In Times of Uncertainty,

By Mahender Singh

“There are many of us dead now, we just don’t know it yet.” —Norman R. Augustine in “Reshaping an Industry: Lockheed Martin’s Survival Story,” Harvard Business Review, May-June 1997.

It will be a while before the dust settles on the ongoing market turmoil and a final tally is made of the losses. The unprecedented manner in which the fortunes of companies reversed abruptly has baffled most experts. Indeed, supply chains are not immune to this sudden change, and most were caught off guard as well. More worrisome, however, is the growing concern about the higher business environment volatility that will make the formidable task of managing global supply chains even tougher. The question is whether this is a temporary phenomenon or the dawn of a new business reality. Unfortunately, the recent changes in the social, political, technology, environment, and economic domains suggest that the business landscape has transformed irreversibly.

Unexpected demand and supply disruptions are the primary reasons preventing businesses from fully exploiting their capabilities in a profitable manner. Driven to maximize returns, most businesses organize their activities into two time-tested categories: strategy and execution. But not even the most exacting focus on these can guarantee a favorable outcome. In the end, it is the market that decides the winner—and that remains unknown until the financial results come out. Simply put, both strategy and execution are critical to business operations, but remain buried under a persistent fog of uncertainty. This is problematic since uncertainty forces decision-makers to place bets and take unknown, un-quantified risks.

In particular, uncertainty is the nemesis of flawless execution. By default, execution driven decisions gravitate towards quantitative models to find optimal solutions for mathematically formulated problems. The major drawback of this “optimization mentality” is that it leads to deterministic plans that fail to address uncertainty in a realistic manner. A turbulent business environment exposes this shortcoming by quickly making rigid plans irrelevant and ill advised. This is a core challenge for supply chain management, since its success rests squarely on execution. It is prudent, therefore, to review our approach to supply chain management in the context of a highly volatile future business environment.

In this article, we set forth a new view of supply chain management. Specifically, we explain why in a time of high uncertainty, it is critical to focus on the future for insights and directions instead of looking exclusively into the past (which makes perfect sense in a deterministic environment).

Constrained Supply Chain Views
Why has our conventional view of supply chain management become inadequate? As supply chains become increasingly central to business competitiveness, the pursuit of efficiency and reliability goals have forced them to become rigid. Unfortunately, these goals are very difficult to reconcile with the parallel and growing need for flexibility, which is required to deal with increasing business unpredictability. Intensifying this dichotomy is the fact that supply chains must interact closely with external as well as internal entities that tend to be located all around the globe.

Mahender Singh (msingh@mit.edu) is Research Director for the Supply Chain 2020 project at the MIT Center for Transportation & Logistics.
Predicting the future is an inexact science at best. And it’s likely to stay that way if we keep relying on past actions and assumptions to navigate us through an uncertain future. What’s needed instead is future-oriented scenario approach that prepares us for events that will unfold in an unpredictable, non-linear manner.

This tension between rigidity and flexibility has increased in scope and sophistication over time. Even though numerous enterprises can boast of a high level of operational and tactical supply chain expertise, many still struggle to fully integrate supply chains into their business strategies. Why? Because there is much more to managing supply chains than planning and optimization, particularly in an increasingly uncertain competitive environment.

Furthermore, companies are venturing into uncharted territory with inadequate capabilities, antiquated business processes, and decision support tools, coupled with a myopic view of future business needs that is uncertain at best. Consequently, supply chains must look beyond their operational heritage and assume a strategic role in enabling business success. Recognizing that many, if not most supply chain related investments tend to be partially irreversible, decision-makers must think long term to incorporate plausible future challenges, instead of simply focusing on current business imperatives. Just as importantly, supply chain implications need to be factored into all strategic business decisions.
One key reason for the current state of short-sightedness in the supply chain domain and the lack of attention it receives at the business strategy level is the mismatch between its state of the art and what is required to be effective at the corporate level and in the future. Going forward, supply chain decision-makers must be capable of thinking simultaneously at multiple levels such as contributing at the leadership table to prevent potential strategic blunders, responding to swift step changes in market, and finding innovative solutions to remain flexible yet operationally efficient. This is an uphill task for what has been so far an inward-focused, optimization-driven discipline.

