

Supply chain resilience  
A Risk Intelligent approach to  
managing global supply chains





# Preface

This publication is part of Deloitte’s series on Risk Intelligence — a risk management philosophy that focuses not solely on risk avoidance and mitigation, but also on risk-taking as a means to value creation. The concepts and viewpoints presented here build upon and complement other publications in the series that span roles, industries, and business issues. To access all the white papers in the Risk Intelligence series, visit: [www.deloitte.com/risk](http://www.deloitte.com/risk).

Open communication is a key characteristic of the Risk Intelligent Enterprise™. We encourage you to share this white paper with your colleagues — executives, board members, and key managers at your company. The issues outlined herein will serve as useful points to consider and discuss in the continuing effort to increase your company’s Risk Intelligence.



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# Foreword

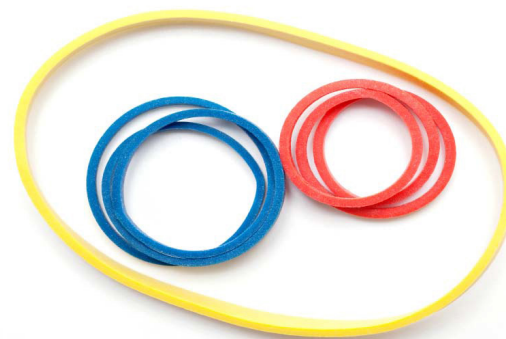
Supply chain risks are on the rise, as is their potential impact on business performance and shareholder value. A recent study found that 85 percent of global supply chains had experienced at least one significant disruption over the preceding 12 months<sup>1</sup>. Another study found that firms that suffered from a publicly-announced supply chain disruption delivered shareholder returns approximately 30 percent lower than their peers<sup>2</sup>. Results like these are too important to ignore — and the risks are only increasing.

A variety of internal and external forces are driving the rise in supply chain risk. Some are macro trends such as globalization and global connectivity, which are making supply chains more complex and amplifying the impact of any problems that may arise. Others stem from the never-ending push to improve efficiency and reduce operating costs. Although trends such as lean manufacturing, just-in-time inventory, reduced product lifecycles, outsourcing, and supplier consolidation have yielded compelling business benefits, they have also introduced new kinds of supply chain risk and reduced the margin for error.

Events that were once considered “black swans” —, high impact, but low probability events— now seem to be an almost regular occurrence. This is not necessarily because problems are happening more often, but because in a globally interconnected business environment, problems that used to remain isolated now have far-reaching impacts.

At the same time, customer expectations and product lifecycles continue to shift. Today’s buyers expect businesses to deliver a continuous stream of products that are better, faster, and cheaper — while acting responsibly toward society and the environment. And thanks to social media and the Internet, if a company has a weak link or one of its supply chain partners stumbles there’s a good chance the public will learn about it even before the CEO does.

All of these trends are challenging traditional notions of “acceptable supply chain risk.” In this increasingly complex and challenging environment, what can an organization do to manage its risk exposure and protect the value of its business and brand?



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<sup>1</sup> “Supply Chain Resilience 2011,” November 2011, Business Continuity Institute.

<sup>2</sup> “An Empirical Analysis of the Effect of Supply Chain Disruptions on Long-Run Stock Price Performance and Equity Risk of the Firm,” Spring 2005, Production and Operations Management Journal; note: value reflects median results against several benchmarks during disruption year.

# A more complete view of supply chain risk

Efforts to identify and mitigate supply chain risk have traditionally focused on operational risks and familiar sources of potential disruption that have caused trouble in the past. But that's just the tip of the iceberg. Risks are constantly evolving and can strike from almost anywhere — including sources that are new and unexpected.

A more holistic approach needs to consider and address four distinct categories of supply chain risk (see figure 1).

**Macro environment risks** are broad external forces that affect the entire business and supply chain. For example, globalization gives businesses access to less expensive labor and materials — and opens up vast new markets. But it also increases supply chain complexity and magnifies the impact of disruptions that in the past might have remained locally isolated — such as natural disasters, political turmoil, piracy, and regional economic crises. This is probably the main reason “black swan” events seem to be increasingly common.

