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FUTURE-FOCUSED SUPPLY CHAINS

SUPPLY CHAIN STRATEGIES SHAPED BY THE FUTURE

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ABSTRACT: *Supply chain managers are used to dealing with uncertainty, but the business environment has become more complex and less amenable to traditional approaches to preparing for the unexpected. For example, when evaluating strategic possibilities managers tend to use historical data to construct a singular view of the future. Such a view is too limited because it fails to take account of the many ways in which events can unfold. A solution being developed by the MIT Center for Transportation & Logistics is future-focused supply chains. The new approach to managing uncertainty enables managers to consider multiple possibilities by simulating possible outcomes, aligning these scenarios with the company's strategic goals, and implementing change as rapidly as possible.*

Introduction

It comes as no surprise that supply chains have to flex with unforeseen events, yet companies are being caught off guard by the complexity and interconnectedness of the changes they now have to deal with. Unexpected twists in business fortunes are unfolding faster and more frequently. And this is happening in slow- as well as fast-moving industries; even the tortoises risk extinction if they fail to keep up with events.

To illustrate the interconnectedness and complexity, take, for example, the steep rise in commodity prices triggered by recent increases in trade tariffs and duties. Behind these price hikes is the increasing cost of oil as well as political and environmental concerns. A more specific example is the rising cost of car batteries owing to recent increases in oil prices. A key material in batteries is sulfuric acid, which has become more costly because of an increase in the demand for sulfur. The demand for sulfur has risen because more fertilizer is required to grow corn to supply the burgeoning biofuel industry: a complex sequence of events.

Unraveling these intricate skeins of happenings is difficult but necessary in order for companies to be prepared for the unexpected. Along the way they gain a deeper understanding of developments that have the potential to transform markets. An example is the Internet, which from its commercial inception has been accepted as a monolithic and universal means of communication that will continue to grow rapidly. Here is another plausible scenario: the Internet becomes fragmented as countries and even organizations decide to create parallel structures. If the Internet fractures in this way the consequences for global business are enormous. How many supply chain professionals have looked at the eventualities in light of their company's competitiveness?

To help companies build supply chains that compete successfully in unpredictable, convoluted business environments, the MIT Center for Transportation & Logistics (MIT CTL) is developing a new approach to managing uncertainty. Using research carried out as part of the multi-year Supply Chain 2020 Research Program, MIT CTL is creating a methodology for simulating and sensing unfolding events and turning this information into decisions that attune the organization's supply chain to the future. This white paper outlines the methodology.

The Supply Chain Dilemma

The increasing unpredictability and complexity of events is particularly problematic for supply chains, which must interact closely with external as well as internal entities in order to perform effectively. Further, as supply chains have become critical to competitiveness, they are driven to become rigid in order to meet efficiency and reliability goals. Unfortunately, these goals are very difficult to reconcile with the growing need for flexibility. This conflict is at the heart of future supply chain challenges.

The tension between rigidity and flexibility has increased even as the supply chain field has grown in scope and sophistication over the past 10 to 15 years. Even though numerous

enterprises can boast a high level of operational and tactical supply chain expertise, many still struggle to integrate the supply chain into their business strategies. Why? Because there is much more to managing supply chains than planning and optimization, particularly in an uncertain competitive environment. Now, more than ever, companies are venturing into uncharted territory with inadequate design and optimization tools and a myopic view of the future.

Such shortcomings can exact a high price. Take, for example, the supply chain-related problems that are seriously disrupting operations at Boeing, the aircraft manufacturer. The company is a veteran of complex manufacturing projects, yet it has found it necessary to repeatedly delay delivery of its prestigious 787 Dreamliner. At current estimates, the penalties Boeing will pay for these delays will amount to $3 to $4 billion over the next three to four years. It introduced a distributed manufacturing model for the new aircraft and did not anticipate a number of critical issues, most notably the challenges that come with managing a globally dispersed supplier network. The manufacturer now faces a number of strategic choices that are dependent on long-term trends, such as the emergence of new competitors and the structure of the air passenger industry in Asia.

"Knowing" the Future

Predicting the future is an inexact science at best, but organizations can do a great deal more to improve the way they anticipate and adapt to groundbreaking change.

When evaluating strategic possibilities, companies commonly rely on historical data to develop a singular view of the future. Locking into a single view of the future is a deeply flawed approach for making strategic investments and is at the core of many business and supply chain planning shortcomings. Forecasts essentially replicate history and present only those outcomes that are guided by events that actually happened. Yet there are numerous possibilities that failed to materialize in the past that had seeds of future realization embedded in them. Failing to capture past possibilities, the forecast has a limited view of what is plausible in the future. The future is open to multiple interpretations that may or may not become reality and are not anchored solely to the precedents of the realized past. As a result, we are always at risk of missing critical opportunities or dangers.

To effectively manage supply chains in today's turbulent markets, companies must be open to multiple possibilities. Also crucial is the ability to simulate and sense future events, and to creatively synthesize the information and turn it into quick decisions.

The Solution: Future-Focused Thinking

Instead of seeing the future as a backward-focused, single, linear path that starts in the past or the present, companies need to consider many paths and potential changes in direction. Future- focused organizations use the information about plausible futures to develop powerful strategies to shape their destiny; they think about real-world events as they unfold in curves rather than straight lines[1].

