



Logistics planners must consider minor disruptions as well as major disasters to keep supply chains running smoothly

When the punishing winds of Hurricane Rita

pummeled the Gulf Coast in September 2005, causing more than \$11 billion in damage, Continental Airlines was forced to close its Houston hub for five days.

That meant canceling or rerouting at least 1,500 daily flights — a large part of the capacity Continental used to handle air cargo from Latin America.

The carrier struggled to reroute shipments through Newark, N.J., Cincinnati and other cities, buy capacity from other carriers and put freight on trucks.

That proved living without some type of contingency management system was too risky for Continental.

The following year, Continental approached JDA Software Group about installing the latest version of its Cargo Revenue Optimizer system. Continental had been using JDA's CRO system since 1999 but the newer version included "what if" planning features that let users input different scenarios — such as taking an entire hub out of the system — and determine optimal rerouting options.

In fall 2006, after a successful pilot program, Continental upgraded to the latest version of the CRO system. The rollout is occurring in three phases, with the final phase scheduled for the fourth quarter of this year.

JDA's aviation team worked closely with Continental staff to adapt time-tested forecasting methods that JDA learned from

working with clients such as UPS, Wal-Mart and DHL to the specific needs of Continental's cargo operations.

"JDA did not offer a standard off-the-shelf risk management system," said Ed O'Meara, director of cargo revenue management for Continental Airlines Cargo. "Our decision to upgrade was a slam dunk because of the pilot's success."

Supply chains are inherently risky, susceptible not only to disasters such as Hurricane Rita but smaller disruptions that can be disproportionately damaging: labor strikes, equipment shortages, fluctuations in demand — all can wreak havoc on even the best-designed supply chain. The risk gets greater as supply lines crisscross oceans and continents and supplier networks become more complex.

"Significant supply chain disruptions can reduce your company's revenue, cut into your market share, inflate your costs, send you over budget and threaten production and distribution," property insurer FM Global said in a report on risk management in a global economy. A companion study of more than 600 financial executives from around the world found that supply chain risk, more than any other kind of risk, had the greatest potential to disrupt their top revenue drivers.

Companies that experienced a significant supply chain disruption between the years 1989-2000 experienced stock returns

that were between 33 percent and 40 percent lower on average than industry peers and share price volatility was 13.5 percent higher in the year following the disruption.

Strictly speaking, there is no such thing as supply chain risk management software, said Razat Gaurav, vice president and general manager for i2 Technology's transportation and distribution group. That's because risk is present in each functional area of the supply chain — from planning and procurement to sales and service — and risk management capabilities are part and parcel of specific management solutions. At i2, for example, solutions are grouped by categories such as visibility, planning, collaboration and control, and each functional area has optimization features that implicitly address supply chain risk.

In a global "buy anywhere, sell anywhere" environment companies must proactively prepare for disruptions by analyzing their supply chains; creating strategic buffers and mitigating potential impacts. When working with clients, i2 tends to frame risk mitigation in an operational perspective; it provides tools to increase visibility and support collaborative relationships, two key steps for mitigating risk in all the supply chain's functional areas.

With risk mitigation tools, inventory is no longer the only buffer against the risk of disruption and total landed costs, not just price, can be factored into sourcing decisions.

"That includes not only things like duties and inventory tradeoffs but also risk metrics," said Gaurav.

Today's risk management tools also allow companies to make inventory, cost and sourcing decisions that are based on variability rather than fixed parameters, which more accurately reflects real-world business conditions. For example, ocean transit times from Hong Kong to Los Angeles may be 14 days, but in fact variables can extend that time by five days or more. The impact of such delays on revenues can be huge, especially for companies operating with low inventories.

"Companies that are doing well over time manage risk and exceptions by taking into account variability as part of planning and execution cycles," said Gaurav.

Not all supply chain disruptions are as catastrophic as Hurricane Rita, but carriers like Continental must prepare for any kind of disruption by running "what if" scenarios in advance, said David Bradford, global account director for the airline sector at JDA. Rerouting efficiency is only one reason; airlines are under intense financial pressure and have to be able to demonstrate to managers and stakeholders that contingency plans are in place.

"This sort of thing can happen anywhere and anytime, and cargo operators realize that they have to have some kind of optimization system in place to maximize financial results," said Bradford.