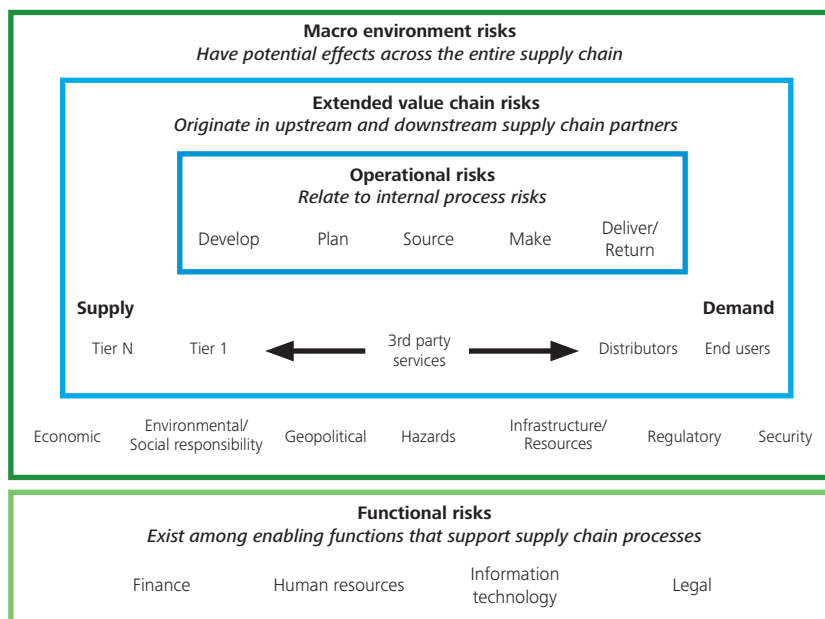
**Extended value chain risks** center around a company's upstream and downstream supply chain partners. Increased use of outsourcing, for example, has improved efficiency and allowed businesses to focus more attention on their core competencies. But it has also made their operations more complex and exposed them to increased third-party risk. Similarly, supplier consolidation can be a double-edged sword. Although it creates economies of scale and makes day-to-day operations more predictable and consistent, it also increases the risk of major supply disruptions by putting all of a company's eggs in fewer baskets. Recent events have shown that if a critical supplier runs into quality problems — or its operations are disrupted by a labor dispute, natural disaster, or financial struggles — the resulting turmoil can send shock waves across a company's entire global supply chain.

**Operational risks** are tied to a company's internal product development, manufacturing, and distribution operations. Lean manufacturing, just-in-time inventory, and capacity rationalization have boosted supply chain efficiency and made businesses more agile and responsive. But by reducing the slack in the network, they have also reduced the margin for error and amplified the disruptive potential of whatever problems happen to arise.

**Functional risks** relate to the business functions that support supply chain activities, such as Finance, Human Resources, Legal and Information Technology. Today's supply chains are enabled and accelerated by a broad suite of applications and systems. Any disruption or breach in these critical systems can have an immediate impact on the customer experience. Also, the rising complexity of regulatory requirements — and increased repercussions of non-compliance — are making supply chains more dependent than ever on legal and regulatory functions.

Looking across all four categories, our research and experience has identified more than 200 different supply chain risks, any of which can have a significant impact on supply chain and business performance. Managing supply chain risk is no longer just a question of ensuring that products and materials get to the right place at the right time. A company that manages supply chain risk more effectively than its competitors do can boost its market image and create significant shareholder value through superior product innovation, cost management, asset efficiency, and regulatory compliance.

