insights

SUPPLY CHAIN RISK
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Avoiding the pitfalls of **supply chain disruptions**

Disruptions happen: the key is how you deal with them

Also in this issue:

- **Taking measures to cope with delivery disruption**
- **Strategies for helping reduce risk and staying ahead of your competitor**
- **Relevant, fresh and precise information can prove profitable**

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In this issue

An insider's view

Welcome to this special edition of *insights* which features a series of articles on the topic of supply chain risk. Drawing on the knowledge of supply chain risk experts, key institutions and industry bodies, themes covered include:

- the challenges and most common causes of supply chain disruption
- what managers can do to avoid them
- how awareness of supply chain risks can boost corporate performance, and
- the implications for business of the likely changes to supply chain dynamics in the upcoming years.

The articles were written by Catherine Bolgar, a business journalist, and were featured on our microsite **supplychainriskinsights.com**, in collaboration with The Wall Street Journal.

We hope the content of this brochure will help you develop a deeper understanding of the tactical considerations and strategic approaches to minimize impacts of disruptions to the supply chain and therefore manage improvements in cash flow, bottom-line performance and ultimately shareholder value.

Nick Wildgoose

Nick Wildgoose

Global Supply Chain Proposition Manager for Zurich

Avoiding the pitfalls

Disruptions happen: the key is how you deal with them

With supply chains, the question isn't whether disruptions will happen, but what and when.

The ripples of disruptions affect the end customer, the brand image, revenues and even investors. Research by Kevin B. Hendricks and Vinod R. Singhal published in 2005 shows that firms suffering from supply chain disruptions experience between 33% and 40% lower stock returns relative to their benchmarks over a three-year period.[1]

"It's no surprise that there is a significant impact on share price and corporate image as a result of a company's inability to respond to supply interruptions," says Tim Astley, strategic risk consultant for Zurich in Birmingham, UK. "It isn't necessary to try to second-guess every possible disruption, because there are always things that come up unexpectedly. It's how companies respond to the incident, how they bounce back, that counts. Getting visibility on the supply chain is the first step."

[1] Hendricks, K. B., and Singhal, V. R. 2003. The effect of supply chain glitches on shareholder value. Journal of Operations Management, 21, 501-522

Categorizing disruptions

The risks of disruptions aren't equal, nor are the consequences. To help companies empirically assess their risks, Zurich teamed up with Manchester Business School of the UK to develop a unique event database, which currently holds some 2,500 supply chain disruptions that occurred around the world between 2000 and 2009. Four categories of disruptions were by far dominant:

- **Accidents** – fire, explosions, structural failures, hazardous spills;
- **Labor availability** – shortage of qualified staff, high-cost labor, labor unrest, strikes, slowdowns;
- **Production problems** – overly lean inventory, process issues, reliability, lead-time variability, inflexible production capacity, long set-up time;
- **Natural disasters** – epidemics, earthquakes, extreme weather.

"Most disruptions in the study were quickly resolved, with many lasting under a month," says Brian Squire, senior lecturer at Manchester Business School. "However," he notes, "a significant number lasted more than a year, with some stretching to more than five years."

A new concern, not reflected in the long-term study, is supplier insolvency amid the economic downturn. While economic crises don't crop up as frequently as hurricanes, they can deliver an even bigger wallop. It's an example of why companies also need to keep an eye out for short-term trends that can deal a knockout blow to business.

Mapping the supply chain

The first ripple of a supply chain break is loss of productivity. "If you don't have what you're supposed to have, when and where you need it, your people have to wait, get around the problem or do their work differently," says Lyndon Bird, international and technical director at the Business Continuity Institute (BCI), an international body for developing and sharing best practices in business continuity management, based in Caversham, UK.

"It isn't enough to have a plan to deal with the loss of X supply," he says. "It's overkill to assume that every supplier and every item is of equal importance. Companies need to determine their sensitivity to specific disruptions. You deal with those suppliers and how they deal with disruption."

Mr. Astley of Zurich recommends that companies map their supply chains, setting out the flow of value throughout the system. "Rather than start with the physical flow of inbound components, companies should look from the other end. Identify where the profit is being generated and trace it back. It gives a better understanding of where to focus effort."

Knowing your suppliers

Knowing your suppliers has two aspects. One is knowing where your suppliers' supplies come from, sometimes all the way back to the raw material. Uncovering such information can be a serious challenge, but it could keep you from being knocked down in a line of falling dominoes stemming from a problem far removed from your direct suppliers.

The other aspect is where you stand in your suppliers' priorities. "It isn't enough for you to declare that a supplier has critical importance; the reverse also needs to be true, that you are a critical customer to the supplier," says BCI's Mr. Bird.

"Sometimes the best way to protect yourself is through ironclad contracts," he says, "though a surprising amount of business continues to be conducted on a handshake basis." Most contracts include force majeure clauses, in which case companies need to approach the supplier (before a problem arises) to explore all possible situations. "Let's imagine there's an energy shortage or bad weather," Mr. Bird says. "What would you [the supplier] do for us in that situation?"

"It isn't enough for you to declare that a supplier has critical importance; the reverse also needs to be true, that you are a critical customer to the supplier."

"Often, problems arise in groups across sectors, making it impossible to turn to alternative suppliers," cautions Stephan M. Wagner, professor of supply chain management at the Swiss Federal Institute of Technology (ETH) in Zurich, citing research he and colleagues began three years ago, well ahead of the current economic crisis. "It challenges the conventional thinking that multiple sourcing overcomes risk," he says. "In the auto industry, for example, nearly all suppliers are facing financial difficulties right now. Porsche has a department just for dealing with supplier defaults," he notes.

"Companies need to be alert to early warnings of supplier trouble, such as a drop in quality, which could be from the supplier cutting corners with cheaper materials or the result of good workers jumping ship," he says. Companies need to talk to suppliers and come up with measures that can help. A simple one: paying suppliers' bills on time, rather than waiting as long as possible, as is often the practice.

Supplier relationships are gaining attention. "Cost and efficiency will always be drivers in choosing suppliers," says Dr. Squire of Manchester Business School. "But for more critical items, which are very high risk, companies might try to develop much better relationships with suppliers. Relationships give you an ability to recover. You're more likely to hear about a problem sooner."

"Companies also are looking at more resilient supply chain design," he says. "They are putting extra capacity back into the system, despite the added costs, or making the flow throughout the supply chain more visible using radio-frequency identification (RFID) tags or other technology to detect possible failures earlier."

A risk-based approach

"Applying a risk-based approach to supply chain management is relatively new," says Mr. Astley. "In broad terms, the techniques and information needed to do it are well established. It doesn't need to be expensive. It just needs a different perspective to be taken. The cost of doing that risk assessment up front and having a set of strategies to deal with the outcomes is far preferable to the potential cost of leaving risk sitting on balance sheet."

You care about **corporate social responsibility.** Do your suppliers?

Your company tries to do the right thing: protect the environment, ensure safe products, pay fair wages. But what about your suppliers?

As too many corporations have discovered, a problem in the supply chain can damage the best efforts and intentions. Corporate social responsibility (CSR) doesn't stop at the company's doors but extends throughout the supply chain.

"Companies need to assess their supply chain risk to drive transparency throughout the supply chain," says Nick Wildgoose, global supply chain proposition manager at Zurich in London. "We look for issues like child labor and environmental practices, because these can result in supply chain disruptions. We help companies embed best practices across the whole supply chain, starting with key suppliers."

Best practices can crop up in unexpected places and often provide multiple benefits beyond the objective of reducing CSR risks. A thorough analysis of the entire supply chain not only helps protect a company's reputation and avoid supply chain breakdowns. It also can reveal ways to reduce waste, save money and spur innovation.

Challenge 1: Perception vs. reality

"Most companies do the economically rational thing, that is, to act when the benefit exceeds the cost," says Corey Billington, professor of procurement and operations management at the International Institute for Management Development, or IMD, a business school in Lausanne, Switzerland. The problem is perception. Costs are imagined to be higher than they really are, while benefits are underestimated. When companies take a hard look at the numbers, they tend to overturn misperceptions.

"A US technology company had outsourced jobs to India to cut costs," says Linda Conrad, director of strategic business risk for Zurich Services Corporation in New York.

"To support the outsourced workers, it needed to base its server farms in India as well, but found that energy costs rose sharply, and the company's carbon footprint ballooned because of the dominance of coal-fired electricity plants in India. The company kept staff in India, then developed servers with remote access and moved the server farms back to the US. The result combined the cheaper Indian labor with cheaper and cleaner US power, and the company had a new product – the innovative servers – it could sell," Ms. Conrad says.

"Companies need to look at their suppliers and see whether there's a better way to do things," she says.

Challenge 2: Positive pressure

"Big companies have been turning the screws ever tighter on suppliers to get the least expensive products possible," says Emma Scott, representation manager at the Chartered Institute of Purchasing and Supply, or CIPS, the leading global professional supply chain body based in Easton, UK. What's cheap in the short term can be expensive in the long run if a product safety issue or other problem arises. In general, it isn't the small supplier who receives the negative media attention, but the company at the top of the supply chain – the one with the recognizable brand name.

"Companies have to know the consequences of their buying actions," Ms. Scott says. "At the same time, companies, especially big ones, need to exert their power to ensure that suppliers act responsibly."