In the air cargo industry, risk management is synonymous with preventing disruption to revenue flows from weather, civil unrest, natural disasters or any other events that could cause airports to close or flights to be delayed.

Airlines have invested heavily in risk modeling and management on the passenger side but cargo has not received the same kind of attention. In the wake of Hurricanes Katrina and Rita, that is changing. There are far more options for rerouting a freighter than a plane full of passengers, but the options themselves present risks; wrong decisions can significantly impact revenues.

"A lot of companies keep inventories much lower than in the past," said Bradford. "If flow is disrupted they need a system to help them make decisions."

JDA has seen a spike in interest in software and consulting services for managing revenue risk on the cargo side, said Steven Balleby, a Copenhagen-based global program manager with JDA. That includes gauging demand patterns prior to purchasing or leasing aircraft; ensuring that planes are well positioned; predicting revenue streams and choosing the right aircraft.

"If you make a capacity commitment to a customer you can't back down," he said.

“Because of interdependency the global economy is much riskier than it was 20 years ago.”

Global competition from low-cost countries has led to increased commoditization of a wide range of products. As a result after-sales service has become an increasingly important competitive differentiator. Many companies have been slow to recognize that after-sales service contracts introduce new risk elements into the supply chain, said Cliff Isaacson, director of pricing for Servigistics, an Atlanta-based provider of Web-based tools to manage extended service networks. Failure to deliver on service agreements put sales and profit margins at risk.

Business-to-business service contracts are fraught with risk because they tend to be longer and applied more broadly than business-to-consumer contracts. In practice, strategic service management is identical to risk management; both involve positioning parts and technicians to be in the right place at the right time to avoid disruption.

"Service risk management requires both short-term and long-term perspective," said Isaacson. "You have to plan for and positioning parts and technicians, and you have to price them effectively."

After-sales service pricing is especially risky. The sheer volume of components covered by service contracts adds layers of complexity and service contracts can extend for decades in some industries, such as aerospace. By failing to accurately price service contracts companies risk stranding inventory, damaging brands and negatively impacting sales of finished goods.

Servigistics' pricing software allows companies to take a much more risk-averse approach to pricing by segmenting services and service parts into specific categories based on life cycle, competition, customer price sensitivity and other criteria.

"You're now looking at market prices and not just a cost-plus approach," said Isaacson.

Not all risk elements can be accurately forecast. It's one thing to position more auto parts in the Northeast in preparation for a surge in winter accidents, but in areas of high uncertainty other approaches are needed. It's harder to predict which parts and skills will be required in 10 years for airplane engines that have been replaced by newer models. As a result, companies are turning to performance-based logistics contracts that cover a broad range of contingencies and potential service disruptions.

Servigistics offers a command center tool that balances service level agreements with available technicians, service parts deliveries and inventory options and enables users to view the status of all service calls on a single screen. When a service call is in jeopardy of not being met, the software identifies the service

level agreement at risk and generates real-time alerts.

The command center tool, based on the way a 911 emergency center operates, can be configured on a customer-specific basis, said Joe Berti, Servigistics' director of work force management. For example, computer giant Dell uses a simple red and green system, with red indicating a missed deadline. At Dell's enterprise command center in Texas, each service call is displayed on a huge map of the United States on which parts and technicians are tracked.

"It gives them a single global view of meeting service delivery deadlines," said Berti.

Servigistics has been working with Dell for around five years. For Dell, risk can be boiled down to a customer satisfaction index; if a customer isn't satisfied, the company's revenue is at risk. "A few years ago customer service was a necessary evil," said Berti. "Now it's a billion-dollar revenue stream."

Supply chains will get riskier as complexity grows, said Rajib Roy, executive vice president for global sales and professional services at Optiant, a Massachusetts-based provider of inventory planning and optimization tools. As consumer markets expand rapidly in India, China, the Philippines and other emerging markets that have traditionally served as pipelines for low-cost goods, supply chains have to adapt by going both ways, increasing both complexity and risk.

Risk has also increased as customer expectations have grown. In industries such as high tech and consumer electronics, prod-

uct proliferation has increased risk. Product lifecycles have shortened and companies are exposed to marketing, capital and inventory risks as they introduce new products.

Companies seeking optimization tools generally aren't thinking in terms of risk management, and depending on the challenge Optiant helps them reframe their objectives in that context. How seriously risk management is handled often depends on how high up in the organization the problem is addressed, said Roy.

