

A “To Do” List to Improve Supply Chain Risk Management Capabilities

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Executive Summary

An emerging high priority issue for supply chain executives to address is how to enhance operations to deal with supply chain disruption risks. In light of the events surrounding 9/11, the West Coast Port strike, the Iraq war, and the increasing development of global manufacturing operations in Eastern Europe and Asia, many executives are realizing that these extended supply chains are exposing their enterprises to an increased level of risk, unparalleled in our history. Many companies are now finding that a major disruption to the supply chain can have a lasting impact on the financial picture, not to mention shareholder value. To address the emerging need for supply chain risk management, the authors present eighteen best practices and “to do” items for enhancing operational resiliency and responsiveness to supply chain disruptions. The best practices are based on findings from a research project sponsored by General Motors, and conducted by the North Carolina State University Supply Chain Resource Consortium. The research team interviewed different organizations in various industries, and explored post event analysis of several major disruption events. A recommended path forward for adopting these best practices is also discussed.

With the movement towards global sourcing, many companies are now recognizing the increased level of supply chain risk that exists in these global distribution channels. While global sourcing affords many benefits in the form of lower price and expanded market access, manufacturing and customer service executives recognize that there is also an increased potential for and magnitude of product and service flow disruptions. Top executives must now manage supply chain risks, just as they must manage other risks that impact business performance. In a recent survey by FM Global and Harris Interactive, 69% of CFOs, Treasurers, and Risk Managers of Global 1000 companies in North America and Europe consider property related hazards (i.e., plant fires and explosions) and supply chain disruptions as major threats to top revenue sources (Green, 2004). Recent studies have also shown that supply chain disruptions can be very costly, and of the same magnitude of impact as other crises (Hendricks and Singhal, 2003, Knight and Pretty, 2002).

The challenge to managing supply chain risks is that supply chain disruptions can occur for a wide variety of reasons such as industrial plant fires, transportation delays, work slowdowns or stoppages, or natural disasters. Companies running lean operations no longer have inventory or excess capacity to make up for production losses, so that material flow problems rapidly escalate to wide-scale network disruptions. From the customer point of view, the customer doesn't care which disruption occurred; s/he still expects the final product or service delivered at the right time and price. Thus it falls on operations to handle these disruptions in real-time.

To better understand the current state of affairs in supply chain risk management, General Motors challenged the NC State Supply Chain Resource Consortium (SCRC) to assess the current state of supply chain risk management capabilities across multiple industries, and identify best practices that companies are using to assure uninterrupted global material availability in a lean operating environment. The SCRC conducted interviews with key executives in multiple industries, hosted focus group discussions, and participated in meetings with executives that led to the discovery of key themes and common best practices with respect to the management of supply chain disruptions. Some of the companies interviewed performed post-event root cause analysis of several major disruptions, and identified preventative measures that firms can use that go beyond simple disaster recovery planning or crisis response. Moreover, the actions and lessons learned from these interviews reveal that best-in-class companies are proactively seeking to build *responsive and resilient supply chains* that can withstand the impact of major supply chain disruptions and catastrophes, without impacting the end customer and without incurring excessive recovery costs. Although many of these solutions require advanced planning, investment, and resources, the dynamic nature of the changing global supply chain environment dictates that the company with the most resilient and responsive supply chain in the future will have a sustainable competitive advantage over other firms.

What Can Companies Do To Enhance Supply Chain Risk Management Capabilities?

Based on our interviews, we developed a list of eighteen different best practices that companies can explore to enhance supply chain operational resiliency and risk management. We have also classified the options by matching them up with the organizational functions that would typically implement or own the specific supply chain risk management capability. Figure 1 shows the four key organizational areas that already have some supply chain risk management capabilities and responsibilities. Note that the risk management matrix in Figure 1 divides risk management responsibility by internal operations or external supply base interface on the horizontal axis, and current or future business on the vertical axis.