"For example, a major retailer decided to redesign the packaging for a toy in order to save resources and cost," says Ms. Conrad of Zurich. "The retailer was big enough to encourage that the toy supplier make the box smaller – about half the size. The switch saved paper products through reduced packaging and saved fossil fuel in shipping. The retailer was able to improve both its finances and promote its reputation for sustainability," she says.

Challenge 3: Collaboration

The relationship between companies and suppliers can be adversarial, with each struggling to get the best financial deal possible while searching for loopholes in contracts. "As a result, companies tend to police their suppliers on CSR issues," says Dr. Billington of IMD. "That's an extremely expensive way to achieve these goals."

Suppliers are more likely to get on board a CSR directive through collaboration and education rather than policing. "I've never encountered a supplier who would refuse training or help to make their business better," he says.

"Companies feel so much market pressure to produce immediate cost savings that they can't imagine there might be a better way or that they can afford the time it takes to build relationships," says Mr. Wildgoose of Zurich. "In some cases, constant bidding and switching suppliers is a competitive strategy, but in others, the best way to take out costs is collaboratively," he says. Companies can't make such a distinction unless they take a close look at their supply chains. It needn't be a monumental task – suppliers aren't equal. Companies can profile suppliers to prioritize them by how critical they are, allowing managers to focus on the most important suppliers.

"A UK brewer of traditional ales worked with its bottler to develop a lightweight version of its big, heavy glass bottles," says Ms. Scott of CIPS. "As a result, the bottled beer weighed less, cost less to ship and used 34% less glass – a total of 550 tons a year. The change also reduced carbon emissions by 415 tons a year."

Collaboration also can happen with competitors, companies outside your industry and your own employees. "Many companies will share intellectual property to help a company acquire processes or tools to help CSR goals, especially in procurement," says IMD's Dr. Billington. "Employees will often do volunteer work to help their companies improve social responsibility." Dr. Billington urges companies to look for the "hidden army" of free help to accomplish CSR goals.

Legal requirements give companies another incentive to build supplier relationships. From Sarbanes-Oxley in the US to the 2006 Companies Act in the UK, not to mention special requirements for sectors like pharmaceuticals or food, company directors are on the line for mistakes that may have taken place at a supplier. "Good relationships with suppliers can aid traceability," says Ms. Scott of CIPS, "particularly if top or second-tier suppliers can be counted on to have traced their own suppliers."

"There are companies that have moved away from outsourcing to have better control over environmental or social issues," says Dr. Billington. "If you can't control your supply chain, then don't outsource it. "Good companies know their supply chains all the way back, and weak companies don't," he adds. "Social, environmental and safety issues are just part of the process to satisfy the demands and expectations of consumers."

Measuring risk is key to protecting your business

You've analyzed the risks to your supply chain, but do you know exactly how much those risks could cost your company? You need some kind of measurement to determine whether mitigating the risk would be money well spent – or not.

"In the past, risk was just accepted," says Bob Ritchie, professor of risk management at Lancashire Business School, at the University of Central Lancashire in Preston, UK, and founder of the Institute for Supply Chain Risk Management, or ISCRIM, a network of academics from Europe and North America. "Now companies are trying to identify what the risk drivers are and their consequences."

"In order to do this they are using simulation models that calculate the ramifications of different disruptions such as a fire at a plant," says Prof. Ritchie. "They allow companies to look in detail at various aspects of the supply chain."

There are three ways to measure supply chain risk: do it yourself, do it with a third party, or get somebody to do it for you.

Do it yourself

As a leading information technology company, Cisco Systems Inc. of San Jose, California, took the first route, developing its own metrics for its supply chain risks. Cisco has gone so far as to integrate supply chain management into the product-creation cycle. By contrast, most companies design a product, then contract for the supplies needed to make it, then backtrack if problems crop up. Cisco involves supply chain experts at the design phase – sometimes a full two years before a product is shipped – to help ensure that new products are resilient in the face of unexpected risks.

"Thinking about risk early in the product life cycle allows us to take a more aggressive posture about how to control its destiny throughout the product life cycle," says Kevin Harrington, vice president of global business operations in the customer value chain management organization at Cisco.

Cisco, a company with more than $36 billion of annual revenue and 65,000 employees, has dedicated eight workers to the task of supply chain management. "Of the tens of thousands of products Cisco sells, only about 100 account for half of its revenues," notes John O'Connor, director of global business operations in Cisco's customer value chain management organization. "By focusing on those top 100 products, Cisco can protect shareholders and customers, with an action plan to drive out risk or at least drive it down to a recoverable level."

Twice a year, Cisco surveys some 700 suppliers and partners, to measure key nodes of the supply chain and to establish a recovery time for each node in case of total disruption.

Cisco's team doesn't just point out risks but also offers a "get-well plan," suggesting alternatives such as second-sourcing, alternative manufacturing sites, lower-risk regions, or whatever it takes to make changes without disrupting deliveries to customers. "It's not just here's the exposure, but here's five ways to diffuse that exposure," says Mr. Harrington.

The third-party approach

DHL, the global transport and logistics giant, is an example of the third party approach. DHL is key to the operational integrity of its customers.

As a key player to supply chain delivery for so many companies, DHL has developed metrics for customers to help with planning, to physical movement of goods, to managing peak business periods, to implementing projects such as setting up a new distribution center. "We can help with controlling risks through project management, risk assessment and experienced people," says Andrew Leahy, vice president of product development for DHL Supply Chain, based in Bracknell, UK.

"DHL collects supply, demand and performance data that give customers visibility about inventory levels, or status of supply movements, looking after lead times so customers can be confident items are moving securely through the supply chain at the required speed, minimizing loss or damage, and at the right total cost," Mr. Leahy says.

With global reach and global customers, DHL has been able to create league tables to enable comparisons at numerous levels: a set of individual sites; industries or sectors; or countries or regions. By determining normal variations, DHL knows when to act or to alert a customer to take action.

"Smaller customers don't have the ability to collect such data for themselves let alone for their entire sector," Mr. Leahy points out. In addition, DHL helps establish a minimum standard set of metrics. "Data collection is important, but a clear and consistent definition is vital," he says. "It's the difference between data and information. You can have data, but what does it tell you?"

Call in an expert

Vel Dhinagaravel, CEO of Beroe Inc., will tell you exactly how much your supply chain risks add up to, as a number in dollars or euros or whatever currency you like, against your bottom line. Beroe, based in Cary, North Carolina, is the have-an-expert-do-it alternative.

"Most of the time, issues don't originate in the first tier of suppliers but a couple of tiers behind," he says. "Organizations that just look to the first tier are very reactive in nature. They're in firefighting mode. They find alternative resources, treat the crisis. Organizations that are leaders look beyond the first tier."

Beroe looks at the key supplies that drive 80% of a company's profit, and maps the entire supply chain, back to the feedstock. With the probability of all the negative risks occurring, Beroe determines the total profit at risk.

"Rather than just look from a risk ratings perspective, we quantify the risk in a dollar figure," Mr. Dhinagaravel says. "So it becomes much easier for anybody, regardless of their understanding of the topic, to understand the impact on the organization."

It also becomes easier to determine the return on investment of risk mitigation: whether it's worth holding extra inventory, using multiple suppliers, changing product design to avoid a risky input, or buying insurance against supply chain disruption.

Mapping the supply chain is just one part of the process. More importantly, Beroe has a database of risks associated with every element of the supply chain. "At any time of the day, we can give the risk of every airport, seaport, etc., of the world," Mr. Dhinagaravel says. "And it's constantly updated." Beroe has access to a wide variety of databases plus more than 400 of its own experts around the world to monitor logistics, weather and other issues that can affect such things as shipment times.

Beroe focuses on profit at risk for each element of the supply chain, rather than the spending on a certain supply. "You can spend close to nothing on the input but if it's touching a large share of your products, you need to take care of it," he says.

A pharmaceutical client had three suppliers in three different countries for a certain key material, he says. Beroe found that all three were buying their raw materials from one supplier, who had one plant. If that plant had a disruption – a strike, a fire, a natural disaster – the drug company would have had a big problem.

"Everyone says across the board, the first priority is business continuity, then supplier diversity, then quality, then cost," Mr. Dhinagaravel says. "Everybody focuses on cost because that's the thing you can measure. The offshoot of metrics is you can measure the effect of using a higher-cost, lower-risk supplier."

Taking measures to cope with

delivery disruption

When you assess risks in your company's supply chain, have you considered the Olympics?

Don't laugh. Risks can jump seemingly out of nowhere, and your company could end up in a stranglehold because of a disruption of something that isn't even used in your products themselves. Sometimes the root cause of the problems can't be avoided, but companies can take other measures to lessen the effects, like increasing inventories or giving a second look at tier-two and tier-three suppliers.

Here's how the Olympics, a storm and the financial crisis combined to blindside the pharmaceutical industry with a shortage of acetonitrile, an inexpensive chemical not mixed in drugs themselves but used in tiny quantities to measure impurities.

Foreseeing a critical shortage

Acetonitrile is a by-product created from the production of acrylonitrile, which is used to make plastics for things like car parts and acrylic fibers for things like carpets. In this scenario, acrylonitrile is the star and acetonitrile is a bit player.

