

Supply Chain Strategy: Real Options for Doing Business at Internet Speed

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A fresh approach is urgently needed to deal with the changing realities of the global business environment. How can *strategic thinking* guide us to the approach we need to compete successfully? Why are *portfolios of real options* becoming a key component of supply chain strategy? What *previews of the future* can we envision?

Facing Reality

Businesses, especially in the electronics industry, are experiencing an ever increasing pace of change. The dynamic nature of the environment faced by business managers around the world has never been more evident than in the explosive growth of the Internet. This information exchange tool allows customers to be more demanding and provides competitors with easier access to existing markets. These rapid changes force reconsideration, if not modification, of traditional business models. However, some new competencies required to deliver customer value—always the primary measure of success—are missing. For example, if we gather market information, examine trends, adapt our supply chains, and deliver customized products efficiently, we may find that our responses to the changing situation are too slow, and we are late to market. This same Internet also offers opportunities for companies to improve their customer knowledge and to tighten their grip on the value delivered through their supply chains.

Facing reality is not easy. The challenge for managers is so urgent, however, that new approaches may be required for survival. Even successful businesses should open themselves to *strategic thinking in real time*. At the heart of this challenge, the supply chains on which our future success depends, may undergo a significant transformation.

Strategy development for the future depends on the ability to create portfolios of options to be exercised in real time, enabling fresh options to emerge as the supply chain becomes more effective. To meet the expectations of increasingly sophisticated customers, we need a dynamic supply chain strategy that responds to complex behaviors as it senses them. As in the symbiotic responses of natural populations, each option enables further options that can be exercised according to prevailing conditions.

Why emphasize options? The complex interaction of uncertainties in a changing world makes adherence to a fixed strategy very risky. We must navigate through stormy weather. Everywhere we look, suppliers are changing their priorities and commitments, customers are acting upon regional and personal preferences, and strategic partners are acting as competitors at the same time. These forces are increasing the unpredictability of our business environment. The expectation that we will deliver customized products and services compels us to figure out what's being demanded even as we attempt to satisfy that demand. In such fluid situations, any rigid approach is bound to fail. A powerful way of dealing with these issues is to prepare ahead of time *options* that take best advantage of various possible situations. Then, when those situations occur, the appropriate options can be executed (exercised) rapidly.

Strategic Thinking

In general, supply chains are moving from vertical integration (within a single company) to multilateral integration (across many partners). The information, material, and financial flows within the network are continually redirected as demand fluctuates. Managing each of these flows has become more difficult as the situation becomes more complex, so organizations are learning a new competency—the ability to create and exercise options across the supply chain. How does this new competency work? How are options defined, evaluated, and exercised?

To develop options as a part of our strategy, it is useful to recognize that optionality in supply chains is not new. Optionality exists in several business strategies that have become familiar in recent years. Here are examples of real options already in play:

- **Postponement**— *We hold an option to produce only the models we need when precise demand information is available.* Delaying product differentiation until precise information about customer demand is known, gives us optionality in the manufacturing of products. From the dyeing of fabrics in the clothing industry to customized configurations of network printers, companies use postponement to manage material flows to meet unpredictable demand.
- **Dual Response**— *We hold an option to produce and ship the right amount at the right time to the right locations.* As an approach for dealing with demand variability, this manufacturing strategy achieves efficiency and responsiveness in the same supply chain. Efficiency is achieved by satisfying most of the demand with stable production in highly cost-effective locations, while responsiveness results from variable—that is, *optional*—production (at higher cost) much closer to the market..
- **Multiple Sourcing**— *We hold an option to procure and use a portfolio of components to ensure meeting demand when manufacturing the product.* This strategy achieves “assurance of supply” through
 - (1) procurement policies drawing from multiple sources of components or
 - (2) product designs that allow the use of components from different sources. Like postponement and dual response, multiple sourcing makes material flows through the

supply chain more efficient, though more rapid and complex information flows are required in the process.

- **Spot Markets**— *We hold an option to obtain parts (or eliminate excess) at uncertain market prices that may be strikingly advantageous.* Matching demand with supply—a classic problem with information and financial flows—is handled by switchboards for linking buyers and sellers. Otherwise unlikely transactions become possible in this dynamic market space where spontaneous relationships occur between interested parties.

Strategies like these have shown supply chain managers that optionality has a significant impact on business success. Strategic thinking extends the notion of optionality to material, information, and financial flows. Integration of these options will be the hallmark of strategies that transform business models—especially for doing business at Internet speed. Moreover, we are learning that an excellent approach to deployment is to use optionality as a way to distribute risk. Evaluation of strategies will focus on risk profiles that change not only if, but *when*, particular options are exercised. The best strategists will be those for whom timing is a paramount concern.

Real Options

Business managers know instinctively that strategies require conscious choices from sets of alternatives. Most of the time, however, these alternatives are based on simple themes that emphasize realistic objectives, completeness across the set, and an assessment of the probability of success. The idea that alternatives can be selected according to the value created by optionality has only recently emerged. We are learning how to develop business strategies in which value increases with the potential to exercise options.

