



# Managing Supply Disruptions

protiviti<sup>®</sup>  
Independent Risk Consulting

ORACLE<sup>®</sup>

Business Risk

Technology Risk

Internal Audit

## Building fundamentals to manage supply risk and improve supply chain performance

All organizations have internal and external supply chains that deliver goods or services to customers. As a result, whether you're an electronics manufacturer using just-in-time inventory (JIT), a financial institution using an outsourced provider for clearing and settlement, a global pharmaceutical company with outsourced manufacturing or an online retailer using a shipping provider for order fulfillment, you are at risk of a supply interruption impacting your and your customers' businesses.

Supply disruptions that occur across the organization can result in reduced revenue and profitability, decreased stock price and market share, reduced customer service and performance, and negative publicity.

Managing supply is not only about acquiring goods and services at the right time, right place, right quantity and right quality; it is also about identifying all possible disruptions within the supply chain and taking steps to either:

- Prevent a supply disruption from occurring; or
- Minimize the impact if a supply disruption occurs.

This is the process of supply risk management.

## Defining supply risk management

Supply chain management has been widely written about for nearly 20 years. It was born from the era of business process improvement in the early 1980s. Risk management is a topic that once exclusively concerned internal audit, commodity trading communities and insurance professionals, but it has since spread throughout the business community. This paper will show the relationship between supply chain and risk management by defining the basics of supply chain risk management, or supply risk management, and describing what organizations can do to begin outlining the building blocks required to move from an ad-hoc/reactive approach to a more repeatable and proactive strategy.<sup>1</sup>

Let's start by defining risk. A risk is process variation (or uncertainty) and its impact on the output (or exposure) of that process. To put it another way, risk equals the product of exposure and uncertainty. Risk applies to all organizations, across all industries, in all processes and in all applications and technologies. If controls are not in place to ensure the desired outcome of a process each time it is performed, the result is process variation with potentially undesirable outcomes or exceptions.

Risks are also inherent in business strategies that organizations employ. For example, take the risk of supply interruption where the source of supply to an organization is impeded by some internal or external factor, causing a delay in operations. This can trigger a cascading effect on supply to a customer and affect customer service levels, costs (due to expediting charges and inefficient production runs) and lead times. The business strategies that can cause this risk to manifest itself are the same strategies that "best-in-class" organizations are employing to improve their supply chains and cost performance. Low-cost country sourcing (LCCS), outsourcing, single sourcing (as opposed to sole sourcing, where there is no other option) and lean operations – eliminating supply redundancies and costs where possible – all allow organizations to realize lower costs and higher margins, and sometimes improve quality and performance. However, strategies like these have increased the risk of supply interruptions. If not properly mitigated, there can be a direct correlation between an increase in supply chain efficiency and an increase in supply interruption risk.

These strategies are inherently more risky when considering supply assurance (which is the opposite of supply interruption). By executing the LCCS strategy, organizations expose themselves to risks and issues that previously caused no impact. Terrorist attacks, natural disasters, tariffs and trade agreements, and customs, for example, now impact the continuity of supply and supply lead time. Outsourcing can reduce the visibility of sub-tier supply networks, thus exposing the company to supply issues over which they have little or no control. Single sourcing can improve product quality and replenishment lead times due to the strategic nature of the relationship between the two companies and the collaborative effort to improve the processes within their customer-supplier supply chain. However, the more dependent a company becomes on a single supplier, the greater the risk of supply interruption if that supplier has financial, operational or regulatory problems, or is subject to external factors that impact operations.

<sup>1</sup> Terms "ad-hoc" and "repeatable" from Protiviti's adapted version of Carnegie Mellon's Capability Maturity Continuum.

## Risk management

Now, let's define risk management. Risk management is the process of monitoring and managing risk exposure. By proactively managing the risk to either reduce the impact or the likelihood of occurrence, or by having contingency plans, that same risk can ultimately increase market share, reduce costs, improve process performance, improve customer service and so forth. Risk management can also entail exploiting risks where possible. For example, if a risk impacts your competitors and you are adequately prepared to mitigate or respond to the risk, it could give your company a competitive advantage.