The perfect storm for acetonitrile started gathering when China shut a chemical plant to reduce air pollution for the Beijing Olympic Games in August 2008. In September, Hurricane Ike knocked out another chemical plant in Texas. Also that month, the financial crisis broke out in earnest, with the sale of Merrill Lynch and the failure of Lehman Brothers. The economic slowdown quickly battered car production, and, in turn, the demand for the main material, acrylonitrile, plunged. It didn't help that the housing slump withered demand for carpets.

Since acetonitrile was just a by-product, its production also dropped. And pharmaceutical companies found themselves out of stock, and unable to continue clinical trials because of a lack of the solvent. Prices of acetonitrile shot up as companies scrambled to get a few gallons.

At least one pharmaceutical company escaped the fallout. It had mapped its supply chain and had noticed the drop-off in acrylonitrile – the star of the show – and had bought extra stocks of the bit player, acetonitrile, in advance. It also arranged preferential agreements with suppliers before everyone got into crisis mode.

"Pharmaceutical companies spend a lot of money to bring drugs to market, so every day they are not selling is a loss," says Vel Dhingaravel, chief executive of Beroe Inc., the Cary, North Carolina, supply-risk consulting firm that mapped the successful drug company's supply chain and flagged the acetonitrile shortage early.

Planning for disruption

Having a single strategic material or using a single strategic supplier doesn't have to be a problem, even in the face of disruptions. "What matters is having a plan for responding quickly to disruptions," says Paul Kleindorfer, professor of sustainable development at the Insead business school in Fontainebleau, France, and professor emeritus of management science at the Wharton School of the University of Pennsylvania in Philadelphia. "The supplier selection process is one which requires certain protocols to be met by suppliers," he says. "It's more of an imposition on suppliers to be part of a company's crisis communication."

One example of a protocol is the Customs-Trade Partnership Against Terrorism, or C-TPAT, created by a consortium of the U.S. government and businesses after the September 11, 2001, terrorist attacks. "It's a real effort globally to determine good procedures for everything from personnel selection to container loading to IT checks to tracking and monitoring," Dr. Kleindorfer explains. In providing clear audit criteria, it "allows you to determine in a straightforward way if one supplier is really up to snuff compared to another one in terms of security."

Security is but one aspect of risk assessment. Companies typically also focus on exposures such as natural catastrophes like earthquakes

or storms common in certain geographic areas, accidents, and strikes. "The last area is arguably the most important: How do suppliers manage their supply chains?" says Tim Astley, strategic risk consultant for Zurich in Birmingham, UK. "What is their relation with key suppliers, how is it managed, what's the extent of cooperation on continuity planning, on interruption analysis? It brings in issues like the financial strength of tier-two and tier-three suppliers."

Managing suppliers

In setting up a supply chain risk management process, a company will see the weaknesses of certain suppliers. "That presents a choice: work with the supplier to correct the problem, keep the supplier but get a secondary supplier on board as well, or get rid of the troubled supplier altogether," Dr. Kleindorfer says.

The premise is that many organizations are good at managing suppliers, based on measures like cost reduction.

"In our experience, there are very often risk elements inherent in the supply chain that are not in the forefront to the same extent as driving cost out. Driving cost out might result in driving risk in," Mr. Astley says.

Supply chains are one of the biggest risk areas facing organizations today, partly due to the all-consuming drive to cut costs, which creates an adversarial relationship with suppliers. "Supposedly strategic suppliers are being managed in a way that doesn't reflect that strategic position," he says. "Sometimes an organization's actions are actually contributing to its supplier's insolvency."

Companies that have decided to buy a failing supplier may find themselves dependent on a single source. At the same time, sourcing to multiple suppliers also can have drawbacks. Handing out smaller pieces of the pie to more suppliers means your company isn't as important to any one supplier and in case of a disruption or shortage you might have to wait in line behind competitors.

"In manufacturing, companies would try to identify the key suppliers," says Bob Ritchie, professor of risk management at Lancashire Business School at the University of Central Lancashire in Preston, UK, and founder of the Institute for Supply Chain Risk Management, or ISCRIM, a network of academics from Europe and North America. "They didn't worry beyond that because any disruption farther down the line was a problem for the supplier, not them. Now, companies are starting to address risk management all the way down the supply chain."

They have to. As companies continue to tighten their focus on core competencies, they are relying on suppliers more and more, says Mr. Dhingaravel of Beroe. "They are pushing more and more responsibility to suppliers. It's a train that cannot be stopped. Nobody is going to go back and do all these things themselves."

Strategies for helping reduce risk and **staying ahead** of your competitor

Companies routinely invest large amounts of money in research and development to deliver the best products and beat the competition. While the latest technology, sharpest design and lowest cost are important, there's another secret weapon that many companies overlook: the supply chain.

A disruption in the supply chain can delay production or delivery of products, which can derail sales and deflate profit. The company that expertly manages risks in the supply chain will avoid some disruptions altogether and can bounce back quickly from others that are inevitable.

Achieving competitive advantage

"For a supply chain strategy to provide competitive advantage, companies need to understand and manage the disruption risk," says David Martin, head of sales and distribution for Zurich's General Insurance division, based in Zurich. "If they don't, a strategy designed to ensure sustainable profits may actually make them less resilient."

Consider that most of your competitors use at least some of the same materials and same suppliers. That means disruptions in the supply chain often affect not just one company but an entire sector. Amid adversity comes opportunity. "Competitors who are more agile and more flexible can gain market share at the expense of those who can't," says Yossi Sheffi, director of the engineering systems division and the center for transportation and logistics at the Massachusetts Institute of Technology (MIT), in Cambridge, Mass., and author of 'The Resilient Enterprise: Overcoming Vulnerability for Competitive Advantage'.

In the textbook case on the topic, two mobile phone makers bought microchips from the same supplier. In 2000, the supplier's US plant caught fire. Based on assurances that production would be back up quickly, one company waited. The other, however, quickly worked with the supplier to get chips from other plants, lined up other suppliers and adapted its phones to use other makers' chips. This company secured its place as market leader while the other company suffered the ultimate blow to shareholder value: it got out of the mobile-phone manufacturing business.

The effects of globalization and outsourcing

The need for managing supply chain risk has grown along with the dual trends toward globalization and outsourcing. The first makes supply chains longer, requiring more time for shipping and affecting the time needed to end a disruption. The second makes companies more dependent on outsiders – external strategic suppliers who deliver ever-more-complex and more critical products that once were done in-house.

"The trend of recent years has been to reduce supply costs by buying from fewer and often more remote sources. But this can substantially increase risk, and in outsourcing supply you might be insourcing a problem when a strategic supplier encounters a disruption," says Mr. Martin of Zurich.

> "Many organizations are still in a crisis management mode. Resources are deployed when there's a problem, rather than saying that managing risk is a business activity like any other."

"Clearly, many organizations have thousands of suppliers, or even hundreds of thousands of suppliers," says Jon Hughes, executive chairman of Future Purchasing Consulting Ltd., based in Guilford, UK. "I ask clients, 'Tell me exactly how much resource and full-time equivalents you've got focused on supply chain risk.' That will stop 99% of chief procurement officers in their tracks. Many organizations are still in a crisis management mode. Resources are deployed when there's a problem, rather than saying that managing risk is a business activity like any other."

Protecting your supply chain

Companies have many options for protecting the supply chain, allowing them to tailor responses to various suppliers. Simple strategies, which might not be appropriate for all parts of a company's supply chain, can include adding multiple suppliers or postponing customization – for example, putting on labels in different languages as close as possible to the store shelf so that in case of a disruption, such as a closed port, unlabeled products can be rerouted to other markets to fill the gap. That flexibility also can protect a company from getting stuck with unsold goods customers in one market don't want, while allowing a company to jump on spikes in demand elsewhere.

"Another simple strategy for certain supplies can be increasing inventory. Just-in-time processes, with their extra-lean inventories, make sense when conditions are right – such as when a process is highly predictable," says George Zsidisin, associate professor of management at Bowling Green State University, Bowling Green, Ohio, and co-author of 'Supply Chain Risk: A Handbook of Assessment, Management and Performance.' "Not every product or process should have a just-in-time system set up," he says.

More complex strategies include building in redundancy and flexibility. The resulting ability to quickly match supply and demand not only helps a company pick itself up after a disruption but also to quickly jump on fickle customer tastes. "If we build in flexibility, it means by and large we not only are able to respond to disruption, we also are able to respond to market changes. This is where competitive advantage lies," Dr. Sheffi of MIT says.

Getting it right from the start

Companies that really take risk management seriously consider the supply chain right from the design stage of the product or process. Early supplier involvement can reduce the overall product development cycle time," Dr. Zsidisin says. Companies have been on a cost-cutting spree, but many mistook low price for low cost. Not all costs – including those associated with risk – were captured. "We are starting to see a shift away from lowest price toward looking at suppliers that supply the best value to your firm," he says.

This collaboration with suppliers also allows companies to know early when a supplier is having trouble. There might be labor unrest at one of their suppliers, or a shortage of materials farther down the chain. "Maybe their managers won't tell you, but if your engineers are talking with their engineers, it's likely to come up. That gives you time to take action," Dr. Zsidisin says. "And if you have trouble, a collaborating supplier may go out of its way to help you."

Empowering your people

In protecting the supply chain from unexpected risks, successful companies also allow their people close to the disruption to take action. "The front line is where the disruptions happen," says Dr. Sheffi of MIT. "In a disruption, the usual rules don't apply. First, you don't have time. Second, there's confusion from a lack of communications and information. You have to fall back on the general corporate culture and act quickly."