Figure 1. Supply chain risks



Even world-class supply chains are not immune to disruption. Toyota has long been recognized for the excellence of its supply chain and supplier controls. Yet the earthquake and tsunami that hit Japan in March 2011 wreaked so much havoc on the company's supply chain that it required six months to fully recover. The disaster spurred Toyota to launch a major improvement initiative with the goal of reducing its future recovery time to two

weeks. While mapping its supply chain, the company discovered that Tier 1 suppliers it thought were unrelated actually relied on the same Tier 2 suppliers, creating dangerous common dependencies. In order to avoid potential disruptions and increase resilience, Toyota is working with at-risk suppliers to build additional facilities, and is standardizing its parts with other automakers so they can share components manufactured in different locations.<sup>3</sup>

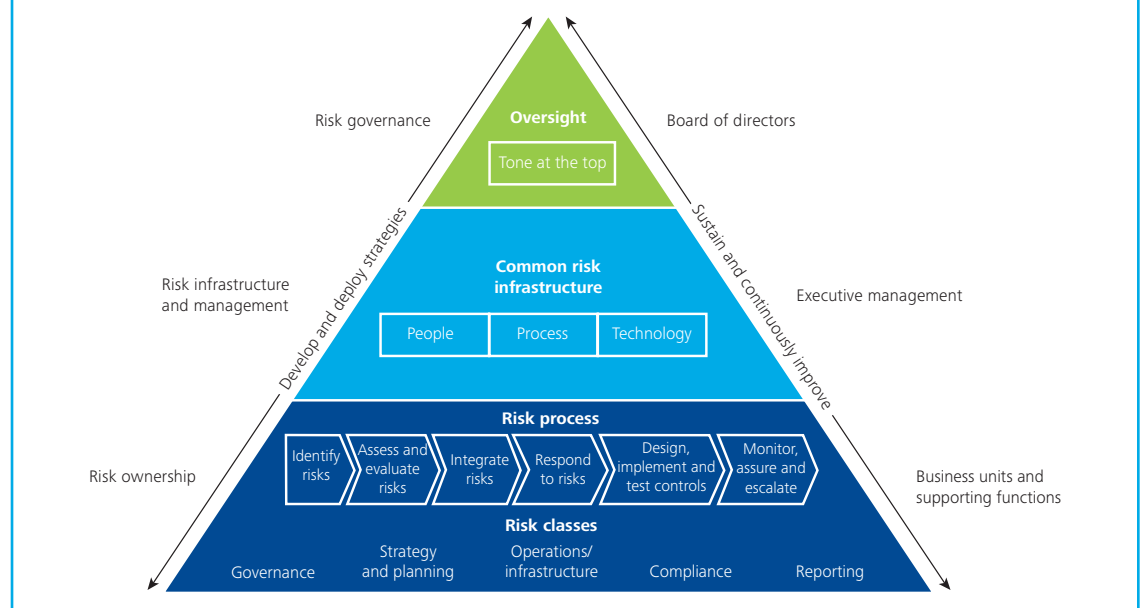
<sup>3</sup> "Toyota aims for quake-proof supply chain," Reuters.com, September 6, 2011.

### The Risk Intelligent Enterprise™

A resilient supply chain is an essential element of the Risk Intelligent Enterprise™. An enterprise that is 'risk intelligent' focuses not solely on risk avoidance, but also on risk-taking as a means to value creation. By implementing an effective risk management program, a company can transform itself into a Risk Intelligent organization where:

- Leaders take a "Risk Intelligent" approach that incorporates a broad outlook on risk and integrates risk-aware thinking into strategic decision-making.
- The board executes fiduciary responsibilities and **oversight** to ensure that appropriate risk management controls and procedures are in place.
- Capable processes, systems and trained people provide a **common risk infrastructure** to act on such intelligence in a timely and coordinated manner.
- A consistent **risk process** is used across the organization to manage all **risk classes** in an effective and efficient manner.

Figure 2. Deloitte's Risk Intelligent Enterprise™ framework



# The four pillars of a resilient supply chain

Given the scale and scope of today's global supply chains, there is no way for a company to predict and prepare for every possible risk. However, what a company can do is build resilience — proactively addressing the critical vulnerabilities in its supply chain that expose the business to risks that exceed its risk tolerance.