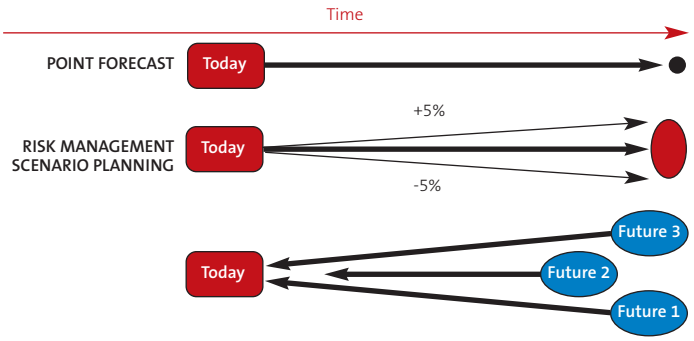

FIGURE 1. DIFFERENT APPROACHES TO EXPLORE THE FUTURE

How can companies develop such a mindset? As part of a research project MIT CTL has developed a three-step framework for the curved thinking approach to managing uncertainty.

Scenario Thinking

Simulating possible outcomes through scenario planning reveals both the kinds of uncertainty that companies face and potential courses of action. The scenarios can be constructed to explore particular business issues and environments or they can be more generic in nature (see the three examples in Figure 2 developed by MIT CTL). A powerful outcome of the exercise is the identification of trends and market developments that the company should be monitoring. For monitoring critical developments, "sensors in the ground" are developed that track vital information on the changes that are constantly impacting the business.

In addition to yielding valuable market information, scenario thinking sessions also help executives to "suspend their disbelief" in unorthodox outcomes. A major impediment to competing successfully in the face of uncertainty is that company leaders become tethered to established beliefs and accepted wisdom — in other words, hidden assumptions. It is

- Globalization and democratization
- Trustworthiness and integrity are crucial values in business
- Constantly shifting market demands and technological breakthroughs
- Frenetic pace of innovation and customization
- Critical role of knowledge workers

- People think and act locally
- Mistrust and security are highly sensitive issues
- Globalization restrained by nationalistic policies
- Trade barriers and national champions
- Secured energy resources
- Limited migration flows

- Interventionist policies of governments
- Complex web of conflicting regulations
- No international consensus
- Globalization remains strong but highly regulated
- Trustworthiness is a competitive advantage to compete globally

FIGURE 2. MIT CTL GENERIC SCENARIOS

crucially important that executives look past these hidden assumptions and be open to multiple possibilities rather than just the ones that are rooted in their past experience.

Strategy Alignment

The next step is to align the responses derived from the scenario thinking exercise with the company's strategic goals. In light of the learning from the scenario thinking, it may be necessary to modify these goals, but the ultimate aim of the exercise is to make sure that the actions taken to support the strategy are in synch with its overarching business objectives. A thorough knowledge of supply chain capabilities is a prerequisite to carrying out this step successfully. A misalignment between business strategy and supply chain strategy can undo all the potential gains of a well-crafted strategy. Similarly, any actions taken must maximize economic gain from invested resources, while minimizing disruptions and reducing the risk of introducing changes that run counter to the way the company operates.

Implementation and Development

Finally, executives look at the nuts and bolts of implementing the strategies they have decided to follow as a result of the previous two steps. There are a number of important considerations.

It is imperative that organizations be able to react quickly to market changes, since even the most meticulously planned strategy is likely to be undermined by real-world events. Companies that have formulated and rehearsed responses and are able to implement the required actions quickly can take advantage of unforeseen developments, and make course adjustments while slower competitors are still trying to find the right direction. Research has shown that speedy decision making is facilitated by a number of key factors, including the greater use of real-time information and the ability to examine alternatives simultaneously.

As the company implements new strategies that are informed by the future and develops the nimbleness needed to exploit change, it will gain insights for sustainable competitive advantage. These insights will come from the process of strategic thinking to design future-focused supply networks that will reveal the "forks in the road" (trade-offs) that will influence the organization's strategic direction. These insights should be treated as opportunities to fundamentally change the nature of the competition.

For example, cost and quality used to be considered antithetical. Choosing between the two represented a fundamental trade-off and companies developed strategies by selecting one and directing their efforts accordingly. Now,

leading companies consider cost and quality as two sides of the same coin and concentrate on their duality. The aim now is to build good quality at a lower cost, since poor quality leads to higher costs.

Also, having identified the "sensors in the ground" that the company needs to put in place, the enterprise can build on this knowledge by refining its network of sensors, thus continuously monitoring the competitive environment and alerting decision makers to significant changes.

Where Do You Stand?

Markets are becoming more volatile and business environments more treacherous; in response, supply chain professionals have to change the way they approach uncertainty. No organization can be in complete control of its commercial destiny, but with a future-focused mindset leaders can become more adept at navigating change. So, what are your sensors in the ground? What hidden assumptions permeate your organization? And what are the forks in the road that are limiting your strategic direction?

[1] We also refer to this as Curved Thinking

NEXT STEPS

For more information on MIT CTL's research on competing in uncertain business environments, and the three-step framework for adopting a curved thinking approach to managing uncertainty, contact Dr. Mahender Singh, at: msingh@mit.edu, or +1 617 253 1701.

For more general updates on this and other projects, subscribe to the MIT Center for Transportation & Logistics' free electronic newsletter, MIT Supply Chain Frontiers, at http://ctl.mit.edu/frontiers.