A culture of empowerment allows managers and even line workers to take corrective action on the spot. To actually make this happen, employees have to be assured that "if they did it with the best information available at that time, they won't be punished," Dr. Sheffi says.

"How well a company protects its supply chain from risk is a measure of its overall performance," says Mr. Hughes of Future Purchasing. "If you're not doing sourcing properly, then you don't have operational excellence embedded in your day-to-day management. Either you have risk under control and are giving it the attention it needs, or you're ignoring it and hoping for the best. It goes right to the DNA of the organization."

Avoiding the gaps in **corporate performance**

It takes a lot more for a company to succeed than for each employee to do his part.

A company is composed of many opposing interests. Product designers want the best materials, but purchasing managers want the cheapest. The finance department wants the leanest possible inventories, but the sales department wants large stocks in order to sell big orders with a promise of quick delivery.

The competing departments are like the proverbial blind person exploring an elephant, each perceiving the animal from a narrow perspective. These management silos can undermine the best business resiliency plans and pose problems for supply chain and risk management.

Overcoming silos

"It would be wrong to think there wouldn't be silos in any organization," says Nick Wildgoose, global supply chain proposition manager at Zurich in London. "Teams and groups will always form. It's an anthropological phenomenon. The key is making sure they all pull in the right direction."

Companies have a number of ways to overcome silos: directives from the top executives, adjusting incentives and bonuses to reflect wider responsibilities and risks, using matrix organization, and collecting and analyzing information to rethink processes and reduce risks.

"In my view a board of directors of a huge financial institution is derelict if it does not insist that its CEO bear full responsibility for risk control," investor Warren Buffet recently wrote. "That applies not just to financial institutions but to all companies," says Mr. Wildgoose.

"Companies in all sectors need to organize supply chain risk in a holistic, strategic way, as something that drives profitability and shareholder value," he says. "That needs to be driven from the C-suite level or a corporation's most important senior executives."

"Some companies create positions for professionals whose job is to look at risk management of the organization as a whole," notes Bob Ritchie, professor of risk management at Lancashire Business School, at the University of Central Lancashire in Preston, U.K., and founder of the Institute for Supply Chain Risk Management. "Risk management has the capacity to straddle all sides of a business," he says. "At the end of the day, it's the whole package that works in selling your product or service."

Another thing top executives can do to overcome silos is to broaden the structure of incentives and bonuses. Usually, the manager responsible for the manufacturing plant has incentives based on production utilization, while the procurement manager's incentives are calculated on the savings he generates. Rather than doing what's optimal for the company as a whole, each does what's optimal for his own performance criteria.

Stephan M. Wagner, professor of supply chain management at the Swiss Federal Institute of Technology (ETH) in Zurich, tells of an appliance maker whose strategic differentiation was quality. Amid problems, it found that the purchasing manager had been buying cheap parts. He was unaware of the company strategy, he wasn't part of bigger decision-making discussions and, above all, his bonus depended on keeping costs down.

"To avoid this, some companies are shifting bonuses to a wider measure of company performance, with a smaller percentage based on the environment the manager can directly influence," Dr. Wagner says.

Calculating the cost of risk

With a little forensic work, a company can also calculate the cost of risk as well as of savings, to better determine performance. "A cheap supplier might not look as attractive if the contract stipulates a supplement for weekend work, or if a disruption means using air freight instead of sea shipment," says Mr. Wildgoose of Zurich. "You might have quite a small savings in the unit cost of an item, but a big loss if a main production plant has to be closed for a few days."

Such costs aren't always pulled together, because they aren't always as easy to define as supply chain-disruption costs, appearing instead as increased logistical costs or material variances. "A good finance person will highlight the variances and what needs to be done to change them, but they need to recognize these interrelationships," he says.

Working together

"A silo problem is a people problem," says Dr. Wagner. "Some engineering firms get around this by using cross-functional teams, especially for the launch of new products. Such short-term groupings originally intended to reduce costs by involving purchasing managers at the design stage. Now they also are being used to execute the supply chain in a way that reduces risk exposure."

A company that excels in this area is Cisco Systems Inc., the San Jose, California, information technology giant. Cisco adopted a matrix organization as a way to drive innovation, but has found other benefits: speeding growth and reducing supply chain risk. Highly autonomous councils and boards work on projects, led by executives who are working on multiple major company agendas in parallel.

Kevin Harrington, vice president of global business operations in the customer value- chain management organization at Cisco, compares it to piloting 30 cars at top speed down a crowded 16-lane highway. "The only way to do that is to get out of the box of hierarchy."

Thinking about supply chain risk when a product is still on the drawing board allows Cisco to "take a more aggressive posture in controlling our destiny throughout the product life cycle," he adds.

Cisco also incorporates risk management into employee performance. It devised a resiliency index of weighted factors that the manager of each business unit would be accountable for. "We talk in terms of performance expectations and cost. We explain what's expected, and partners are free to organize around those any way they want," Mr. Harrington says. "A collaborative undercurrent runs really thick around here," he adds.

"Companies have silos because they make performance easy to measure," says Dr. Wagner. Silos develop along the lines of job functions or geography.

"Good companies break down silos by implementing cross-functional teams and getting purchasing managers involved in product development," says Dr. Wagner.

Silo-fighting "has to be improved on a continuous basis," he adds. "The effects fade away if you don't launch new initiatives all the time... overcoming silos can be done, but it's never finished."

Coping with **outsourcing**

Outsourcing offers flexibility, but it comes at a cost. The vertically integrated company is a dinosaur. Today, almost all companies outsource to some extent. Some companies outsource nearly everything, acting as a conductor of an orchestra, making the various suppliers, like musicians, work together to create a product or service.

Outsourcing has given companies flexibility, speed and lower costs. But it has taken away control, exposing companies to greater risks. The advantages of outsourcing have accelerated its use, but most companies haven't kept pace with the mushrooming risks.

"Risk is an uncomfortable bedfellow," says Jon Hughes, executive chairman of Future Purchasing Consulting Ltd., a Guildford, UK, consultancy. "Just because you outsourced, it doesn't mean you can walk away from the risk. The very nature of outsourcing means you're going to increase risk, not decrease it. Often you're outsourcing to countries that have fewer capabilities to manage risk."

Supplier relationship management

With control no longer in-house, companies need to work with suppliers to manage risk. Alan Day, Managing Director of State of Flux, a procurement and supply chain consultancy based in London, advocates treating supplier relationship management with the same zeal as customer relationship management, or CRM. "Most companies have CRM programs, manned by well-trained personnel, technologically equipped to gather extensive data. That only looks at what goes out of the company – what the company is selling. Typically, far less attention is paid to what goes into the company, with supplier management not even meriting a full-time position, much less training or technological support," he laments.

Until recently, supplier management has focused on cost containment. Many companies have been squeezing suppliers – both on an individual level, pushing for price cuts, and as a group, reducing the number of total suppliers. "We have seen supply chains get much leaner, but at the same time, have they become anorexic?" asks George Zsidisin, associate professor of management at Bowling Green State University, Bowling Green, Ohio, and co-author of 'Supply Chain Risk: A Handbook of Assessment, Management and Performance'. "You still need muscles to do the job. At times, supply chains have gotten too lean."

Price isn't everything

By looking only at price, too many companies are painting all suppliers with the same brush. In fact, some suppliers are important and some just aren't. That may seem overwhelming to companies that have hundreds, thousands or tens of thousands of suppliers. "Companies tend to focus on those with whom they spend the most money or those who pose problems," says Mr. Day.

"Companies spend huge sums researching their customer segments, but rarely think about where their value is coming from: supplier segments. Suppliers can be divided into four categories: tactical, approved, preferred and strategic," he says.

Tactical suppliers are the least important; those who execute one-off orders or who furnish commodity-level products or services that are easily substituted by another supplier. Management of tactical suppliers is based above all on price. Approved suppliers are more regular suppliers who have contracts and who should be managed according to how well they adhere to the contract as well as price. Preferred suppliers are judged on service levels, as well as contract and price. With them, you get what you pay for, so sometimes better quality, speed or other added value trumps low price.

Strategic suppliers are the most important. Of course, you look at quality, performance and price as well, but strategic suppliers can give you innovation that can secure your lead in the marketplace. They also might be the suppliers of a product or service that is essential to your business and not found elsewhere – a rare chemical input, for example. There are over a dozen criteria companies can use to determine who is a strategic supplier. Laying out a definition is important; however, only half of the companies in a survey conducted by State of Flux had a definition of strategic supplier and none of them had the definition distilled to a sales-pitch simplicity. Often, a strategic supplier will be one you have a big contract with, but that isn't always an accurate measure. A supplier with a relatively small contract might be a critical player in a product that contributes heavily to your company's profit. A problem with such a supplier could hammer your bottom line.

"The message isn't that this is so complex that you can't do anything," says Mr. Hughes of Future Purchasing. "It's very straightforward. You ask for the sources of risk in a well-segmented manner and then you mitigate or reduce it in an orderly way." So few companies are doing anything about supply chain risks that "it's a great source of competitive advantage. It can give you a real head start on your competitors."