How can optionality become a distinguishing characteristic of future strategies? What makes an option an option? Here some fundamentals:

- **Segmentation**—Options are segmented so they can be exercised in parts. More value can be created when there is *subtlety* in the potential action.
- **Scalability**—Options are scalable so the *magnitude* of their application or impact can be controlled. The action can be focused, shifted, or zoomed as the opportunity changes. Similarly, the optionality needs to evolve with the business it is supporting.
- **Time-Sensitivity**—Options are time-sensitive. They gain power from their potential to be exercised in the future, in part or all at once. The value created by an option is actually a *profile of values distributed in time*.
- **Creativity**—Options can be designed to create new options. These non-conventional options, created and executed in new and innovative ways, can create successive new generations of innovative and new options. This characteristic can stimulate ongoing growth of option portfolios.

With this view, we can appreciate the instincts of the business strategist who observed, “When the future is highly unpredictable, it pays to have lots of options open.”

Optionality in Supply Chains

How can we create optionality in supply chain strategies? To survive in the turbulence of the global business environment, we clearly need more robust supply chains. One way to achieve robustness is to develop options for real time execution as we deliver value to customers. With the Internet, for example, we can get better prices through multiple bids; we can sample and qualify more suppliers; we can manage partnerships; we can change the order fulfillment process, we can adapt our value proposition on the fly. As customers become better informed, more demanding, more fickle, we respond by becoming more responsive, customer-focused, smart.

As an illustration, consider the flower business. What is the potential for real options as we make business decisions? How much leeway do we have in deciding when to harvest? Should we wait for better conditions? Are buds in short supply? Are full blossoms popular? Does foliage command a premium? If an unexpected frost catches us, will we lose the whole crop? On the one hand, we must respond to weather, soil quality, pests, and other factors. On the other, we must ready ourselves for demand variability, seasonal peaks and valleys as well as for consumer preferences. Material flows—including when to harvest—are strongly influenced by information flows about supplier and consumer behavior.

In the electronics industry, the situation is similar:

- **Supply Side**— The supplier covers the risk of higher than expected demand or oversupply. We create structured contracts with suppliers and expect their flexibility in dealing with uncertainty. We determine the range of expected demand, we order any amount within this range, and we hope not to be charged for costs that result from the uncertainty. Eventually, these costs begin to affect us, but that’s acceptable within limits. Without this relationship, our supply might be disrupted.
- **Demand Side**—We provide branded products with high service levels over a long horizon (six to twelve months) and optimize our supply chains using the best information we can get. This strategy works when uncertainty is limited (that is, we can forecast accurately). If there’s a high brand premium, and we get the right product, our profit opportunity may be substantial. This is especially true if customers perceive the product as desirable and are willing to wait for it; they behave as if they have no other choices.

People at Hewlett-Packard generally make good choices from the alternatives available. Teams responsible for purchasing or sales, for example, usually make the right decision. Unfortunately, most organizations are poor at *designing* situations that offer choices for selection. It’s hard to envision options, particularly when we’ve been told to be as efficient as possible. Creating options can be both unfamiliar and expensive. In fact, many organizations aggressively *limit options to ensure efficiency*, striving for standardized processes even when the environment is highly uncertain. A challenge faced by Hewlett-

Packard is to balance the need for business controls and the opportunities created by options.

Optionality on the Supply Side

How can we create optionality on the supply side? Instead of structured contracts based on forecasts, suppose we have the ability to create spot markets for parts? At Hewlett-Packard, we use TradingHubs.com, a web-based business-to-business switchboard that provides the capability needed to support a dynamic procurement strategy. For components needed for manufacturing, at HP we have the following choices:

- Make a structured contract with the supplier (as in the past) that obligates the supplier to manage the demand-supply risk.
- Make a fixed contract for *less* than the amount we need and go to TradingHubs (spot market) to purchase the remainder. We accept the risk of not finding sufficient supply.
- Make a fixed contract for *more* than the amount we need and go to TradingHubs (spot market) to sell the excess. We accept the risk of not finding sufficient demand.

We now have three strategic choices. Moreover, the ability to time the purchase or sale on the spot market provides optionality. Structured contracts are still a possibility, but the ability to create a spot market gives organizations more flexibility. In fact, Hewlett-Packard diminishes the overall supply chain risk by leveraging its positioning close to the customer and exercising its options in real time. Suppliers and manufacturers should jointly determine who will be compensated for managing the demand-supply risk. We need to expand our knowledge and evolve tools to create and evaluate real options like these.