Putting the concepts together, we have supply risk management, the process by which customer “supply” and all components of supply chain – from planning to production, inventory management and distribution – are considered when identifying, measuring and monitoring potential disruptions of product availability to the end customer, and mitigating these risks through preventive, detective or monitoring controls. Product supply from the customer perspective can be internal to an organization (component and finished goods manufacturing, packaging and labeling) or externally based (raw material and component suppliers, contract manufacturers, etc.).

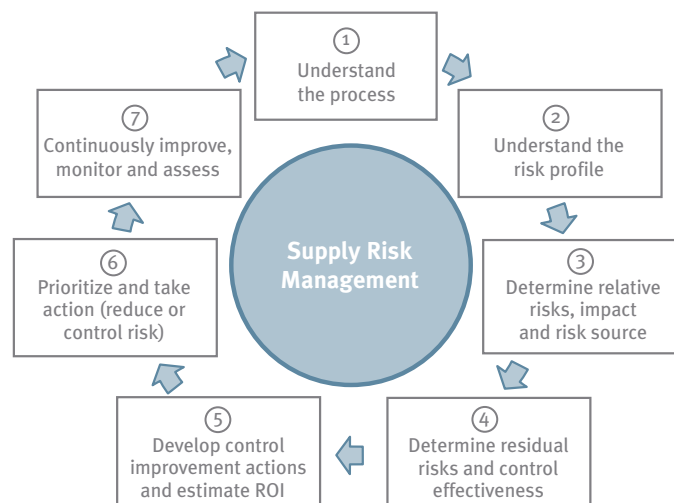
Supply interruption risks cover a broad scope, from supplier-centered risks (bankruptcy, financial insolvency, performance issues, end of life or discontinued products), external or environmental factors (regulatory, legal, natural disasters, etc.), internal factors (under forecast, manufacturing capacity or quality issues, warehousing, failure of critical systems, etc.) or other supply chain issues (product damage during distribution, labor strikes, geopolitical events, etc.).

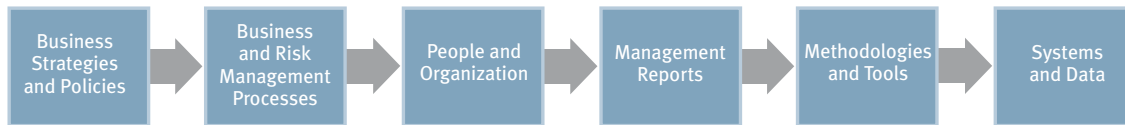
## Determining risk management capabilities

Protiviti uses a seven-step approach to assess a company's supply risk and applies a number of methodologies in helping companies identify, measure and manage risks associated with their business.

Effective risk management involves more than just defined processes and methodologies. It requires a supporting infrastructure that starts with an executive-led strategy, and is enabled by real-time and actionable information for decision-making from capable systems.

While this is a process-based approach, systems play an integral role and can be used at various stages. The starting point for supply risk management lies within the sales and operations planning processes and systems, including forecasting, demand and supply planning, inventory optimization and trade promotion management. Enabling technologies, such as Oracle's Demantra solution, can be used to manage the impact, risks and variability in the process. Modeling applications, like Oracle's Strategic Network Optimization solution, also can be used to calculate and quantify the impact of potential supply interruption risks and prioritize response plans. These applications, along with Oracle's Inventory Optimization application, make up the advanced planning suite, which delivers scenario planning and advanced optimization capabilities to support contingency planning and alternate sourcing strategies to address supply chain risk management (SCRM) solutions.





Protiviti defines (as illustrated above) the required capabilities as the Risk Management Infrastructure (RMI), which includes: Business Strategies and Policies, Business and Risk Management Processes, People and Organization, Management Reports, Methodologies and Tools, and Systems and Data. These six elements comprise a holistic view of risk management, taking into account all the things that can be used to identify, measure and manage risks, rather than considering just processes or reports. If one element is deficient, the entire process will not be effective.