**Learning from the Past**

Upon encountering extreme uncertainty, organizations tend to “hunker down” and switch to survival mode. A series of cost cutting measures are unleashed and the focus shifts to the very near term. Although justifiable and instinctual, it is not advisable to neglect the future upturn, which is unlikely to resemble the past. So, how should a company—and more specifically, its supply chain—address this dilemma and plan effectively for an uncertain future?

A typical recommendation when planning for the future is to look back and learn from past experiences. How can we replicate past successes? What would we do differently? How could the company avoid problems in the future? What operational changes need to be made? These are all valid questions and represent a logical approach to making sense of past developments. But this approach is seldom effective to prepare for the future given that repeated business and supply chain failures are common. As to why businesses fail to learn from—and take action based on—past events, consider the following points.

First, regardless of the lessons and facts confronting them, organizations inherently resist acting for the long term. When things are going well, initiating a change or moving in a new direction is almost impossible, since the emphasis is on exploiting the momentum, typically through greater focus on the present and higher operational efficiency. Unfortunately, the same effect is at play when facing a crisis; the emphasis, however, shifts to cutting costs and regaining confidence.

Second, learning what specific actions to prepare for the next downturn is a meaningless exercise in many ways. For even if the company can pinpoint what it did wrong in the past, the learning cannot be used as a guide to what to do in the future. The reason is simple: the future market and business realities will be different enough to render specific lessons ineffective; moreover, it is impossible to predict the timing of the next downturn.

The key is to selectively leverage what we have learned from the current and past events by following a structured and adaptable process in a disciplined manner. This, in turn, calls for the transformation of the organization’s cognitive and decision-making DNA. To this end, we propose an approach based on scenario thinking to help supply chain decision-makers channel their resources effectively and fundamentally change the way in which they explore the future and make decisions.

Scenario thinking is not a silver bullet, but it offers a way to incorporate future uncertainties more effectively into an otherwise highly quantitative and short-sighted decision making process.

**Companies are venturing into uncharted territory** with inadequate skills, antiquated business processes, and decision support tools, coupled with a myopic view of future business needs that is uncertain at best.

A typical recommendation when planning for the future is to look back and learn from past experiences. How can we replicate past successes? What would we do differently? How could the company avoid problems in the future? What operational changes need to be made? These are all valid questions and represent a logical approach to making sense of past developments. But this approach is seldom effective to prepare for the future given that repeated business and supply chain failures are common. As to why businesses fail to learn from—and take action based on—past events, consider the following points.

First, regardless of the lessons and facts confronting them, organizations inherently resist acting for the long term. When things are going well, initiating a change or moving in a new direction is almost impossible, since the emphasis is on exploiting the momentum, typically through greater focus on the present and higher operational efficiency. Unfortunately, the same effect is at play when facing a crisis; the emphasis, however, shifts to cutting costs and regaining confidence.

Second, learning what specific actions to prepare for the next downturn is a meaningless exercise in many ways. For even if the company can pinpoint what it did wrong in the past, the learning cannot be used as a guide to what to do in the future. The reason is simple: the future market and business realities will be different enough to render specific lessons ineffective; moreover, it is impossible to predict the timing of the next downturn.

The key is to selectively leverage what we have learned from the current and past events by following a structured and adaptable process in a disciplined manner. This, in turn, calls for the transformation of the organization’s cognitive and decision-making DNA. To this end, we propose an approach based on scenario thinking to help supply chain decision-makers channel their resources effectively and fundamentally change the way in which they explore the future and make decisions. Scenario thinking is not a silver bullet, but it offers a way to incorporate future uncertainties more effectively into an otherwise highly quantitative and short-sighted decision making process.

