read this guide to learn what steps to take to successfully manage continuous operations.

Supply Chain Insights

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bit.ly/SmarterSustainability

Sustainable Supply Chain Management: Driving a Smarter, More Sustainable Future

Offered by Coyote

Today's supply chain professionals are tasked with finding smarter ways to reduce waste for their companies—not just cost, but also miles and emissions. Whether they're preparing for conversations with leadership about sustainability, developing a new program, or advancing an existing one, it's important to understand what's happening in the marketplace. This free report shares research that will help you drive smarter and more sustainable practices.



bit.ly/ConvynOV20EB

Four Ways Digital Freight Networks Improve Shipping for Small and Mid-Size Businesses

Offered by Convoy

From fluctuating demand to uncertain capacity, 2020 has been a challenging year for shippers. Small and mid-size businesses have been hit especially hard, with transportation teams finding new ways to streamline operations, reduce costs, and improve customer experience. Learn the four ways that digital freight networks can help businesses weather market volatility and improve freight logistics.



bit.ly/SupplyChainBlueprint

Blueprint for Managing Supply Chain Disruptions of Any Size

Offered by E2Open

The impacts of COVID-19 caused hardships for many companies, but others were able to use technology to quickly understand how their businesses were affected and take action. This study outlines how to prepare for future disruptions related to climate, technology, pandemics, economic turmoil, trade wars, and any other challenge. Learning how artificial intelligence and real-time data mitigate extreme conditions can better position leaders to reduce risks and emerge even stronger.

podcast



Weathering a New Retail Climate

GUEST: Nathan Schmies, Vice President of Supply Chain Operations, Hub Group

bit.ly/HubgrpJan21POD

E-commerce surges during the pandemic may have changed the retail landscape forever. How can suppliers and retailers adjust their strategies in response? Hub Group's Nathan Schmies shares his take on what occurred in retail in 2020 and what's to come in 2021.



[IN FOCUS]

INBRIEF

New Services and Solutions

>TECHNOLOGY

> The 4SIGHT Connect Digital Gate from **4SIGHT Logistics Solution** can help improve driver scheduling and communications for warehouse and distribution center dock operations. It lets facilities proactively schedule docks for loading/unloading and send drivers to the right location, based on availability, and upon arrival.

> **Fetch Robotics** unveiled the PalletTransport1500, an autonomous mobile robot that supports cross-docking, returns, and case picking workflows for contactless pallet transport in distribution centers. The PalletTransport1500 utilizes Honeywell Intelligrated's Momentum warehouse execution system software to safely move pallets and other large payloads up to 2,504 pounds.

> To help organizations increase the efficiency of their global supply chains, **Oracle** added logistics capabilities to Oracle Fusion Cloud Supply Chain & Manufacturing. New capabilities include the rules of origin qualification, which helps customers comply with rules of origin criteria across hundreds of trade agreements, and machine learning, which helps shippers predict transit times, reduce costs



> Designed for heavy-duty materials handling applications, the **Raymond Courier 3220 Automated Tow Tractor** can tow up to 15,000 pounds. Featuring vision-guided technology, this model comes with a low-clearance arch as a standard design, making it easy to maneuver through areas with low overhanging structures.

associated with unplanned delays, and improve customer experience.

> Dispatch software **Elite EXTRA** and operating system **Datatrak** launched Beacon, a combined last-mile delivery solution. Beacon integrates data from order flow and delivery to provide rate-charge, invoicing, and settlement information, as well as automated dispatching, optimized routing, real-time visibility, and contact-free deliveries.

> **Transfix** launched TrueView TMS, a flexible transportation management system for small and mid-sized shippers. The solution can reduce time to tender by up to 92%.



> In partnership with the North Carolina State Ports Authority, **Scoular**, which provides supply chain solutions for end users and suppliers of grain, feed ingredients, and food ingredients, is developing a transload operation at the Port of Wilmington's General Cargo Terminal (*pictured*). The facility, which is expected to be completed in summer 2021, will be used to transfer bulk agricultural products to containers for export on ocean vessels.

> **Samskip** ramped up its shortsea container connections between Ireland and North Continental Europe by introducing a dedicated service link into Amsterdam. The fixed-day service departs from the TMA Terminal Amsterdam on Monday evenings for arrival in Dublin on Wednesday and a weekend return to Amsterdam.



> **Kenco Logistics** released its proprietary materials handling equipment (MHE) telematics solution, Kenco FleetCloud. By providing real-time visibility into a range of metrics that impact MHE operations, Kenco FleetCloud lets managers make data-driven business decisions to boost efficiency, safety, and compliance.

>PRODUCTS

> **Digital Matter**, a supplier of GPS and IoT hardware and device management software, utilized Semtech's LoRa Edge asset management platform to develop the Yabby Edge, a battery-powered tracking device for indoor/outdoor asset management. The Yabby Edge features cloud-based location calculations, significantly reducing power consumption and extending battery life for up to 12 years.