Supply chain risk management is the combination of the RMI elements to:

- Determine appropriate risk management strategies and policies for initial and continuous risk identification and management
- Implement the processes to identify, monitor, report and mitigate the risks
- Train people in risk management practices and concepts and embed risk management in the organization's culture
- Define risk management identification and mitigation methodologies (strategic sourcing, supplier risk assessments, supply market risk assessments, etc.)
- Develop the metrics and reporting capabilities for management to identify and monitor risks
- Use supplier-specific and market-based data and decision support systems as the foundation for risk management processes

## Putting it all together – improving supply risk management capabilities

Supply risk management has been the topic of many recent studies, articles and white papers, and has garnered a lot of attention as a result of the Sarbanes-Oxley Act of 2002, terrorism, hurricanes and other natural disasters, and other well-known supply interruptions. However, most of the publications discuss best-in-class case studies. These model companies have mature supply chains and even have dedicated and robust supply chain risk management organizations. The articles and white papers don't cover the basics that companies need to address for this emerging concept. Before implementing a systemwide advanced decision support modeling system that is fully integrated with your entire supply base and coupled with predictive risk analytics and robust contingency plans, you must first define what your risks are. Crawl before you walk, walk before you run, and then you can work on running a five-minute mile.

All companies that deliver products to a customer are exposed and at risk of supply interruptions. There are a number of symptoms or indicators of need that, if present, should be given immediate attention. These include:

- Recent supply interruptions
- An increase in supply lead times from suppliers
- Supplier capacity issues and constraints
- Declining supplier product quality or performance
- Regulatory changes
- Global sources of supply or recent supplier rationalization and consolidation initiatives
- Heavy reliance on outsourcing
- Use of single/sole sourcing arrangements for critical items
- Recent change in sourcing strategy or internal process changes
- Use of lean or JIT inventory principles
- Vendor managed inventory or integrated supply relationships

So, what's next? Start with the basics and set the foundation. Define and build the components across each of the six capabilities to allow for a repeatable process, and then improve from there. Conduct internal risk assessments to understand which risks have significant impact or are most likely to occur in your organization. Conduct similar risk assessments that are externally focused through your supply chain and critical sources of supply (suppliers, contract manufacturers, distribution centers, etc.). Look at recent internal audit reports around supply chain functions, and look at historical reports to see if there are trends or recurring themes. If you are required to comply with Sarbanes-Oxley, you likely have Section 404 documentation of your inventory, manufacturing and procurement processes, and the identified financial reporting risks, controls and control gaps. This documentation is a starting point for understanding your risks and exposures and should be expanded beyond financial reporting risks into operational- and financial-related risks. Define the metrics needed to measure and monitor risks. Perform spend analysis to answer the basic questions: How much do you spend, with whom and for what? From there, you can begin to understand your commodity profile, your risk areas and supplier dependencies, and begin working on plans to understand specific risks for critical commodities or sources of supply and distribution. Build basic models to assess the financial viability of key suppliers on an ongoing basis. Then, work outwards and focus on supplier development programs to address second-tier suppliers, and implement the planning systems and the analytical and exception management systems required for a fully integrated supply chain and all of the other best-of-breed practices and concepts that are widely written about.

More mature organizations can assess risks using financial measures to further prioritize potential issues and opportunities. Existing controls should be documented, control design effectiveness assessed, and control operating effectiveness tested to determine likelihood or probability of risk occurrence and subsequent residual risks. Process improvements or control mitigation plans should be prioritized based on a return on investment (ROI) calculation.

When it comes to managing the risk of supply interruption to your customers, it is critical to not only understand the risk profile of your supply chain, but also what mitigating controls are in place, how effectively they are designed and operating, and where the residual risks lie that need to be addressed. Organizations need to determine the effectiveness of their risk management capabilities and what the future state should be based on appetite for risk, then develop action plans to improve capabilities.

Regardless of how you go about it, your organization needs a framework to not only understand and address current supply risks, but also to develop and implement repeatable strategies, processes, organizational structures, skills and training programs, management reporting tools and risk management methodologies, as well as underlying systems for ongoing supply management. If left unmanaged, supply interruptions can have a disastrous effect on the bottom line.