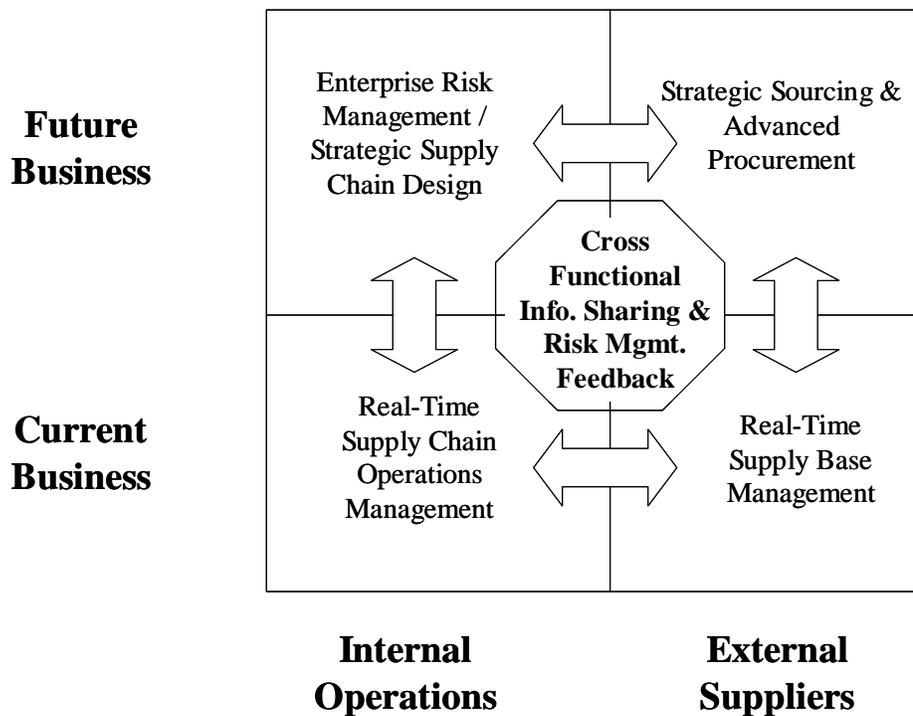


Figure 1: Organizational Functions With Supply Chain Risk Management Capabilities and Responsibilities.

While these groups often already have risk management processes in place, we are now explicitly recognizing supply chain risk management as a core competency for these four groups, and highlighting that there must be regular cross-functional multi-directional information sharing and feedback into the inter-dependent risk management responsibilities. For example, if the real-time supply base management group is observing a type of risk event repeatedly disrupting material flow at suppliers located in a particular country, they can feed the information back to the strategic sourcing group to make sure that the risk event is explicitly considered in future business sourcing decisions. Similarly, the Enterprise Risk Management / Strategic Supply Chain Design Group can pass down information to the Real-Time Supply Chain Operations Group on things such as material flow hedging strategies or contingency plans evaluated for most effective response to key port disruptions. In addition, the two strategic future business groups, and the two current business operations groups must interact to coordinate decisions and actions made for more effective risk management, with the strategic level handling proactive risk management and the operational level handling reactive risk management responsibilities. Next we discuss the eighteen best practices for supply chain risk management and assign them to the four key functional groups that normally have the risk management capability and responsibility.

Eighteen Best Practices For Supply Chain Risk Management

Strategic Sourcing or Advanced Procurement primarily deals with developing supply market intelligence, developing sourcing strategy, negotiation with core suppliers, and finalization of contracts for material or service supply. The strategic sourcing process

typically includes some supply base risk management already, but we highlight some additional best practices that companies can adopt to enhance the strategic sourcing process.

1. Screen and monitor (regularly) current and potential suppliers with respect to potential supply chain risks through self-assessment templates or internally developed risk scoring methods (which can include risk metrics on quality, financial condition of supplier, technology leadership, price competitiveness, location risk exposure, shipping modes and routes exposure, etc.) to identify high likelihood/high severity potential disruptors, for use in the RFQ evaluation process. Note that the ongoing monitoring of current and potential suppliers naturally includes maintaining a database of suppliers and tracking assessment results, or risk scores over time.
2. Require critical suppliers to produce a detailed plan of disruption awareness, and to identify supply chain risk management capabilities that can be executed if disruptions occur in the supplier's own supply base network. The supplier business continuity plan should be reviewed as part of the bid evaluation process. The strategic sourcing group can work with the chosen supplier(s) to improve those plans if necessary as part of the bid acceptance contracting process.
3. Include expected costs of disruptions and operational problem resolution in the total cost equation derived through the strategic sourcing decision process.
4. Require suppliers to be prepared to provide timely information and visibility of material flows that can be electronically shared with your enterprise.