Making the most of the supply chain

Indeed, savvy exploitation of the supply chain, especially strategic suppliers, can not only reduce risk but can offer greater value, such as innovation. "But," cautions Mr. Day of State of Flux, "that requires different relationships for different segments of suppliers. Companies have squeezed suppliers so much that the relationships are contentious, with each side suspicious of giving the other too much. That's appropriate for tactical or approved suppliers, but it is less so for preferred suppliers," he says. And with strategic suppliers, companies may be doing themselves more harm than good.

Mr. Day says, "Companies that cultivate collaborative relationships with strategic suppliers can reap greater value through innovation and faster times to market." In addition, collaboration reduces the risk from strategic suppliers: a greater flow of information can let you know about potential problems sooner, meanwhile your status as a good customer can put your company at the front of the line in case of a shortage or other problem.

"Companies need to develop clear procedures for governance of suppliers, especially strategic suppliers," he says. "These programs usually originate in the procurement departments, but procurement professionals tend to be tough negotiators, not warm collaborative types."

"That's why," Mr. Day says, "companies need integrated teams, so procurement is involved early in the design process to head off potential supplier risks and so the 'bad cop' isn't the only interface with strategic suppliers."

"Another tactic is to develop stress tests for their top strategic suppliers," says Mr. Hughes of Future Purchasing. "As the economic crisis developed, companies in many sectors faced disruptions caused by supplier insolvencies. Stress tests can highlight such troubles before they come to a head, giving a company a cushion of time to find alternative suppliers."

"Supply chain risk management is a business discipline like any other, but it's still in its infancy," he says "If companies asked for resources to manage outsourcing properly, not just to assess risks but also to look at other aspects like value and innovation, sometimes it would erode the business case for outsourcing in the first place."

"The very nature of outsourcing means you're going to increase risk, not decrease it."

Food **challenge**

When it comes to food, a smooth path from farm to fork is vital. Food leaves little room for error. If conditions aren't just right all along the supply chain – too warm, too cold or too late – food may spoil. Even if it looks OK, it could make a consumer sick, or even die.

"If you're into perishables, you really have got to have a slick supply chain, from farm to fork," says Alan T. Cooley, founding partner of NewDawn Partnership, an Ascot, UK supply chain consultancy. "There's no room for messing about."

"While the sector has made huge strides in logistics and packaging, not as many food companies have applied the same energy to evaluating their supply chain risks," he says.

Growing risks

The food sector is diverse, spanning producers like farmers, to processors to retailers and restaurants. At the same time, as in so many sectors, changes have come quickly: consumers demand more choice at lower cost, while new suppliers, often from new parts of the globe, are entering the picture all the time.

"Demand is mushrooming at one end, and supply is mushrooming at the other," says Andrew Fearne, professor of food marketing and supply chain management at Kent Business School, University of Kent, UK. "There are lots of opportunities for things to go wrong."

"Risks that grow out of today's extended supply chains include trying to manage quality over long distances, in foreign languages, different time zones, different legal structures and different cultures," says Simon Plumridge, head of product recall for the global corporate division of Zurich in London. "The big danger in any supply chain breakdown in the food sector is recalls, and 70% of recall insurance buyers have been in the food industry," he says. However, other sectors are showing more interest in recall insurance, especially as legislation for consumer goods evolves toward the stringent standards already in place for food. An examination of the food sector can give companies in other areas a new way to look at the risks in their own supply chains.

Learning lessons

"Finance, for example, has a lot in common with the food sector," says Helen Peck, senior lecturer of commercial and supply chain risk at Cranfield University in Shrivenham, UK. "The big systemic failures in food, such as foot and mouth disease and BSE (bovine spongiform encephalopathy) reveal similarities to the outbreak of the financial crisis and shortcomings in risk management," she says. "In addition, in the UK, both food supply chains and the financial sector are formally designated as part of the nation's critical infrastructure, even though both are very much in the private sector."

Dr. Peck found that food companies often use network-based approaches to deal with risks, relying on responses among other companies or organizations in the same tier. A company suffering a fire in a kitchen would transfer the work to a competitor, or, in the case of a public-service provider, to a similar organizaton. Small businesses in particular are willing to help each other out.

"Demand is mushrooming at one end, and supply is mushrooming at the other. There are lots of opportunities for things to go wrong."

"However," she says, "companies tend to plan only for localized or internal disruptions. Their externally based contingency planning allows the sector to retain its efficiency, while making it resilient to localized disruptions. But for a widespread disruption, such as an infectious disease outbreak or a broad power outage, most companies had no workable plan," she says.

In such a scenario, distributors turn out to be key. For example, with a power outage, distribution centers are recognized as single points of failure, unlike the thousands of individual stores they deliver to. Therefore, the distribution centers are likely to have at least some back-up power generation facilities. Yet, if the distribution centers are unable to deliver to the closed stores, they would quickly become clogged with undeliverable loads, halting just-in-time factories with limited storage capacity higher up the chain. "The real issue here is that although we are encouraged to think in terms of single points of failure, systemic disruptions occur when common elements across the system are compromised at the same time," she says.

New challenges

Meanwhile, companies in all corners of the food sector face the conflicting challenges of cutting their costs in the face of increasing regulatory scrutiny – traceability is not free yet retailers will not pay for it and consumers assume that food safety is being taken care of and not something they need to worry about or pay for! "You wouldn't get a retailer in the world who wouldn't say safety is the No. 1 priority," says Prof. Fearne, "but when their backs are against the wall and they are losing market share, then they or their suppliers might take their eyes off the ball when under intense commercial pressures."

"Retail food chains are a generation ahead of food service in assessing and controlling risks in the supply chain," says Prof. Fearne. "Planes, trains, pubs – the food you're eating there is less tightly regulated because the supply chains in the food service sector are much more fragmented than those supplying supermarkets." A major reason for that is the UK 1990 food safety, which introduced the concept of due diligence in the retail sector, making retailers legally responsible for the safety of all the food they sell.

But food is no longer bound by national borders, which was the case not so many years ago. "Today, there are hundreds of global brands," says Mr. Plumridge of Zurich. "When things are going well, that's a great strategy, but in a recall, the magnitude is multiplied many times. You have damage control in many countries and cultures."

The importance of information

"Independent inspection and monitoring are an 'inefficient way to control' safety and quality," Prof. Fearne says. Information-sharing between the public and private sectors could eliminate much of the work and associated costs of ensuring compliance with basic safety requirements. But cost-cutting pressures all along the food chain have sown distrust and adversarial relationships. "Unless businesses trust each other they are not going to disclose commercially sensitive information that someone might use to exploit them," Prof. Fearne says.

A true tale of distrust: One of Mr. Cooley's clients at NewDawn Partnership was buying orange juice through middlemen – sales agents who represent growers. The client had an all-new team of buyers who didn't know the business, and Mr. Cooley suggested sending them to Israel to learn about the business on the ground. The outside sales agents had warned that Israel's crop would be 15% to 20% smaller than usual because of a late frost. The client's team sent back photos of trees groaning with fruit – the frost had affected only a small area, but the market rumors didn't specify that and were driving up prices. Armed with the photo, Mr. Cooley's client insisted on a 10% price cut, while the wider market took a 7% price increase. "It made a huge difference for profitability," he says. "It cost a lot to send the team, but the payback was more than 50 to 1."

He's seen the same thing with coffee, paprika and other foods. "Often what has happened affects a very small area in one piece of the supply chain, but it talks up the price."

While misinformation may reap windfalls for some stakeholders in the supply chain – agents and merchants have historically made money from the lack of transparity in the food industry – it can cause real pain for others – businesses producing food that nobody wants or to the wrong specification, warehouses full of finished products looking for a market and consumer vulnerable to poor quality food that lacks integrity. Prof. Fearne says, "More openness and greater sharing of information in the food chain would be a win-win." In sustainable food chains – those that are safe, ethical and profitable – all the stakeholders are pulling in the same direction, pulled by what it is that consumers value and are willing to pay for. "That's good news for everyone," he says. "No one part of the chain is to blame – there are victims and culprits at every stage from primary production to retail – because too many people are driving blind! How do you kick the addiction of opportunistic behavior? It takes time – trust has to be earned and the benefits must be shared. We need a fundamental change in the way businesses think, take decisions and behave if we are ever going to avoid falling ever deeper into the commodity trap."

"In the meantime, companies need to be able to trace products at least one step forward and one step back in the supply chain," Mr. Plumridge from Zurich says. They need to be able to trade and test products quickly, and to lay their hands on perfect data about which product has been shipped to whom, all batch coded. "It all has to aggregate into a bulletproof plan for a recall. You have to plan ahead of time and rehearse it to iron out any problems."

Business **resilience**

Contingency plans and logistics partners can help companies cope with natural disasters and other unexpected events

The Eyjafjallajökull volcano in Iceland may continue to spew ash from time to time, again throwing a wrench into European air transport and creating a serious disruption of commerce and industry.

But some companies coped pretty well with the recent turmoil. The question isn't whether they were prepared for a volcano – such events are far too rare to warrant a special disaster plan. Instead, some companies have built in resilience that allows them to withstand or recuperate quickly from whatever problem that pops up in their paths.

"We can't predict everything that's going to happen in the future," says Richard Russill, principal of R C Russill & Co., a procurement consultancy based in Fishguard, Wales, and author of the 2010 book 'A Short Guide to Procurement Risk'. "Thinking about potential risk and probabilities can seduce us into thinking that we've anticipated everything that might happen. But things are going to happen that we haven't anticipated."