As companies move up the adoption curve of supply risk management, enabling technology like Oracle's SCRM solutions will become the differentiator in how effective the process is by increasing the data velocity and transparency of supply chain events and transactions, allowing organizations to get inside the competitors' decision cycle – gathering, analyzing and responding to information before competitors can.

Companies can realize the following benefits by building sound supply risk management capabilities:

- Clear knowledge of supply risks and prioritized risk mitigation plans
- Aligned and integrated views of risk and risk management across the organization
- Improved supply chain performance and integrity
- Reduced supply chain risk and variability
- Continuous vigilance against business interruptions and earnings losses
- Increased confidence of investment community and stakeholders
- Enhanced corporate governance and operational control environment
- Strategies and tactics for increased supply assurance and improved supply chain continuity planning
- Increased profitability and bottom-line savings from cost-effective mitigation plans, and reduced expediting, disaster recovery and other unexpected costs
- Successful response to changing business environment, market conditions and catastrophic events

## About Protiviti

Protiviti ([www.protiviti.com](http://www.protiviti.com)) is a leading provider of independent risk consulting and internal audit services. We provide consulting and advisory services to help clients identify, assess, measure and manage financial, operational and technology-related risks encountered in their industries, and assist in the implementation of the processes and controls to enable their continued monitoring. We also offer a full spectrum of internal audit services to assist management and directors with their internal audit functions, including full outsourcing, co-sourcing, technology and tool implementation, and quality assessment and readiness reviews.

Protiviti, which has 60 locations in the Americas, Asia-Pacific and Europe, is a wholly owned subsidiary of Robert Half International Inc. (NYSE symbol: RHI). Founded in 1948, Robert Half International is a member of the S&P 500 index.

## Protiviti's Supply Chain Solutions

Protiviti's supply chain solutions help clients identify, manage, measure and monitor risks within their supply chains and develop the ability to improve process performance, reliability and control in a cost-effective and efficient manner.

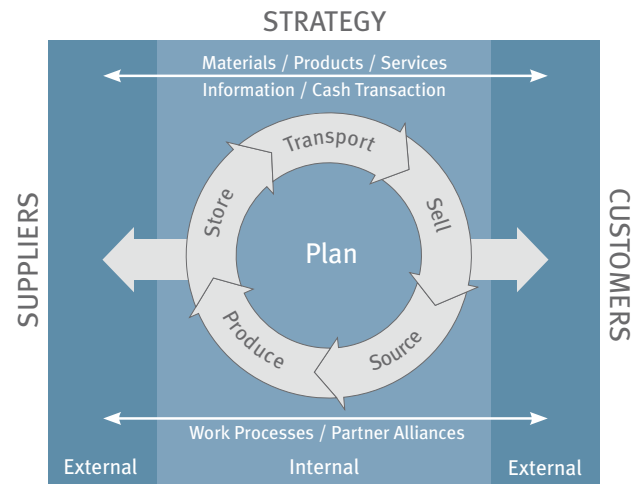
Our methodologies allow us to understand our clients' supply chain processes, capabilities and risks, assess the current state of these areas, identify any gaps, benchmark best practices, and facilitate a system selection and implementation. We develop prioritized actions and customized recommendations to support our clients' strategies and organizations as a whole.

Our scope of services is defined by an adapted version of the Supply Chain Council's Supply Chain Operations Reference (SCOR) model, with an emphasis in the following areas:

- Sales and Operations Planning
- Sourcing and Procurement
- Inventory Management and Control

Our approach to supply chain management risk consulting includes:

- Risk Assessments and Controls Improvement
- Benchmarking and Capabilities Assessments
- Process Improvement/Transformation
- Optimization and Cost Reduction
- Software Selection and Deployment



For more information about the topics covered in this white paper or Protiviti's supply chain risk consulting practice, please contact:

Christopher Monk  
713.314.4970  
[christopher.monk@protiviti.com](mailto:christopher.monk@protiviti.com)

# Supply Chain Risk Management



In today's fast-moving world, competitive markets require companies to adopt supply chain solutions that can profitably cope with a myriad of geographically diverse suppliers, production facilities, distribution centers, subsidiaries and vertical target markets. Managing these elements to maximize profit in the face of a constantly changing environment requires a methodology by which process and technology enablers come together to create a risk-optimized management strategy as a way to stay competitive.

