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Can you Measure your Supply Chain Resilience?

BY TIMOTHY J. PETTIT, JOSEPH FIKSEL, PH.D. AND KEELY L. CROXTON, PH.D.

As a supply chain manager, what keeps you up at night? Is it supplier deliveries, rising costs, price competition or equipment failures? No matter what the issue, the business environment is always changing and change creates risk.

According to Deborah Wince-Smith, President of the Council on Competitiveness, “Managing this rapidly changing risk landscape is an emerging competitiveness challenge—a challenge that demands resilience."

“Resilience” has become a buzzword with supply chain leaders, guest speakers and consultants, but what does resilience actually mean? How is it measured? To answer this you need to understand what creates your ability to be resilient. This is exactly what the Center for Resilience and the Fisher College of Business at The Ohio State University are investigating. Let’s begin with an example.

A recent natural disaster brought most of Japan’s automobile manufacturers to a halt for several days. On July 16, 2007, an earthquake measuring 6.8 on the Richter Scale hit central Japan. The quake severely damaged the facilities of Riken Corp., a supplier of automobile components including specialized piston rings. Riken originally located all of its plants into one area of Japan to increase efficiency, but this strategic decision made the entire production capacity vulnerable to a catastrophic incident. Therefore, the combination of concentrated production, low inventories and lack of alternate suppliers created supply chains that were highly vulnerable to production and distribution disruptions. Firms must determine whether the expected benefits of policies such as centralization and limited sourcing outweigh the costs of potential disruptions. However, to make this decision, supply chain managers must be able to measure their current state of resilience while evaluating options to reach their desired state of resilience.

WHAT IS RESILIENCE?

Resilience is defined as the capacity of a system to survive, adapt and grow in the face of change and uncertainty. Resilience is a feature of complex systems such as companies, cities or ecosystems. Systems evolve through cycles of growth, accumulation, crisis and renewal, and even self-organize into new, more desirable configurations.

In a world of technological change, financial risk, political turbulence and mounting regulatory pressures, industrial growth does not always proceed smoothly. Risk management is especially challenging when threats are unpredictable. Thieves and terrorists are adapting to even the newest security measures. At the same time, corporations are accepting broader responsibility for the social and environmental impacts of their supply chains. Each part of an enterprise has a role to play in creating and maintaining resilience.

A resilient enterprise has the capacity to overcome disruptions and continually transform itself to meet the changing needs and expectations of its customers, shareholders and other stakeholders.

All enterprises rely on their suppliers to maintain smooth operations and their customers for continued revenue. Therefore, an enterprise is truly only as resilient as its supply chain.

Developing a methodology to optimize the resilience of your supply chain was the goal of this project.

A new conceptual framework for supply chain resilience was developed through collaboration between the Fisher College of Business and the Center for Resilience. The foundation of this framework defines optimal resilience as the balance between vulnerabilities (fundamental factors that make an enterprise susceptible to disruptions), and capabilities (attributes that enable an enterprise to anticipate and overcome disruptions). Figure 1: Optimal Resilience

Figure 1: Supply Chain Resilience Framework

Figure 2: The Zone of Resilience
or creating excessive risk through less than optimal capabilities. This concept is depicted in Figure 2.

Further research categorized vulnerabilities to supply chain disruptions and the capabilities used to overcome them through the integration of literature and insightful focus groups with a world-class, global manufacturing firm. The final list consists of seven vulnerabilities such as turbulence, deliberate attacks and supplier reliability, and 14 capabilities such as anticipation, flexibility, recovery and adaptability. By combining both vulnerabilities and capabilities, the supply chain resilience framework allows assessment of supply chain resilience for the first time.

**HOW TO MEASURE YOUR RESILIENCE!**

The Supply Chain Resilience project refined the 21 factors into measurable attributes. The resulting Supply Chain Resilience Assessment and Management (SCRAM™) tool is based on the framework and incorporates the complete spectrum of resilience factors. Assessment scores provide leadership with recommendations for directing improvement. This secure, on-line tool is now being validated with a select group of global manufacturers who understand supply chain resilience as a critical factor to success and see the need to integrate it into their business strategy to create a new competitive advantage.

Jack Welch, former CEO of General Electric, wrote in a recent *Business Week* segment that resilience should be on every manager’s must-have list “...because anyone who is really in the game messes up at some point.” He concludes that “The most successful people in any job always own their failures, learn from them, regroup and then start again with renewed speed vigour and conviction.” This perspective spells out the heart of the issue. The Supply Chain Resilience framework offers a tool for understanding and measuring Resilience.

**FOOTNOTES:**


Timothy J. Pettit is a Lieutenant Colonel, U.S. Air Force and a Doctoral Candidate with Fisher College of Business, The Ohio State University.
Joseph Fiksel is a Senior Research Scientist, Industrial, Welding & Systems Engineering and Executive Director, Center for Resilience, College of Engineering, The Ohio State University, and Keely L. Croxton is Associate Professor of Logistics, Fisher College of Business, The Ohio State University.

The views expressed in this article are those of the authors and do not necessarily reflect the official policy or position of the Air Force, the Department of Defense, or the U.S. Government.