Two companies that face similar risks can have dramatically different levels of risk exposure depending on the resilience of their supply chains. A resilient supply chain can help a company sidestep a wide range of risks and, perhaps even more important, to bounce back quickly from risks that cannot be avoided.

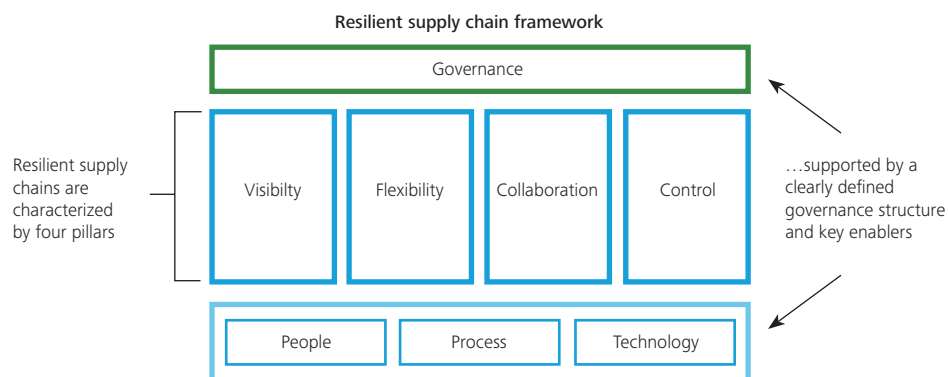
The notion of resilience is not new; in fact, it is a characteristic many enterprises and supply chains have long aspired to possess. However, simply recognizing the value of supply chain resilience as a concept is not enough. To build resilience, organizations must understand the essential components — and required trade-offs — that are necessary to build resilience. In our experience, four capabilities are key (see figure 3).

- **Visibility** is being able to track and monitor supply chain events and patterns as they happen — or even before they happen. This capability enables an organization to address supply chain issues before they become problems.

- **Flexibility** is being able to adapt quickly in response to problems without significantly increasing operational costs. This capability enables an organization to sidestep potential problems deftly and minimize the impact of a critical disruption or sudden shift in expectations.
- **Collaboration** is the ability to work effectively with supply chain partners through symbiotic, trust-based relationships in order to avoid disruptions and achieve common goals.
- **Control** is having robust policies, monitoring, and control mechanisms to help ensure the proper procedures and processes are actually followed.

In addition to these four essential capabilities, organizations with resilient supply chains tend to have a clear governance structure. Too many organizations still struggle with supply chain issues because they don't have an executive-level position with full, end-to-end ownership of supply chain operations — let alone supply chain risks. Clear accountability and ownership — supported by a strong foundation of key enablers (people, processes, and technology/analytics) — are critical to sustaining a resilient supply chain.