“Knowing” the Future

Predicting the future is an inexact science at best. Organizations can, however, do a great deal more to improve the way they anticipate and respond to the future step changes. When evaluating strategic possibilities, companies commonly rely on historical data to develop a singular view of the future. Yet, while locking into a single view is a deeply flawed approach for making strategic investments, it remains at the core of most long-term business and supply chain planning efforts.

Strictly speaking, forecasts replicate history, since they present outcomes that are based solely on actual events in the past. Forecasting ignores the numerous possibilities that came close to materializing, and whose seeds for future realization remain active even in the present environment. By relying exclusively on forecasts that offer a truncated view of what is possible in the future, we risk missing critical events. Consequently, to be useful, descriptions of the future should incorporate multiple plausible interpretations that go beyond the precedent of the realized past.

In the future, businesses will find it difficult to ignore longer-term considerations and will be expected
to actively explore the impact of sudden changes in the business environment. Admittedly, no one will ever know a priori what will work best in the future. But failing to incorporate uncertainties into the business plans will no longer be acceptable. Plans based on a single view of the future (whatever the origin of that view) in pursuit of logically constructed hard-bound strategies won’t work anymore. The environment has become too dynamic and unpredictable, and companies must expose their plans to multiple possibilities. More importantly, they must be able to simulate and sense future events—to creatively synthesize real time information and turn it into quick decisions.

**Scenario Planning**

Future-oriented decision makers think about real-world events as these unfold in a non-linear fashion, rather than the conventional linear approach. They work with plausible futures to develop powerful, flexible strategies that shape their destiny. As compared to a single view of the future, based on historical data and seen as a straight line extending outwards from today, or even a “risk management” strategy that includes a narrow band of possibilities around that single view, scenario planning allows for deeper insights, by looking simultaneously at multiple plausible and challenging futures. Also, tracing the multiple paths from these futures back to the current environment invites consideration of potential events and opportunities that would otherwise be ignored. (Exhibit 1 contrasts the scenario planning approach to the other methods.)

Scenarios are methodically constructed stories about alternative future environments in which today’s decisions might play out. Note that scenario planning is not a prediction tool, as every scenario is considered equally likely and not expected to occur as described. The power and value of this approach lies in its ability to open the decision makers’ minds to diverse and unnoticed possibilities, which allows them to suspend their beliefs and explore their environments in a comprehensive manner.

In addition to gaining key insights, through this process decision-makers uncover their hidden assumptions about the future and possible opportunities. A major impediment to competing successfully in the face of uncertainty is that we become tethered to established beliefs and accepted wisdom—in other words, hidden assumptions. Yet to operate effectively in this environment, we must open up our minds to multiple possibilities, rather than using mental constructs that are rooted in past experience and guided by personal beliefs and preferences.

Simulating possible outcomes through a scenario planning process reveals both the kinds of uncertainty that companies face and potential courses of action. Application of scenario thinking can help supply chain leaders in multiple ways. First, it can help them identify critical market uncertainties that directly impact the current and future product demand and customer service needs. A deeper understanding of such forces is key before supply chain challenges and strategies can be considered in full view of what could be expected in the future. Second, the analysis of scenarios from a supply chain perspective helps uncover potential opportunities and challenges that must be considered before making any long-term investment in supply chain design and capabilities.

Scenarios can be created specifically for a particular business issue, or they can be more generic in nature, as is the case of the scenarios shown in Exhibit 2 and described below. (These three scenarios—Alien Nations, Spin City, and Synchronicity—were created by MIT Center for Transportation & Logistics. For a more detailed description, visit www.sc2020.net).

**Scenario 1: Alien Nations**

Citizens of the Alien Nations world think and act locally. Foreign peoples and governments are mistrusted or even disdained; globalization does not even warrant lip service from a political establishment driven by nationalism. Energy is a hot-button issue because their countries are in competition for dwindling natural resources. Conservation and energy efficiency policies are being pursued with vigor. The lack of standardization across global trading and commercial systems in this scenario makes international expansion risky and expensive. Trade barriers are
strewn across the world and companies focus their endeavors on national markets and customers. Major threats to world stability are unsynchronized business cycles and investment strategies, a byproduct of the lack of global unity. Nationalistic attitudes obstruct emigration, even though there is a high demand for younger migrant workers in many countries. In the Alien Nations scenario, charity begins—and ends—at home.