Facing new issues

Historically, businesses have focused their continuity plans internally, but the rapid shift to outsourced processes, long supply chains and just-in-time operations means companies must consider far-reaching continuity plans that involve partners such as suppliers and logistics companies. Fundamentally, the supply chain is a critical part of the resilience picture.

"Thirty years ago, most manufacturing companies had their own shipping departments, their own material- sourcing department, and so on," says Lee Meyrick, London-based global marine practice leader for Zurich. Those days are gone. Today, companies' fates balance atop a complex network of suppliers. Key among those suppliers is the logistics company.

"As companies outsource, it's been accompanied by vertical integration of logistics companies," Mr. Meyrick says. "Nowadays most of the major logistics companies can provide a complete 4PL (fourth-party logistics provider) service, where the logistics company is managing the entire supply chain for you."

"Bespoke contracts place the risks on the logistics provider," he says, "but then you have little control over the risk, other than the fact that you put in a financial impediment and incentive on the logistics provider, so you would hope they would be concentrating on that point."

Case study: DHL

DHL, the global transport and logistics giant, is one of those companies that handles more and more of other companies' supply chains. DHL showed its true colors during Eyjafjallajökull's April 2010 eruption. With northern European airspace closed for an unprecedented six days, delays were inevitable. But there's a difference between a minimal delay and a long one. Within hours of the closure of airspace, DHL implemented an emergency plan that set out alternative air routes and shifted transport to ground vehicles.

DHL sent a fleet of trucks to its hub in Leipzig, Germany, to retrieve shipments. Meanwhile, about 100 flights were rescheduled from Leipzig to airports in southern Europe, which were outside the flight ban. The quick action prevented a pileup of shipments from accumulating, while getting them on the way, albeit more slowly than through normal direct flights, to their destinations.

Despite the shake-up from normal procedures, DHL insisted on continuously scanning shipments so that customers could get regular updates about their status. DHL says it didn't lose any customers because of the volcanic disruption, and the financial impact was negligible. In fact the response has created opportunities for DHL to examine the optimum transport mix of road and air to meet service levels which could lead to a lower total transportation cost.

"The volcanic ash disruption highlighted the need for businesses reliant on the global movement of goods to have robust and rapid continuity processes in place," says Andrew Leahy, vice president of product development for DHL Supply Chain, based in Bracknell, UK. "It might have seemed like an insurmountable act of God, but businesses with established contingency plans or logistics partners with fleet-of-foot international networks weathered the cloud better than others; alternative supply chain networks were established within hours of the disruption hitting, rerouting flights to unaffected cities and establishing emergency ground and sea transportation."

Image source: Deutsche Post AG

DHL is an example of a company adept at coping with disruption. "If a company hasn't got the right culture and capability, it has additional risk," says Dr. Russill, the procurement author and consultant. He warns that "people are going full-bore looking for risks in the physical supply chain," but the supply chain holds other risks:

- **External dependencies** – or the reliance on the suppliers being there and being motivated;
- **Procurement process** – really checking out suppliers before awarding contracts;
- **Market behavior and conditions** – being aware of monopolies and cartels ("markets can be a jungle," he notes);
- **Management control** – companies often give a false impression of control existing, but "that can be blown out of the water," he says.

Preparing to profit

"Companies need to map out their supply chains in detail and use creative techniques to see what would happen under various kinds of disruptions," Dr. Russill says. "My advice would be to spend more time anticipating potential eventualities. By definition, you would have fewer that are unanticipated. And once you've identified a possible risk, it can be obvious what to do to resolve it."

Some companies are shifting back toward sourcing closer to home, which can shorten supply chains and offer better communication. However, other companies have good reason to maintain supply chains that stretch around the world.

"Having a proper supply chain and confidence in logistics helps drive costs and efficiencies in world markets," says Mr. Meyrick of Zurich. A reliable supply chain of both inputs of supplies and exports of finished products "allows maximum price leverage in different markets. It allows companies to diversify markets. It gives them balance to not be so reliant on certain traffic flow. It lets them maximize tax breaks where manufacturing is being lured to. Any interruption in the supply chain prevents companies from maximizing it to the biggest extent they could."

A well-prepared company can profit from a widespread interruption that affects an industry or a geographic region. Dr. Russill tells of two food companies, both of which relied on buying chicken. One had a contingency plan for a disruption at its suppliers; the other company didn't. When a disease struck, the first company switched to its backup plan seamlessly. The competitor was stuck and asked to buy chicken from the first company. The first company sold chicken to its rival, at a tidy markup.

Dr. Russill urges companies to be not just resilient but agile. "Resilience conjures up the idea of bouncing back. A company that has an agile culture is not only able to bounce back but bounce forward."

A well-prepared company can gain a competitive advantage and profit from a widespread interruption that affects an industry or a geographic region.

Financing **success**

Savvy management of capital and supply chain risks can boost the bottom line

When most executives think about supply chain finance, they think about cost cutting. Clever executives look for ways to manage working capital and supply chain risk in order to boost the bottom line.

"The risk cost associated with the finance of a supply chain transaction can be equated to as much as 20% of the transaction value, when you take all things into account," says Nick Wildgoose, global supply chain proposition manager for Zurich in London. That doesn't even include such costs as duties and bank charges. "People don't add them all up," he says.

"Not only that, but changes in costs of the supply chain get amplified on the bottom line, in a kind of bullwhip effect," says Stuart Morrison, chief executive of EZD Ltd., a London company that specializes in analysis and management of supply chain risk and related financial products.

For one UK retailer, Mr. Morrison says, a 1% improvement in supply chain finance translated into a 32% improvement in earnings. "The chief executive saw that and said there was nothing else in the business as important to be focusing on because the supply chain has the biggest impact on earnings."

This can be done without downgrading to cheaper, lower-quality supplies or pressuring suppliers to do more for less. It's more about finessing transaction costs to one's favor, something more companies are examining as the financial crisis has tightened liquidity in traditional venues like banks.

The buyer/supplier relationship

"Companies are thinking more out of the box about whose credit rating could be used to different levels of advantage, out of the necessity to drive down the cost of working capital," says Lawrence Copeland, director at the global business consultancy AlixPartners Ltd. in London.

A buyer's company might offer its credit rating so a supplier can get preferential terms. "There are banks that will, assuming that the buyer has processed the invoice and has agreed that it will be paid in full, become quite inventive then about offering better terms to the supplier," Mr. Copeland says. Bank rates these days are "not very competitive," and the companies could avoid paying a few extra basis points on financing by managing their factoring this way.

> "If there are times when materials are short, if you're giving support on payment terms, you're likely to get preferential treatment from the supplier."

Relations between buyers and suppliers have traditionally been slightly antagonistic when it comes to payment terms, with each side trying to get the best deal for itself. A deal in which a buyer helps finance a supplier changes the relationship, sometimes with big payoffs. "If there are times when materials are short, if you're giving support on payment terms, you're likely to get preferential treatment from the supplier," Mr. Copeland says.

Other twists have sprung up around factoring, in which suppliers sell outstanding invoices to third parties at a discount in exchange for immediate payment.

"Some more inventive suppliers have gone into the marketplace and have auctioned what they're owed by the buyer and have really fished around for the best payment terms available. It keeps them very liquid and they get the cash in three, four, five days. In some instances it also has shaved a few basis points off," he says.

Exploring supply chain finance

"Traditionally, there are three methods for supply chain finance, each with its drawbacks," explains Mr. Morrison of EZD:

Open account: The risk of default remains effectively on the balance sheet of the vendor until the goods have been paid for. The risk is that buyers have limited recourse against vendors in a foreign jurisdiction in the event of a dispute.

Factoring: The vendor sells his invoice to a factor at a discount, usually three to four cents on the dollar. Factoring also is difficult across borders because it faces different jurisdictions. It's also expensive, prone to error and doesn't take account of operational risk – in fact, it can encourage risk because once the vendor has received money, he has no incentive to deliver the supplies in good faith.

Letter of credit: Very common and old-fashioned. A disadvantage is that it's difficult for low-cost suppliers in developing countries to ask a high-value buyer for a pledge of his creditworthiness. When the supplier is small and easily exchanged for another, a buyer has no reason to take the risk.

> "The risk cost associated with the finance of a supply chain transaction can be equated to as much as 20% of the transaction value, when you take all things into account."

"The global supply chain is made up of millions of transactions, usually on cycles of 90 days," Mr. Morrison says. "Between $1 trillion and $2 trillion of the supply chain is currently weakly banked, using existing methodologies. So it's pushing virtually everybody into open account territory, where assets are traded freely across borders. It's difficult to manage if you're only looking at counter-party risk, but it's much easier to manage if you're looking at operational risk."

EZD offers trade finance while focusing on operational risk. EZD differs from factoring by validating suppliers' quality and monitoring deliveries to ensure purchase orders are fulfilled correctly. "Much of the product default, defect, delivery or time-limit problems are generally felt very early in the cycle, often in the production or pre-production states," Mr. Morrison says. "Those risks can be managed, with risks reduced for everybody's benefit. A financial product can be put in place using that much lower risk profile."

"EZD delivers cash up front to the vendor, but allowing the buyer to have a period of credit from the point of shipment, which often covers the sales cycle. The buyer pays when the goods have been sold," Mr. Morrison says.

Collecting advantages

Collections also are key, especially as the economic crisis led many companies to delay payments to suppliers because their own customers were taking longer to pay. A survey of the 1,000 largest public US companies found that collection time rose by three days in 2009, according to REL, a division of the Hackett Group Inc., an Atlanta and London consultancy.