Companies no longer can rely on a mix of spreadsheets and guesswork traditionally used to make key strategic decisions. Implementing a best-of-breed approach to supply risk management provides companies with a considerable competitive advantage in the face of supply disruptions.

Proactive risk management helps companies of all sizes eliminate problems caused by supply chain inefficiencies, and leads to improved profitability by allowing organizations to make decisions that enhance supply chain resilience and enable quick responses in the face of disruptive events.

## Supply Chain Resilience

Anticipating risk requires that companies analyze a wide range of possible scenarios to minimize the impact of both planned and unplanned supply chain variability.

Decision support tools, such as Oracle's Advanced Planning Solution, provide leading companies with the insight needed to design robust, profitable supply chains and tackle many of the most intractable questions facing supply chain executives, such as:

- Where should I hold inventory to remain profitable when unplanned events occur?
- How do I manage currency and commodity hedging strategies to minimize risk and maximize profits in my supply chain?
- What is my risk related to single sourcing materials?
- What is the total cost of outsourcing, including the impact on inventory, working capital and cash flow?
- What are the "choke points" in my supply chain?
- How should I rationalize assets?
- What is my most profitable product mix?

Built on a set of sophisticated algorithms, Oracle's risk management solution lets companies take into consideration all the factors relating to the situation being examined, ensuring the proposed decision is truly the optimal solution. The impact of these potential solutions is always reflected in the current sales and operations plan to keep managers in control of risk mitigation strategies.

Optimized planning lets companies of all sizes manage their networks effectively, so they incur the lowest cost for producing each product they sell, while minimizing supply chain risk and maximizing revenues.

## Disruptive Events

Supply chain disruptions are often unavoidable, but the ability to quickly and intelligently respond to these events can provide companies with a valuable competitive advantage.

In the face of unplanned events, such as a hurricane or flood, dynamic sourcing decisions can be made to help companies minimize their exposure and maximize their profits. Oracle's risk management solution delivers the capability to optimally respond and analyze an infinite number of disruptive events, and answer tough questions, such as:

- What impact does a 30 percent increase in fuel price have on my profit margin, and should I change supply source and/or product mix in response to this increase?
- If demand in Asia grows dramatically, how will that impact my go-to-market strategy for Europe three months from now?
- How do I deal with a power outage at my critical component plant?
- If my contract manufacturer goes on strike in two weeks, how will I continue supplying products to my most important customers?
- If my main inbound port has a shutdown and I cannot deliver goods to my most profitable customers, how much money will I lose?

Contingency planning to accommodate catastrophic events enables companies to survive in an uncertain world. Only by considering all the data relating to the supply chain do companies stand a chance of making the most cost-effective and least risky decisions for both short- and long-term profitability.

With Oracle's Advanced Planning Solution, companies can be assured they're making the right decisions even before they put them into effect. These decisions are truly optimized because they're based on all the facts, not on guesses. And in a tightly competitive market, the power to make the right decision at the right time – quickly and easily – can be the biggest benefit of all.

Sidebar author: Brian Vazquez, Oracle Corporation  
Contact: 415.577.7901 or [Brian.Vazquez@Oracle.com](mailto:Brian.Vazquez@Oracle.com)

Worldwide inquiries and Oracle information: 650.506.7000 and [oracle.com](http://oracle.com)



Protiviti and Oracle provide this document for information purposes only and the contents hereof are subject to change without notice.

This document is not warranted to be error-free, nor subject to any other warranties or conditions, whether expressed orally or implied in law, including implied warranties and conditions of merchantability or fitness for a particular purpose. We specifically disclaim any liability with respect to this document and no contractual obligations are formed either directly or indirectly by this document.

Oracle is a registered trademark of Oracle Corporation and/or its affiliates. Other names may be trademarks of their respective owners.

Protiviti is a registered trademark of Protiviti Inc. and/or its affiliates.

*Protiviti is not licensed or registered as a public accounting firm and does not issue opinions on financial statements or offer attestation services.*