> For organizations looking to increase picking speeds, **Kardex Remstar** now offers the Display LED-Navigator to improve order picking performance on

its high-density storage systems. The Kardex Remstar Shuttle XP Vertical Lift Module now comes equipped with the LED panel featuring a status bar and countdown, which indicates when it's time to pick. A color navigator delivers guidance to the exact location of the stored part to pick.

>SERVICES

> **Bridgestone** opened a warehouse in Ancaster, Ontario, to better serve Canadian tire distributors and customers. With a maximum storage capacity of 570,000 tires and a strategic location, the new distribution center enables the company to reduce transportation costs and shorten time-to-market of its products to meet customer demands in Eastern Canada.



> To better serve cargo customers, **New Orleans Terminal** developed a warehouse management

system (WMS) internally on a cloud-based platform. The WMS offers online quote requests, quick invoice turnaround times, transparency, ease of communication, and better internal reporting capabilities. Because it's housed in a cloud-based platform, multiple users can directly update the WMS in real time.

> Online retailers looking to build an international customer base can now turn to a new global e-commerce delivery service launched by **Asendia**, the joint venture between La Poste and Swiss Post. The new service called e-PAQ enables international retailers to reach customers in more than 200 countries.

>TRANSPORTATION

> **GEODIS** extended its AirDirect service by adding a weekly flight from Shanghai to Guadalajara. The service is a permanent addition to GEODIS' network linking China with Europe and North America and provides direct access to Mexico from North and Central China.

> To offer seafreight shippers a faster alternative, **cargo-partner** introduced its Adria Express service, which connects Asia to Europe via Koper, Slovenia; Rijeka, Croatia; and Trieste, Italy. Transit times from Asian ports to Koper, Rijeka, and Trieste are on average 5-8 days shorter than to North Sea ports such as Hamburg or Bremerhaven.

> **CMA CGM** is boosting capacities throughout its network to better serve ocean shippers. With the signing of Ocean Alliance Day 5 Product, the CMA CGM Group will provide additional port calls and more direct links with 39 services and a 4.1-million-TEU capacity. This includes 20 services covering Transpacific trade, 7 services between Asia and Europe, and 4 services between Asia and the Mediterranean.

> **ZIM Integrated Shipping Services** signed an agreement for the long-term charter of ten 15,000-TEU liquefied natural gas dual-fuel container vessels to serve its Asia - U.S. East Coast trade.

CALENDAR

Logistics Events 2021

Connect with industry peers, join thought-provoking discussions, and discover the future of supply chain.



**MAR
23,
2021**

Georgia Logistics Summit

bit.ly/GeorgiaSummit

At this virtual summit for the trucking industry, trucking and technology providers discuss digital acceleration, the American Trucking Research Institute explores current trends, and grocery and retail leaders share how to cope with last-mile delivery challenges.

VIRTUAL

MAR 29-APR 1, 2021

Smart Digital Ports of the Future

sdp.events

This is the first of two events in 2021 that bring together global ports and supply chain leaders to network and share best practices on the latest developments in automation, sustainability, and connectedness. Learn about the true value of smart data, and attend a panel outlining the C-suite's strategic plans to create autonomous ports of the future.

APR 12-16, 2021

ProMatDX

promatshow.com

Discover innovative solutions to move your business forward as the industry's thought leaders showcase their latest manufacturing, distribution, and supply chain equipment and systems. Tap into cutting-edge education and product demos designed to improve resiliency and agility.

MAY 11-13, 2021

American Supply Chain Summit

supplychainus.com

Join senior-level executives for thought-provoking case studies and key implementable

ideas. Access live-streamed sessions, participate in real-time chats, and ask your most pressing questions. Select which sessions to stream and get instant access to all presentations and videos. Download materials to store in your "digital briefcase." Stroll the virtual exhibit hall to identify key services to enhance your operations.

JUN 8-10, 2021

GS1 Connect

gs1connect.gs1us.org

Access live-streamed and on-demand digital content that focuses on adapting to supply chain and e-commerce challenges, with tracks such as healthcare, grocery, retail, and technology. Industry leaders share success stories leveraging GS1 standards and how to solve specific challenges. The expanded program features a pitch competition, discussion groups, and virtual classroom.

OCT 13-15, 2021

CMA Shipping

informaconnect.com/cma-shipping

The virtual platform hosts live and on-demand sessions throughout the event. Key expert speakers provide exclusive insights into the hottest topics in the global maritime industry, including the impact of COVID-19. Get an update from the U.S.

Coast Guard on IMO 2020 compliance and enforcement, and learn how automation in the workforce will affect the industry.

IN PERSON

**APR 26-27, 2021
SPOKANE, WA**

Northwest Food & Beverage World

bit.ly/FoodBeyWorld

This food manufacturing trade show hosts exhibits featuring the latest technologies and solutions, valuable networking with new and established colleagues, and interactive educational sessions. Get hands-on technical training and join discussions on food safety, COVID-19 response, energy savings, corporate responsibility, and more.

**AUG 17-20, 2021
ORLANDO, FL**

Link: The Retail Supply Chain Conference

bit.ly/LinkConference

Join top executives in the retail supply chain to network and learn about new retail strategies. This premier forum addresses your challenges with retailer breakouts and roundtables, industry executive general sessions, executive insights, and a bustling expo experience, so

you can take back fresh ideas and best practices to your company.