Supply Base Management deals with the ongoing day-to-day interaction with existing suppliers as well as the transport of the material from these sources to domestic warehouses and points of use. Modifications include:

5. Conduct weekly teleconferences with critical suppliers to identify current issues that may disrupt daily operations, and tactics to reduce them. Option 1 in the previous section (screening and monitoring of suppliers) can provide input into the teleconferences and a method to track effectiveness of tactics implementation.
6. Seek security enhancements that comply with new initiatives in Customs-Trade Partnership Against Terrorism, Container Security Initiative, and others.
7. Test and implement technologies (e.g., RFID) to track containers in distribution channels to enhance global pipeline inventory visibility.
8. Conduct a detailed disruption incident report and analysis following a major disruption event, using root cause and/or failure mode and effects analysis (FMEA) to learn from and prevent recurrence of similar events.
9. Create an “Exception” Event Detection and Early Warning Systems to discover critical logistics events that exceed normal planning parameters on an exception basis, which can trigger managerial action to mitigate the impact of the disruption.

10. Gather supply chain intelligence and monitor critical supply base locations to allow real-time sense and response maneuvers against material flow disruptions.

Real-Time Operations Management includes all processes from the point of delivery by the supplier and the banks/buffers of inventory held at warehouses, manufacturing locations, and distribution centers. Notice that we have deliberately separated internal operations management with external supply base management to differentiate risks that are internally and externally facing. Options to improve resiliency include:

11. Improve visibility of inventory buffers in domestic distribution channels at a part-level, to assist real-time contingency planning and mitigation execution.
12. Classify buffered material for different levels of criticality to ensure appropriate inventory positioning (safety stock) to mitigate risk of disruptions.
13. Train and educate key employees and groups to improve real-time decision-making capabilities, and equip managers and associates with plans and processes for managing disruptions when and if they occur.
14. Develop real-time supply chain reconfiguration decision support, to enable evaluation and execution of contingency plans in response to disruption discovery.

Enterprise Risk Management / Strategic Supply Chain Design includes system-wide issues pertaining to disruptions, including system-wide supply chain redesign issues.

15. Develop predictive analysis systems, incorporating intelligent search agents and dynamic risk indexes at major nodes in the supply chain to identify potential problems (including likelihood of occurrence and potential impact if the disruption occurs).
16. Construct damage control plans for likely disruption scenarios, by modeling supply chain events and using scenario envisioning tools.
17. Utilize supply chain redesign tools and models to understand cost tradeoffs between strategies such as increased inventory, premium freight, parts substitutability, or manufacturing process flexibility.
18. Enhance system-wide visibility and supply chain intelligence, in the form of improved databases collecting daily or hourly snapshots of demand, inventory, and capacity levels at key nodes in the supply chain, including ports and shipping locations.

How Can Companies Prioritize the Best Practices For Adoption and Integration into Business Processes?

Clearly, some of these actions can be taken with a minimal level of investment, and should yield immediate benefits. Other elements will require additional effort and business case justification for the significant investments to deploy (e.g., visibility systems). Companies may want to use the best practices list as a thought-starter to determine a priority order of supply chain risk management elements to strategically

pursue for adoption and integration. At a minimum, organizations need to develop a focused long-term plan for building supply chain resiliency and responsiveness, which identifies the short-term actions that can be deployed with a minimum of investment, while establishing a roadmap for deploying intensive project team resources, business intelligence systems, and improved supply chain infrastructure.

A second possible use of the eighteen best practices is to develop a survey to measure current awareness and internal business knowledge of supply chain risk management capabilities and responsibilities across a company. For example, for each of the best practices, the survey participants (company employees) can be asked to rate the company’s risk management capabilities on a 5-point scale defined as follows:

Table 1: 5-point rating scale for assessing awareness and knowledge of a company’s internal supply chain risk management capabilities.

Subjective Rating	Points Assigned
We do not perform this activity	0
We perform this activity, yet significantly below the needed level	1
We perform this activity, yet below the needed level	2
We perform this activity, yet slightly below the needed level	3
We perform this activity at the needed level	4

Survey data can then be analyzed to identify strengths and weaknesses as perceived by the survey participants in the different supply chain risk management capabilities and best practices. The priority list for short term action and longer term action can then be

developed based on the survey benchmark of the company's own internal assessment of supply chain risk management capabilities.

To our knowledge, no companies we reviewed or are aware of, have achieved all of these supply chain risk management best practices in their purchasing and supply chain organizations. However, there is definitely a new awareness and recognition among global companies that they need to develop better risk management capabilities and responsibilities in their procurement and supply chain operations.

References

1. Green, "Loss/Risk Mgmt. Notes: Survey: Executives Rank Fire, Disruptions Top Threats," Best's Review, Sept. 1, 2004
2. Hendricks and Singhal, "The effect of supply chain glitches on shareholder wealth," J. Ops. Mgmt., Vol 21, 2003, pp. 501-52
3. Knight and Pretty, "The impact of catastrophes on shareholder value," The Oxford Executive Research Briefings, February 2002, 22 pages.