However, the best-performing companies collected 17 days more quickly than did typical companies that year. How did they do it? REL President Mark Tanner lists three keys:

- managing the process from the front end by monitoring the terms being agreed by your company's sales representatives;
- identifying why payments are late—often it's because of a shipping, quality, quantity or pricing error in the order—and getting your own house in order; and
- enforcing payment terms by contacting the customer before the payment due date, and prioritizing which customers get contacted in person and which by phone, mail or email.

According to Mr. Copeland of AlixPartners, "companies can look at how inventory is held – is it work in progress or inbound materials or outbound materials ready for shipping? They can look at their whole inventory and how to minimize cost."

Likewise, for accounts receivable, companies need a tough dynamic collection process. "Sometimes companies don't want to offend customers, so they let invoices stay unpaid too long," he says. "When it's a buyers' market, you can push and push and push until you get what you need. In some sectors it's a buyers' market now," Mr. Copeland says. "You don't have to accept what somebody tells you is the normal practice."

"Companies also can free up cash by reducing inventory and extending terms for accounts payable. There's a lot out there that can be done that companies are not doing."

Relevant, fresh and precise information can prove profitable

Information is essential to reducing risk in the supply chain. But a barrage of data does no good. Successful companies filter out what's irrelevant, while pushing for fresher and more precise information about suppliers.

"Much of the information available publicly is out of date because it's based on annual accounts," says Clive Lewis, head of enterprise at the Institute of Chartered Accountants in England and Wales in London. "You need the monthly accounts they assemble for their own management. If you're not getting that level of information, maybe you should ask."

Reading the news

"The trend of outsourcing to Asia and increasingly numerous suppliers has reduced the information traditionally available about suppliers," says London-based Mark Stapleton, director of client solutions for Dow Jones, a unit of News Corp. "The advent of the economic crisis exposed just how little companies often knew about suppliers," he says. Traditional metrics, such as filing of financial results, were showing a picture that was six or 12 months old. In contrast, news can indicate events happening today that could affect the supply chain today or in the future.

Dow Jones Supplier and Risk Monitor harvests news from more than 28,000 media, industry, Web and social media sources from 150 countries and in 23 languages. Dow Jones can "push it at a group of clients that is hungry, but doesn't have a lot of time to do research. They want a quick view of a very specific universe," he says.

"It can be hard to get information about small suppliers in developing countries. However, a company can check regional news for information about various risks in an area where a key supplier is situated," Mr. Stapleton says. Child-labor violations, pollution incidents, labor unrest, floods, infrastructure breakdowns, piracy and similar topics might make it into the local or regional press but not beyond. Dow Jones Supplier and Risk Monitor picks up such local news items and sends them to a company's supplier and risk monitor. "It's not just companies but also parts or raw materials that a team wants to track," he adds. "The solutions get customized to cover only the list of topics the client needs to follow. Many clients sign up after they've been impacted by an unforeseen disruption in their supply chain."

Seeing the supplier's view

It's one thing to know whether a supplier meets your criteria. It's another thing to know where you stand in the supplier's eyes. Purchasing Index Ltd. of London maps where a client stands from suppliers' points of view based on interviews with suppliers. One axis is scaled for the value of the contract and the other axis is scaled for strategic importance, dividing the area into four quadrants: develop, protect, exploit and nuisance.

"So while a supplier might get a lot of money from the client, if they are in the 'exploit' area and there's a disturbance, this client may not be getting the best service," says Keesup Choe, chief executive of Purchasing Index.

Procurement managers have long used the matrix to position suppliers as strategic, high value but easily replaced, not important or fairly important but risky. "By doing this exercise, they can see which suppliers they can squeeze on price because they are easy to substitute," Mr. Choe says. Purchasing Index pointed the matrix in the other direction, to measure risk in the supply chain itself. It melds quantitative data like contract size with qualitative data like whether a customer is considered a nuisance.

Suppliers are shown as circles scaled to their importance to the client. The circles also bear colors, indicating risk, from green (low) to red (high). Risks range from having a location in an earthquake zone to financial problems to being in a politically unstable country. A client can click on the circle to see secondary and even tertiary suppliers, each color-coded for risk. The more finely a client can map its supply chain, the more accurately it can price the risk.

Purchasing Index also gives a geographic view. Say there's a volcanic eruption – a client can see dots on a map showing primary, secondary or tertiary suppliers in the path of the ash cloud, again with the size of the circles indicating how big the supplier is. A company could think it's safe because none of its primary suppliers is in the region, but the map would show that many secondary suppliers are affected and that backups need to be found quickly.

Being ready for change

"Change is the biggest problem in any supply chain," says Richard Forrest, director of Barloworld Supply Chain Software, based in London. "Being change-ready will determine how effective you are."

Barloworld looks at supply chains in three areas:

Design: "Where are my warehouses and my stores in relation to demand and supply," he says. "We believe you get about 80% of supply chain savings out of design." Having too many warehouses, for example, means a company is investing too much in fixed costs, worsened by the fact that leases are usually over a long term. Design needs to evolve over time to reflect changes in things like fuel costs.

Inventory: "Where to keep buffer stock in the network in order to maximize customer service. Buffers are there to support risk," Mr. Forrest says, "so in evaluating disruptions throughout the network a company can see its alternatives for moving inventory and what the costs would be".

Execution: "How do we actually execute the orders that need to be placed upward in the supply chain in order to meet customer demand," he says. "Software links all the players in the supply chain so they can better collaborate and be alerted to changes in supply and demand."

A maker of industrial chains wanted to move production out of Eastern Europe to either the UK or the US Barloworld evaluated the scenarios and found that while production costs in both countries were similar, working capital costs were 43% lower in the US to serve the US market because shipping would involve raw materials rather than more costly finished goods and because, being closer to eventual customers, lead times were less, requiring smaller inventory. "So buffer stocks were in raw materials rather than finished products," Mr. Forrest says. "They were looking so much at production costs they had forgotten to look at inventory and working capital costs," he adds.

"Too many companies are in a `data smog,` says Mr. Choe of Purchasing Index. "Companies have information, but it's sitting there. They can't get a handle on it."

Companies face supply and demand trends

pulling them in opposite directions

Competing supply/demand trends pose complications for companies. On the supply side, time frames are growing as companies do more due diligence on suppliers and as supply chains become longer. On the demand side, product lifespans are getting shorter as customers jump on new trends or innovations.

It means companies need to tap their existing supply chains for short-lived, one-off or trendy products. The boom of fast fashion is the starkest example, but similar change is coming to many industries, from autos to book publishing. 'Lean' and 'just-in-time' became standard practice in many sectors; the buzzwords today are 'agile' and 'flexible.' Here's a primer.

Pull, not push

Central planning doesn't work any better for corporations than it did for communist economies. It might seem far-sighted to plot out growth curves and line up orders in advance, but at some point, your company risks holding the bag when demand shifts. "You want to move from being forecast-driven to being demand driven," says Martin Christopher, professor emeritus at Cranfield University's school of management in Cranfield, UK, and author of 'Logistics and Supply Chain Management.' To do that, "you need to get data from the point of sale and get that information back through the system," says Martha Turner, vice president at management consultancy Booz & Co. in New York. "With increased transparency, you don't have to rely as heavily on forecasting. Products are pulled through the supply chain, rather than pushed."

Prefer raw to done

The gridlock caused by the volcano in Iceland in 2010 showed the weakness of just-in-time supply chains. While everybody wants someone else to hold inventory, you want to have enough to get through disruptions. The key is what kind of inventory. "You have inventory, but you keep it flexible, you keep it generic," says Cranfield University's Prof. Christopher. "You don't want to carry inventory of finished products."

Beware of ghosts

"Bandai Co., a Tokyo-based toy and video game maker, had a hit in 1996 with its Tamagotchi virtual pet toy, and kept increasing capacity to meet the exploding orders," explains Marvin Troutt, professor of management and information systems at Kent State University in Kent, Ohio, and co-author of a study on the case. "However, Bandai was facing 'phantom' demand, because panicked retailers had placed multiple orders with different distributors in hopes of at least one order panning out. Once stocked, the retailers canceled the extra orders, and Bandai got hit. If demand seems too strong to be true, you may need to dig down to verify what is real and what is phantom."

Postpone

Economies of scale require mass production of identical goods, but consumers increasingly want customization. The result is mass customization. "The idea now is postponement of the final product," says Susan Horne, assistant professor of management at Texas A&M University in San Antonio. "You take a product as far as you can before the final stage. You can do various things with components, but not with final products." Dell Inc., the Round Rock, Texas-based computer maker, set itself apart by letting consumers order customized computers; "Dell mass-produces or procures mass-produced modules and component parts but delays assembly until the individual orders come in," Prof. Horne explains. "In the future, all kinds of products will be much more modular," says Prof. Christopher of Cranfield. "They will share platforms, so under the skin they'll have high levels of commonality."

Timing

"When you start looking at what you need to do to become fast, you start looking at the whole supply chain, what lead times are, where there is waste, duplication and queues and what you need to do to affect change," says Ken Watson, managing director of industry Forum services Ltd., a fast-fashion consultancy in London. In fast fashion, a "key determinant to be agile is to have the flow of textiles. If you wait until you know the demand signal to create the flow of fabric, you don't have enough lead time." Fabrics may be ordered and delivered but not dyed until later. "The important thing with suppliers is knowing which decisions need to be made early and which should be made at the last minute," he says.