**Scenario 2: Spin City**
Trust and national security issues dominate political and corporate agendas. Globalization remains a powerful force, but hamstrung by a complex web of conflicting regulations. Governments are intervening more and more to strengthen security, while paying less attention to their markets in an increasingly complex trading environment. As a result, markets are not as efficient as they could be. Since the ground rules for trade are in a constant state of flux, managing change is a major challenge. Trust is a distinct competitive advantage. To compete globally, companies have to build solid reputations for being trustworthy. Highly innovative enterprises that can exploit the new (but fleeting) business opportunities around this fast-changing world are in a strong competitive position. The conflict at the heart of the Spin City scenario: Should regulation or market forces be the advocate for trust and physical security?

**Scenario 3: Synchronicity**
Democratic ideals have taken hold across the globe. And intrinsic to these ideals is the notion that all parties—whether individuals, companies, or governments—must trust each other. In this world, trust does not impede business or societal relationships; it promotes them. As a result, untrammeled global commerce flourishes in the Synchronicity world to such an extent that keeping up increasingly rely on “knowledge workers” to create the customized products and services in demand. Environmental protection has become a universal aspiration.

### Implementing Scenario Thinking
There are three key concepts that are central to the application of scenario thinking for developing effective strategies and maximizing returns, namely sensors in the ground, forks in the road, and fast decision making.

**Sensors in the ground.** Sensors in the ground are indicators that allow early detection of signs of change in the business environment. These can range from trends isolated through sophisticated analysis to a simple task of browsing local newspapers for information on suppliers in remote areas. The key is to identify, monitor and pay close attention to leading variables that may hint at a future event or trend. For example, sensors in the ground for a biotech firm could include:

- Ratio of approved biotech to traditional drugs.
- Level of investment by venture capitalists in biotech firms.
- Acquisition profile of big pharmaceutical companies.
- Political shifts in U.S. healthcare policy.

**Forks-in-the-road.** As the company implements new strategies that are informed by multiple futures and develops the nimbleness needed to exploit change, it will gain competitive insights that often reveal “forks in the road”—that is, trade-offs that influence the strategic direction of the company in a dramatic way. Viewing these forks as obstacles can have a paralyzing effect on decision makers; instead, we recommend treating these as opportunities to redefine the company.

For example, cost and quality used to be considered antithetical. Choosing between the two represented a fundamental trade-off or a fork in the road. Companies developed strategies driven by one objective and directed their efforts accordingly. Now, leading companies consid-
er cost and quality as complementary and concentrate on their duality. Their aim is to build good quality at a lower cost (acknowledging that poor quality leads to higher costs). Similarly, leaders have made significant gains by exploiting the duality of safety and cost, concepts that were previously considered antithetical. Focusing on critical forks in the road and seeking innovative solutions is the way forward to significant competitive advantage. From a supply chain point of view, a successful strategy in the future will pivot on innovative solutions to address vexing problems, such as flexibility and efficiency, customer service level and cost, to name a few.

**Fast decision-making.** In the end, success hinges on the organization’s ability to react quickly to market changes, since even the most meticulously planned strategy will be undermined by real-world events. Companies that have formulated and rehearsed responses and are able to implement effective actions quickly can take advantage of unforeseen developments. They’re capable of quickly adjusting their course while slower competitors struggle to find the right direction. Research has shown that fast decision-making is facilitated by a number of key factors that include examination of multiple alternatives (for example, scenarios) simultaneously.

### Implications for Supply Chains

Knowing that the future is unpredictable and will be different from the present, raises the question of what can we do now to prepare for it. In one sense, if the future is truly unpredictable, any advance preparations are futile. But on the other hand, certain core attributes—if designed into supply chains—will clearly position a company to better handle most eventualities that arise. We have isolated out nine of them here.

