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BY LARRY LAPIDE

Don't Forget Supply-Side Risk

As the global environment becomes more uncertain, managers need to pay greater attention to risks on the supply side. A technique called decision analysis can help.

Supply chain managers are reconciled to the fact that customers are fickle. They understand that demand is uncertain and forecasts and plans are invariably inaccurate. They've become adept at coping with demand uncertainty by using various buffering strategies including the deployment of inventory safety stocks. When it comes to understanding and managing uncertainty and risk on the supply side, however, they are typically far less accomplished.

After the global crisis hit a few years back, I remember being on a panel at which we were discussing supply chain uncertainties, including the supplier risk that might arise from a dearth of credit in the financial supply chain. One of the other panel members agreed with my view that demand-side uncertainty might increase significantly because of the financial crunch. However, he refused to accept that the same could happen on the supply side. He could not envision any supply-side uncertainties that he couldn't manage around—and the audience agreed with him.

Managers take great pains engineering supply chains so that customer demand will be met: period! Internal and external supply sources know in advance what to do, and are prepared to keep goods flowing no matter what happens. The mindset is to plan well enough in advance. And if things don't go according to plan, you fix them later. Supply chain managers resort to expediting and redirecting shipments as well as changing plant schedules to produce goods on an emergency basis.

This *modus operandi* has worked over the years because the level of supply-side uncertainty was insignificant compared to the demand-side. On those occasions when supply went amuck, managers could figure out a way to respond, albeit sometimes inefficiently. However, things have been changing.

Global Forces Increase Uncertainty

To paraphrase the late comedian Gilda Radner, when you operate a global supply chain: "It's always something." Supply chains have gotten longer and more global, so chances have increased that some "bad" event coming from the supply side will disrupt them. The factors that can drive this supply-side turbulence and uncertainty—political, economic, Mother Nature, to name a few—seem to be intensifying every day.

Consider just a few examples: Credit is still hard to get, which puts the financial viability of small suppliers at risk, possibly cutting off the supply of production materials. The Japanese Tsunami and the Thai floods of last year disrupted the high-tech and automobile supply chains for some time. The Arab Spring caused the disruption of supply chains in those Arab World countries. Several Latin American countries are now more inclined to nationalize businesses—think about Venezuela, Argentina and Bolivia. Pirates continue to disrupt supply lines off the coast of Somali. Lastly, politicians around the world are expressing concern about the unemployment of domestic workers, putting outsourcing and off-shoring programs at risk.

Bad Things Can Happen to "Best Decisions"

Managers will need to employ risk management strategies to cope with the growing supply-side uncertainties. They'll need to understand the risks, make decisions recognizing possible impacts, and live with the reality that decisions will invariably lead to both good and bad outcomes. From time to time, they will regret decisions made and maybe even feel that they have lost control of supply chains. Will they be able to reconcile themselves to the reality that although they make the best decision possible, bad things might still happen?

A good example of a best decision leading to a bad outcome comes from the world of professional football. New England Patriots Coach Bill Belichick has been criticized for a decision made in a 2009 regular season game against the Indianapolis Colts. Conventional wisdom says that whenever it's fourth down and the ball is deep in your own territory (the 28-yard line in this case), you punt the ball to the opposing team so they have a long way to go for a touchdown. That's especially true when it's late in the game, you are winning by six points, and the other team only needs to score a touchdown and an extra point to win.

Belichick bucked conventional wisdom and decided to try to make the two-yard gain needed to get a first down and seal the game. The play failed. The Colts got possession of the ball, scored, and won by one point. Football fans thought Belichick made a bad decision. The next day, however, the *Wall Street Journal* published an article arguing that he made the best decision. The author argued that the Patriots had the best chance to win by relying on its offense to gain the yards needed because the Colts would almost certainly score in the time allotted—irrespective of where on the field they took possession of the football.

Decision Analysis Can Help

Given what's been happening on the supply side, managers are going to be making tougher decisions under uncertainty. Like Belichick, they'll need to recognize that the best decisions do not always lead to good outcomes—they just increase the chances of good outcomes. So how should supply chain managers go about making these decisions?

Decision analysis provides a framework that can help. The technique involves first understanding uncertainties, then their implications, and lastly deciding what to do. The analysis revolves around the development of a "Payoff Matrix" (see Exhibit 1). The example shown is for two possible decision options and three random outcomes. The rows represent alternative courses of action or decisions. The columns represent the random states of nature, or outcomes, that might occur. The entries in the matrix cells represent payoffs (for example, profits and margins) that would result when a decision is made and a given state of nature happens. So $Payoff_{12}$ would be the amount of payoff if Decision 1 was taken and State 2 occurred.

EXHIBIT 1

Example of a Payoff Matrix

Alternative Courses of Action	States of Nature: State 1 (e.g. Pessimistic Outcome)	State 2 (e.g. Most Likely Outcome)	State 3 (e.g. Optimistic Outcome)
Decision 1	$Payoff_{11}$	$Payoff_{12}$	$Payoff_{13}$
Decision 2	$Payoff_{21}$	$Payoff_{22}$	$Payoff_{23}$

Let's take a simple example of deciding how many hours to schedule plant production. Two scheduling decisions might be: (1) one 8-hour shift and (2) one shift with two hours of overtime. Three random states of nature might involve the availability of production materials—for example, Shortages, Adequate, and Surpluses. The payoffs might be in terms of plant costs. Payoffs would be comprised of all material and production costs including those associated with actions taken to execute "exception management" or contingency plans when an undesirable outcome occurs. For example, if shortages occurred, actions might involve expediting or redirecting materials, reducing overtime, or rescheduling plant activities.

A Payoff Matrix identifies the implications of what might happen should each of the decisions be taken and each random outcome occurs. There are a variety of criteria in decision analysis that can be used to ascertain the "best" decision for a company depending upon its risk aversion. For example, an optimistic risk-loving company might gamble to try to get the highest possible payoff, while a pessimistic risk-averter might gamble to get the largest of the minimum possible payoffs. Others might follow a scientific approach and estimate the probability that a given outcome might happen, and then pick the decision that optimizes the expected payoff.

The decision criterion selected will dictate the "best" decision a company ought to make relative to that criterion. Once decided, however, managers will need to recognize that even the best decisions don't always yield good outcomes. That's just they way it is when planning for today's riskier global supply chains.