If a client contact is in charge of a single functional area it's harder to frame challenges in a wider risk management context. At the CFO or vice president level there tends to be a broader perspective on enterprise-wide risk.

For example, a client recently decided to increase safety stock after risk modeling showed it would reduce the risk of out-of-stocks. The modeling also showed that holding the inventory further upstream would decrease risk to the whole enterprise, but the person implementing the solution did not have the authority to make that decision.

"Seeing the bigger picture helps them improve metrics for measuring risk," said Roy. "It helps to talk to the person who is responsible for total costs."

A good risk management program begins with risk identification, which involves a supply chain network analysis. The second component is to quantify the risk. After that, companies should explore risk mitigation strategies such as risk transfer through insurance or alternative supply networks. The next steps are implementation and monitoring over time.

Kenneth Travers, senior vice president of ABS Corporate Solutions, a consulting and technology-based risk management firm, said that interdependency between supply chain trading partners has greatly increased risk.

"An event that might not affect your assets can still cause a significant disruption," he said. "Because of interdependency the global economy is much riskier than it was 20 years ago." ■

Federal Guidance for Port Disaster Recovery is Lacking, GAO Says

Nearly two years after hurricanes Katrina and Rita, a Government Accountability Office report says shortcomings persist in federal guidance and coordination of disaster planning and recovery at the nation's ports.

The GAO said planning and information sharing among port interests, including port authorities, vessel and terminal owners and operators and state and local emergency management agencies, remains spotty at best.

The GAO study reviewed 17 ports, ranging from the earthquake-zone ports of Tacoma, Oakland, Los Angeles and San Diego to the hurricane-threatened ports along the Gulf Coast and mid-Atlantic seaboard. Twelve of the 17 experienced at least one hurricane or earthquake since 1998, and eight of those ports reported problems in responding to them.

Planning for natural disasters varies from port to port, and none of those plans undergo federal review.

While the federal role in port activities is extensive and involves many agencies, there is no uniform federal guidance for ports to draw upon in disaster planning, response and recovery. Ports remain on their own to a large degree, and they also must depend upon each other.

Some ports "are limited in their understanding of the federal resources available for predisaster mitigation and post-disaster recovery," said Katherine Siggerud, director of physical infrastructure for the GAO.

Unlike the many security efforts and plans formulated after the Sept. 11 terrorist attacks, natural disaster planning is not subject to similar specific federal requirements.

There are many incident-response plans, such as the National Response Plan, but it was only in April 2006 that the Department of Homeland Security released the Maritime Infrastructure Recovery Plan, which applies various disaster preparedness documents to the maritime sector. The maritime plan is supposed to help restore maritime commerce after a terrorist attack or natural disaster and reflects the disaster management framework of the National Response Plan. But the maritime plan "does not set forth particular actions that should be taken at the port level, leaving those determinations to be made by the port operators themselves," said Siggerud, who wrote the GAO report. Although the use of risk-management principles is widely touted by the DHS for homeland security, "little specific guidance or direction exists as to how risk management should be implemented," she added.

There is a growing acknowledgement among port and transportation experts that disaster preparedness planning should include consideration of all port risks — both natural, such as hurricanes and earthquakes, and man-made, such as terrorist attacks. This is called an all-hazards approach to risk management and would apply planning resources and investments more efficiently to security and natural-disaster preparedness.

"An all-hazards approach is in many ways a logical maturation of port security planning," the GAO said. At some ports, hurricanes or earthquakes may be a greater threat than terrorism, so "a case can be made that overall risk to a port might be more effectively reduced through greater investment in mitigating those risks."

Two ports, Houston and Mobile, are beginning to take an all-hazards approach to disaster planning and another, Oakland, is taking some initial steps in that direction. There still are no national requirements or guidelines for all-hazards planning forums involving port stakeholders, something the GAO said is needed to ensure that local port interests can access federal resources effectively.

Shippers also have a huge stake in disaster preparation, and they should be assessing risks and developing alternative relationships with suppliers and logistics networks, said Bernie Hart, global product head for JPMorgan Chase.

"Don't put all of your eggs in one basket," and "have the ability to diversify transportation," Hart said. He also said access to disaster plans is critical, and that importers and exporters must "be prepared to avoid certain regions during certain months," such as Florida during hurricane season.