Optionality on the Demand Side

Strategies that provide optionality on the demand side are also possible. Here are some examples:

- **Alternate Labels**—We can create a second label for the product. If we have too much product, what can we do with the excess? Dye them blue, affix the new label, and sell them at a discount. This approach allows us to assume risk from suppliers and vent it through the market by taking a lower premium on the second label. If the supplier's risk reduction is more valuable than our overall margin loss, the supply chain is more competitive. This strategy does not focus on supply chain optimization for a given product and market, but on creating alternative material flows. A fixed quantity would be available for an uncertain period, providing a material flow option.
- **New Channels**—HP Shopping Village, HP Kiosk, and HP Store are examples of new channels for reaching customers. We can create products from excess parts, assign special product numbers, and sell at special prices. When the supply is gone, the product disappears. This approach provides options in material flows at both ends of

the supply chain, and the information flow to customers is used to exercise them. Channels like these provide options for quickly reducing inventory levels.

- **Auctions**—On the demand side, auctions allow us to create new ways of bringing products to market. Information can be provided to attract business customers who want the benefits of dynamic pricing. The more we learn about purchasing behavior, the more we can exercise options to everyone's advantage. Should we disposition more product? Are there ways to challenge the competition? Can we trigger additional options when conditions are favorable?

All these approaches thrive on excellent information. Resources required to expand our knowledge are well-spent when we learn the value of alternatives across the supply chain. Consider, for example, the surveys by which we learn more about customer loyalty. The product and channel attributes that inspire customer loyalty are more valuable when options have been designed to reinforce them. Simultaneously, we need to design options that counter forces that inhibit customer loyalty and profitable business growth. In many situations, moreover, our attitudes toward knowledge sharing are changing. Strategies that keep information proprietary actually inhibit customer loyalty and limit our partnership options. Paradoxically, greater openness works to our advantage in engaging customers, managing risks, and sharing rewards across the supply chain.

Portfolio Management

In every strategic dimension, we need to consider how options fit together in a portfolio, so we can take advantage of the “portfolio effect”—the ways options create synergies and gain strength by their interaction within the portfolio. We need portfolios of supplier options, partnership options, core competencies, metrics, and other sophisticated alternatives that give us greater flexibility in the ways we can run the business.

Why talk about portfolios? A strategy that features optionality in the available alternatives offers increased opportunities to manage risk and grow our business. The whole purpose of portfolio management is to reduce risk where possible, manage the remaining risk, and exploit new opportunities. We need to find the best positioning for the ever changing business situation—using options to take advantage of the opportunities immediately available—not necessarily the optimal solution for a single, specific scenario.

Hewlett-Packard’s managers are learning to avoid forcing efficiency through controls or standard procedures when the future is highly unpredictable. The challenge is to create options and to allow people to exercise them as the world keeps changing. Since precise planning is impossible and we have cheap, ubiquitous information, we must learn to transform information into knowledge for exercising the right alternatives from our portfolio of options.

Previews of the Future

As we look into the future, the need for risk management across the supply chain is clear—especially the need to diminish the overall risk by shifting specific risk to the partner in the best position to manage it effectively. This requires that we reach agreement on the points in the supply chain where risks can be mitigated—the strategic control point for a type of risk or opportunity. (This is similar to deciding where to hold inventory in the supply chain.) In the future, we will need portfolios of real options—on the demand as well as the supply side—for taking advantage of risk and redistributing the costs and benefits among participants. The result will be more effective and responsive supply chain networks. A cornerstone of this approach will be mutual trust and openness, built on open agreements about which options are available, who will manage them, and how the costs and benefits will be shared among the supply chain partners. A binding element will be the sharing of customer knowledge.

Recent decisions at General Motors to centralize their procurement of steel—purchasing surplus from a web-based spot market and auctioning the excess to their suppliers, subcontractors, and partners—indicate that optionality on the supply side is for real. Toyota's participation in this network has changed the landscape for steel manufacturers, who are less likely to exact premiums from smaller customers (since these customers will be able to exercise options with the big guys). Instead of proprietary information and dedicated relationships, as in the past, supplier-manufacturer relationships have suddenly broken open.

Situations like these are appearing in the electronics industry. IBM will manage procurement of Cisco parts, leveraging its procurement power (here proprietary information still applies). With increased shortages of strategic parts like DRAM and ASICs, however, any reliance on proprietary information may be wishful thinking. By contrast, Hewlett-Packard has found that open relationships with suppliers is a key success factor in ensuring supplier loyalty. On the supply side, optionality must be available from manufacturers without driving their suppliers out of business or endangering their assurance of supply. On the demand side, customers must be given a wide range of options. Just as consumers can buy airline tickets at flexible prices, combine orders to achieve volume discounts, and pursue comparison shopping online, supply chain partners will expect the same dynamics from their counterparts, looking for demand side optionality between business partners.

Change has become an integral part of our business environment. The pace of change will continue to accelerate. Being more efficient and optimizing our (supply chains and) strategies for some anticipated new reality, doesn't necessarily position companies for future success. Therefore, incorporating options in collaborative strategic planning helps us thrive in highly uncertain business environments.