Capacity is flexibility

"Many people think that if they have idle capacity, that's a cost," says Prof. Christopher. "In traditional accounting, you have to recover overhead by making more units per hour. You can end up being convinced that it's better to keep the machine running at full speed to make 100 units per hour, when demand is for 60. So you build up inventory. Capacity is flexible, but inventory isn't," he notes. Says Ms. Turner of Booz: "You need to create fungible capacity among your network of suppliers so that you can absorb spikes in demand. You have to have a prequalified set of suppliers whom you can ramp up or down as needed."

Redefine lean

The understanding of the application of lean techniques to develop rapid innovation and change in the fashion sector resulted from work undertaken in the 1990s within the automotive sector, Mr. Watson says. "Fast fashion is an application of lean systems, across the whole of the supply chain, and not just the manufacturing side of it," he says. "Lean is the elimination of waste. Waste is producing a product the customer doesn't want. You need to be lean to be agile."

Communicate

Companies are collaborating much more with suppliers, especially in the fast-fashion industry, says Mr. Watson. To attain the speed and keep down costs, companies need to communicate with suppliers to make sure "all products coming to you have the right handwriting" – the right 'look' or 'feel' for your customers. In an environment where a shirt has about the same shelf-life as a sandwich, approval processes need to be tightened, he adds. Meanwhile, designers and retailers can tap the innovations coming out of suppliers all along the chain. "It has become much easier to have collaborative design, even at great distances," he notes.

Simplify

The mix of customized products, shorter life cycles, fragmented product portfolios and longer supply chains, and unpredictable demand make for a complicated mess. "Companies probably are running too fast already. The secret is to do fewer things, especially fewer things that don't add value," says Cranfield University's Prof. Christopher. Complexity can add costs as well as increase the time it takes to do things in the supply chain. "Good complexity allows us to differentiate ourselves," he says. "But you have to ask, 'can I charge somebody for this?' If complexity is only adding cost and not value, you have to reduce or eliminate it."

Technology will help **optimize value networks** in the future

Supply chains are dynamic, and the risks that surround them shift quickly

“The most successful companies in the future will have developed integrated supply chain risk management into a strategic value-adding activity,” says Nick Wildgoose, global supply chain proposition manager at Zurich in London.

A combination of factors is indicating change – and increased risk – in the supply chain of the future.

First, supply chains are increasingly complex. “It’s better to refer to them as ‘value networks,’” Mr. Wildgoose says. Networks because few supply chains are linear chains anymore, and value because “quite often, the supply chain is driving the value the company provides,” he explains.

Secondly, uncertainty is increasing. Part of this arises from the way everything has speeded up – with customers no longer willing to wait, shorter product lifecycles and globalization. “This combination of complexity and uncertainty can lead to fragility, or higher risk in the supply chain,” Mr. Wildgoose says. “Companies are moving from doing almost nothing about risks and disruptions – a reactive approach – to being proactive. Ultimately, they will move on to driving competitive advantage through managing supply chain risk,” he says.

Unfortunately, “businesses are unprepared,” says Gerard Chick, head of research and knowledge management at the Chartered Institute of Purchasing and Supply, or CIPS, in Stamford, UK.

While each company’s supply chain is unique to it, all companies face similar broad trends that are likely to affect their people, processes and technology to some extent. What lies ahead?

People

"One of the biggest risks for companies is finding people who can lead initiatives to generate sustainable value from the supply chain," says Michael Lewis, professor of operations and supply management at the University of Bath in the UK. "There is a shortage of people who can do this kind of strategic multitasking."

Supply chain management is likely to move from being an administrator driving costs down toward a collaborative model of leadership. "They will use a language of options and portfolios of risks," Dr. Lewis says.

"Since the supply chain represents such a major financial and reputational exposure, it is imperative that the portfolio of supply risks is integrated into an overall enterprise risk and resiliency management process at the company," explains Linda Conrad, director of strategic business risk at Zurich. "In this way, procurement options and mitigation steps can be prioritized and budgeted for along with other essential risk control steps taken to help optimize the risk/reward balance across the business."

"That already is happening," says John O'Connor, senior director of global business operations in the customer-value-chain management organization of Cisco Systems Inc., the San Jose, California, maker of routers and switches for networking. At gatherings of the Supply Chain Risk Leadership Council, a multi-industry forum, "Cisco, as recently as two years ago, was the one in the room that had a dedicated supply chain resiliency team, and we were seen as luxurious in that regard," he says. "Now we see more companies with individuals and teams who are dedicated to that responsibility."

Procurement teams also are going to have to change. Up to now, some procurement people "enjoyed that they got the last euro or dollar out of their supplier," says Mr. Wildgoose of Zurich. "In the world we're moving into, which is a world of scarcity, collaboration is needed to help optimize the supply chain. You can only get that in a meaningful way with trust – there has to be an element of win-win."

Procurement officials also will hone their definition of what's a critical supplier. "Some supply chain people will measure the importance of a supplier on their spend," Mr. Wildgoose says. "Instead, it should be driven from a top-down approach: what is our most profitable product or service and which suppliers do we rely on to drive that."

Processes

Some of the givens of recent years are over. Easy credit and cheap oil are at the top of the list. In the past five years, some transport costs have increased substantially because of rising energy costs. And though central banks have slashed interest rates to historic lows, wary commercial banks are keeping purse strings tight. "The easy wins are over," says Dr. Lewis of the University of Bath. "Companies are going to have to give as much attention to the finance chain as they do to the product or service supply chain," he says.

However, Mr. Wildgoose notes, a significant part of what banks charged for trade finance revolved around risk, such as the uncertainty of the transaction, including delivery. "With risk being better managed and with better traceability, companies will most likely drive efficiency into finance in the future," he says. Thus, better supply chain management could ultimately have a positive impact on not only profitability but cost of capital as well.

Outsourcing to overseas has raised wages in those countries – an average of 20% year-on-year over the past five years in China, according to the Massachusetts

Institute of Technology Sloane Management Review. "Those labor costs are unlikely to go back down," says Mr. Chick of CIPS.

"Meanwhile, commodity prices have gotten more volatile," according to Mr. Chick. The situation is "potentially fatal for some organizations. Think of airlines procuring fuel – do you go for the long or short term? How do you outguess the market?"

In addition, he and Dr. Lewis note that the focus on environmental sustainability is likely to sharpen. Dr. Lewis says that a meaningful price for carbon would make near-sourcing much more attractive.

"More companies are likely to involve supply chain managers upstream at product design and launch to ward off problems, rather than fix them," says Mr. O'Connor of Cisco, which already operates this way. "The resiliency of the product design, and all the elements of the value chain – components suppliers, manufacturing locations, logistics – are being taken into consideration early in the New Product Introduction process, as early as 18 to 24 months before the customer sees the product. Companies will design for resiliency."

Resiliency, he notes, "has an idiosyncratic meaning that differs from company to company." He expects "resiliency standards to start to form at the industry level and become a must-have."

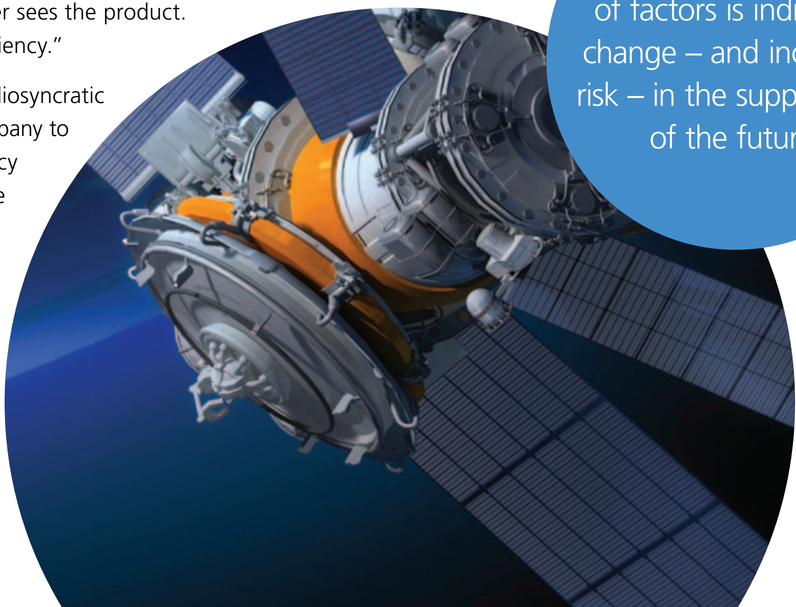
Technology

"Technology used to enhance transparency in the supply chain will be one of the key ways to help decrease risk," says Mr. Wildgoose of Zurich. "Technology is helping to track goods around the world. In the future, we should be able to track any key parts anywhere in the world."

"Technology also will improve collaboration," he says, "so forecasts really will flow through the network. It won't remove all uncertainty but it will help optimize and improve the value of the whole supply chain."

Dr. Lewis of the University of Bath in the UK. also sees technology helping companies address visibility needs, but at the same time, firms will take a new look at their information security. "People haven't thought through how much information is public in social media and also in the supply chain."

A combination of factors is indicating change – and increased risk – in the supply chain of the future.



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