**Figure 3. Key attributes of a resilient supply chain**

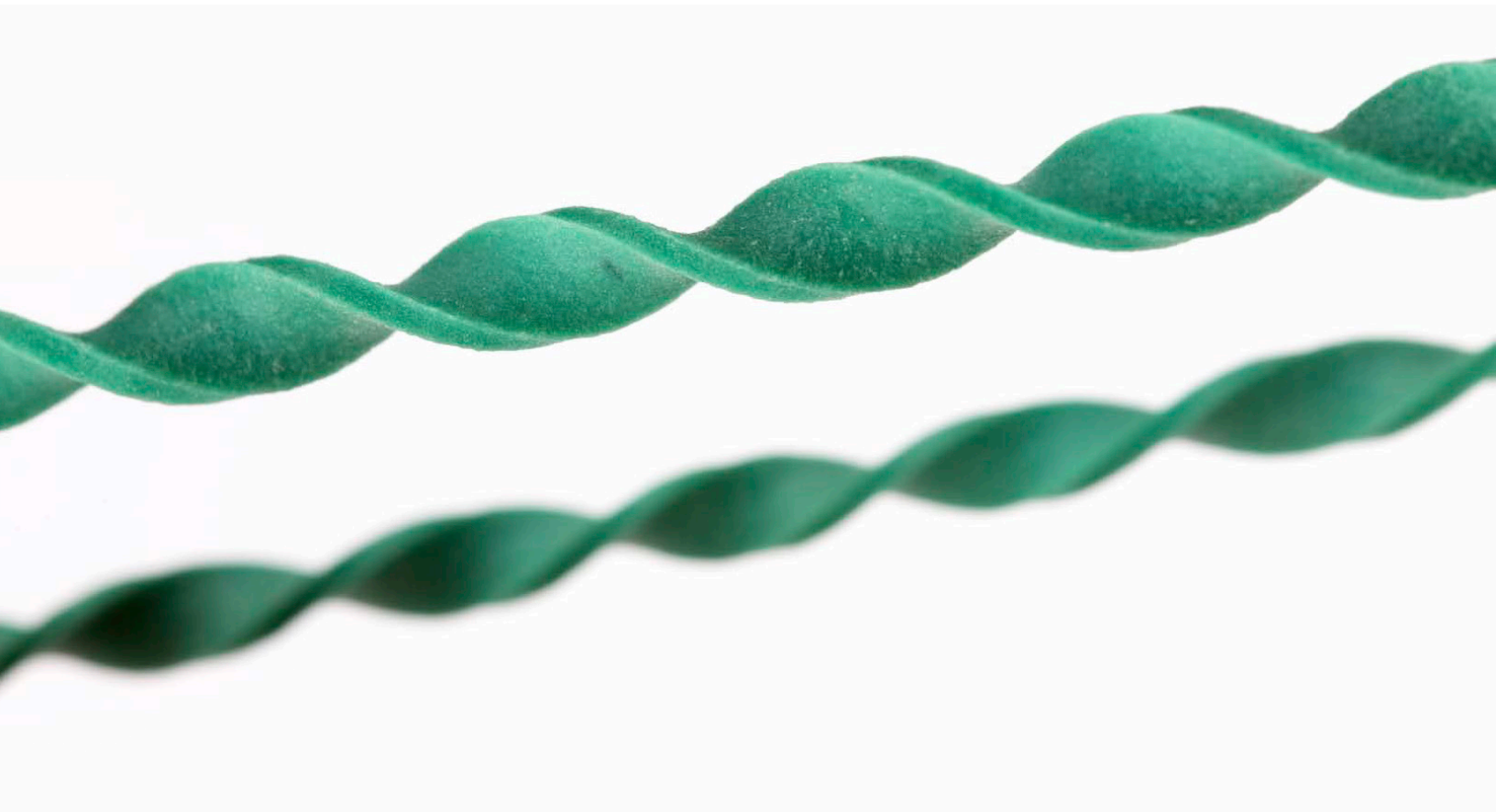


# Resilience in action

A company may not be able to prevent a shipping port from shutting down due to a natural disaster or labor strike, but it can minimize its vulnerabilities by creating a **flexible** supply chain strategy that includes alternate distribution points and/or modes of transportation — with the ability to shift quickly between various options as needed. Similarly, although a company can't guarantee its production equipment will never fail or that demand will never shift above or below expected levels, it can build reasonable levels of **flexible** manufacturing capacity into its network to support the ability to produce different products in response to problems and changing needs.

Also, while it might not always be possible to avert the bankruptcy of a Tier 1 supplier, a company can anticipate the problem and minimize the damage by improving its **visibility** into supplier financial performance. What's more, through close **collaboration** it may be able to work with at-risk suppliers to improve their operations and help them remain viable and competitive in the face of adversity.

Although some level of supply chain risk is unavoidable, robust **control** mechanisms help ensure a company is doing everything it can to minimize its risk exposure, including comprehensive business continuity plans to prevent or recover from critical disruptions.





# Building a resilient supply chain

There are five major steps to improving the resilience of a company's supply chain (see figure 4).