1. **Strategic importance:** Organizations must view the supply chain as strategically important to their business success. With this enhanced stature will come greater responsibility for supply chain leaders to think holistically and beyond the short-term focus that is characteristic of a typical supply chain today. Furthermore, they will be required increasingly to incorporate subjectivity and qualitative information into their decision-making.

2. **Multiple roles:** Versatility will become a central tenet of the future supply chain as expectations will change requiring it to play multiple roles. In addition to taking care of traditional back end responsibilities of moving products and managing costs, supply chains will move to the front end of the business. Increasing pressure to explicitly commercialize their capabilities will cause supply chains to acquire a value and market oriented focus.

3. **Accountability:** The unbundling of the supply chain function will continue unabated (irrespective of who owns and operates various sub-tasks). To support scalability and formation of ad hoc arrangements to serve dispersed global markets, supply chains must have a clear understanding of the cost and value proposition of their various constituents. It must know, in unambiguous terms, the performance of its constituents on key dimensions such as cost, risk, cycle time, and flexibility.

4. **Transparency:** the mandate today is to operate with minimum harm to the environment, to reduce energy consumption and pollutant generation, and to recycle all discarded products and packaging. Already, we’re starting to see the requirements (both regulatory and from customers) that products carry carbon footprint information. As these mandates increase and as consumers become more environmentally conscious, companies that can transparently show that their products and supply chains are thoughtfully designed to take the environment into account will enjoy a competitive advantage. This represents a significant shift, as the true performance of any supply chain operation remains hidden from external entities. Companies must redefine their approach to supply chain management and make transparency requirements a part of their business strategy.

5. **End-to-end visibility:** Recent turbulence in the economy has made it almost impossible to predict the operating environment even in the short term. Coupled with the issues associated with frequent supply disruptions, counterfeits, and the inexorable need for traceability, real-time supply chain visibility has become unavoidable. This will be even more critical in the future as business objectives will require supply chains to recon-
Supply chain management often involves a myriad of interconnected processes and decision points. As such, it becomes crucial to adapt and evolve in response to the rapidly changing environment. The future of supply chain management will undoubtedly include increased emphasis on agility, sustainability, and innovation. Here are several key considerations:

1. **Rationalization of Investment**: Technology is crucial in managing volatile demand. Current technologies allow for tracking almost anything globally at a cost-effective rate. However, the challenge lies in making such technology investments yield end-to-end visibility that adds value.

2. **Social Responsibility**: With products recalled on a massive scale, supply chains must ensure safety and quality. Suppliers failing to meet standards should be immediately replaced. Such a focus on social responsibility can prevent future debacles without compromising on efficiency or cost.

3. **Risk Informed**: The complex and dynamic nature of future supply chains requires a risk-informed approach. Supply chains can be modeled as channels through which risk flows due to its interconnected product, information, and financial flows. Understanding how risk propagates helps in better strategic planning.

4. **Financial Sophistication**: The financial implications of supply chains are often overlooked. The recent financial crisis highlights the need for a new perspective on managing capital, inventory, and other financial aspects. This involves treating supply chains as capital flow channels to manage working capital, fixed capital, and inventory.

5. **Master Volatility**: In an uncertain future, the ability to react quickly and strategically is crucial. Companies must leverage innovative processes and technologies to maintain efficiency and cost-effectiveness.

6. **Success in an Uncertain Future**: The current economic downturn has taught us valuable lessons about resilience and adaptability. Leaders must think strategically and integrate supply chain decisions with broader business strategies to succeed in an uncertain environment.

Research has shown that fast decision-making is facilitated by examining multiple alternatives simultaneously. Effective decision-making requires careful consideration of various factors, including technological advancements, regulatory changes, and market trends. As the future unfolds, supply chain professionals must remain agile and responsive to achieve success in an uncertain world.