**SEPT 28-30, 2021
LAS VEGAS, NV**

RLA Conference and Expo

rta.org/event/125

The Reverse Logistics Association (RLA) presents industry thought leaders who discuss how to navigate the demanding world of reverse logistics, especially during unprecedented disruption. Take part in powerful keynotes, content-driven panel discussions, and an ample number of networking opportunities.

**JULY 16-17, 2021
WAYNE, IN**

Expedite Expo

expediteexpo.com

Learn about the latest expedite trucking industry news, equipment, career opportunities, and products geared toward owner-operators and drivers of medium-duty and heavy-duty trucks. Attend workshops packed with advice on how to spec a truck, choose the right carrier, reduce costs, improve profits, and save time. Every type of industry professional, including drivers, fleet owners, owner-operators, beginners, and chief executive officers, can take away practical tips and solutions from this expo.

These events were scheduled to proceed as of press time.

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sandiego.edu/msscm	619-260-4860

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PIZZA PIZZA!

WHILE THE PANDEMIC TOOK A BITE OUT OF PIZZA RESTAURANT GROWTH, SALES REMAIN STEADY AS PROVIDERS AND PURVEYORS COOK UP NEW DELIVERY MECHANISMS.

ANY TOPPINGS? BOTS GOT IT

Picnic, a maker of food production technology and Robotics-as-a-Service solutions, updated its automated pizza assembly system, which can make hundreds of pizzas per hour in various shapes from 8 to 18 inches.

The system makes it easier to clean and better able to handle wet and brined ingredients. It uses a modular assembly line with high-capacity sauce, cheese, and pepperoni dispensers.

Kitchen operators can use their own recipe with precision and consistency while reducing food waste.

THESE OVENS ARE READY TO BAKE

Ghost kitchens, also known as cloud or virtual kitchens, support delivery-only operations. For instance, kitchen rental space provider ChefReady offers pizza purveyors plug-and-play kitchen stations equipped with commercial hoods, sinks, and electric and gas hookups.

The company also offers software that aggregates third-party delivery platforms and employs food runners to bring orders to delivery drivers.

ChefReady lets tenants customize their kitchen's layout, and can build it out in 2-4 weeks.

PIZZA MACHINE MEETS DRONE

Piestro, which developed an artisanal pizza-making machine, has automated pizza purveying all the way to the last mile. Through its partnership with Kiwibot, its units can integrate with delivery bots that take the pies to customer locations.

As a standalone pizzeria model, Piestro units can also be set up in public spaces close to where consumers live, such as apartment complex lobbies. With a press of a button, consumers are able to watch as a pizza is made in about 3 minutes.

\$46.2B

Total U.S. pizza industry sales from October 2019 through September 2020. While a small 0.2% decline from the year before, that's still a lot of dough.

STILL COOKIN'

While growth in the number of U.S. pizzerias stalled in 2020, the five-year trend shows a healthy uptick of nearly 40%. There are currently 90,817 pizza places in the United States, giving it the biggest slice in the world.

UPPER CRUST

With 8,271 pizza places, California tops New York, which is home to 7,190 pizza restaurants, a growth of 48% since 2016.



SOURCES: BOLDDATA; PMQ
PIZZA POWER REPORT
PMQ.COM/PIZZA-POWER-
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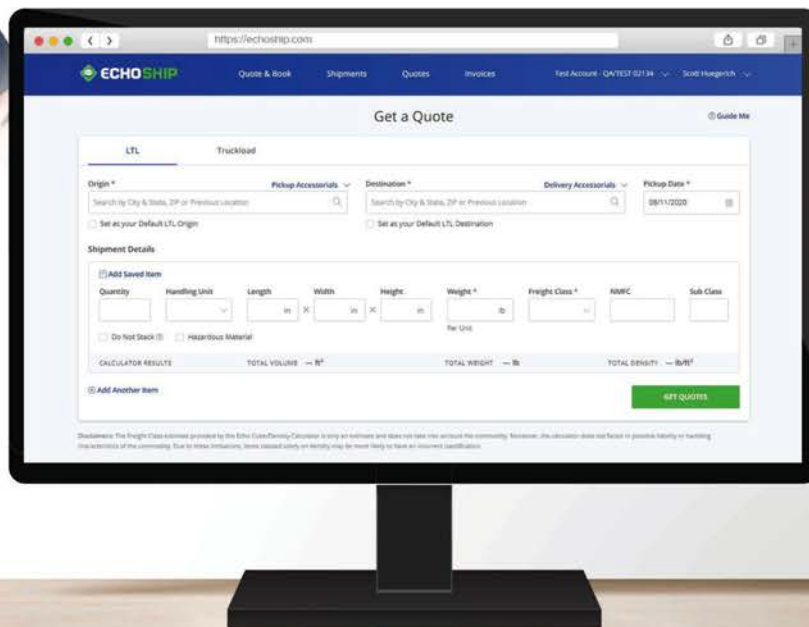
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