1. **Assess supply chain resilience.** Evaluate overall supply chain resilience and pinpoint critical vulnerabilities.
2. **Determine risk exposure.** Prioritize risks based on intensity, vulnerability, and node criticality; aggregate key risks to quantify baseline exposure level.
3. **Evaluate and prioritize resilience strategies.** Assess potential resilience and mitigation strategies against cost, benefit and risk tolerance; develop an overall business case for the best course of action.
4. **Address supply chain resilience opportunities.** Define and follow a clear roadmap for addressing supply chain vulnerabilities and capitalizing on opportunities to improve resilience.
5. **Monitor supply chain resilience.** Develop mechanisms to monitor supply chain resilience, manage new vulnerabilities, and tee up the next iteration of improvement.

Building a resilient supply chain is an ongoing process, since the risks and complexity associated with global supply chains are constantly evolving and expanding. This five-step approach helps companies identify and address the supply chain risks that are most critical to their business, and positions them to tackle future risks as they emerge.

Figure 4. Building a resilient supply chain



### Useful tools and accelerators

The right tools can accelerate the creation of a resilient supply chain and help management build a strong base of support at every level of the organization.

- **A supply chain resilience index** reduces a complex situation to a single number that helps people understand the company's overall risk exposure, and provides a clear baseline for measuring progress and improvement.
- **Supply chain mapping and risk visualization** provides a pictorial view of global supply chain risk, highlighting the areas of greatest vulnerability and providing a visual impetus for action.
- **Pre-defined risk indicators** provide rapid access to public and proprietary data that can help a company understand its risk exposure at various points in the supply chain and take action before supply chain issues become problems.

- **An extensive database of supply chain risks — along with proven risk response strategies** — helps a business quickly assess its unique situation and develop a customized set of solutions to address its most critical vulnerabilities — without reinventing the wheel.
- **Advanced supply chain modeling and simulations** help decision-makers understand and quantify the potential impact of specific risks in multi-echelon supply chains.
- **War gaming techniques** enable a company to test worst-case scenarios and gain hands-on experience responding to critical disruptions, in a safe environment.

Tools like these make it easier for companies to get their arms around the overwhelming complexity of today's global supply chain risks, to build resilience, and to act quickly and confidently in the face of adversity.



# Ready. Set. Go.

Managing risk has always been an important part of supply chain management. But the increasing complexity and hyper-connectedness of today's global business environment is taking the challenge to a whole new level. In a world where a problem in one isolated region can bring an entire global supply chain to its knees, a business-as-usual approach to supply chain risk simply isn't good enough. Eliminating all risk is impossible, of course. However, a resilient supply chain can help your company identify and sidestep risks that are avoidable — and bounce back quickly from those that aren't.



#### **Nine fundamental principles of a Risk Intelligence program**

1. In a Risk Intelligent Enterprise, a common definition of risk, which addresses both value preservation and value creation, is used consistently throughout the organization.
2. In a Risk Intelligent Enterprise, a common risk framework supported by appropriate standards is used throughout the organization to manage risks.
3. In a Risk Intelligent Enterprise, key roles, responsibilities, and authority relating to risk management are clearly defined and delineated within the organization.
4. In a Risk Intelligent Enterprise, a common risk management infrastructure is used to support the business units and functions in the performance of their risk responsibilities.
5. In a Risk Intelligent Enterprise, governing bodies (e.g., boards, Audit Committees, etc.) have appropriate transparency and visibility into the organization's risk management practices to discharge their responsibilities.
6. In a Risk Intelligent Enterprise, executive management is charged with primary responsibility for designing, implementing, and maintaining an effective risk program.
7. In a Risk Intelligent Enterprise, business units (departments, agencies, etc.) are responsible for the performance of their business and the management of risks they take within the risk framework established by executive management.
8. In a Risk Intelligent Enterprise, certain functions (e.g., HR, finance, IT, tax, legal, etc.) have a pervasive impact on the business and provide support to the business units as it relates to the organization's risk program.
9. In a Risk Intelligent Enterprise, certain functions (e.g., internal audit, risk management, compliance, etc.) provide objective assurance as well as monitor and report on the effectiveness of an organization's risk program to governing bodies and executive management.



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