SUPPLY CHAIN MYTHS AND REALITIES

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INSIDE

Technology's Role; The Balance Problem; The Cost Reduction Promise; Myths: Common Obstacles to Effective Business Models

INTRODUCTION

Technology, inventory, and a supply chain are important elements of many companies' business models. These companies spend heavily on technology to ensure that their supply chains function well. Yet few do. This article explains why these companies fail and how other companies can avoid their mistakes.

TECHNOLOGY'S ROLE

The technology element, in particular, has come in for criticism lately. Technology often advances faster than the readiness of users to put it to work. Along with the recent implosion of the dot.coms, the claims of technology purveyors are more likely to be met with well-deserved skepticism. Monday morning quarterbacks have discovered that, although the dot.coms had products and technology, the inventory and supply chain management components of the business model were not there. The result was "hot" companies wasting a lot of investor money.

On the other hand, no company can long ignore the promise inherent in the technology. How can an organization do a better job in planning its evolution from "here" to "there"? What should "there" look like? The latest wave of supply chain solutions brings exhortations to implement ever more advanced generations of software. These include an alphabet soup of application package categories including ERP, MES, APS, WMS, CRM, and many others. The Internet is an enabler of this connectivity and enhances collaboration along the supply chain. Another enabler is the commodity exchange, also likely

PAYOFF IDEA

An effective supply chain is essential to many organizations. This article sorts through the myths and realities of creating and maintaining one.

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to be Internet based. Here, the exchange takes a fee to automate the marketplace for the commodity.

One dot.com lesson is that a successful business model requires balanced application of all three elements to make money. For this article, the three business model elements are defined as:

1. *Technology:* as in computer hardware, applications, and the Internet
2. *Inventory:* includes material selection, purchasing, distribution, and sourcing; and encompasses decisions regarding service levels and the deployment of inventory to meet customer needs
3. *Supply chain:* encompasses end-to-end product, financial and information flows, along with related transactions, partnerships, and collaborations

THE BALANCE PROBLEM

The three elements are frequently supportive and frequently in conflict. Perhaps the most important conclusion is that each is a necessary but not sufficient element in achieving a lasting competitive position. Strategy makers should understand the choices they have in striking the right balance among the three.

Exhibit 1 illustrates three situations that commonly take shape in an organization. In situation A, the three elements are considered separately. They are addressed with roughly equally weighted efforts. Their separation implies that cross-talk is minimal; the efforts are justified, administered, and measured independently; and the plans for each are not coordinated. This is particularly true for the business that has been around for a while. Starting with a blank sheet of paper can be an advantage.

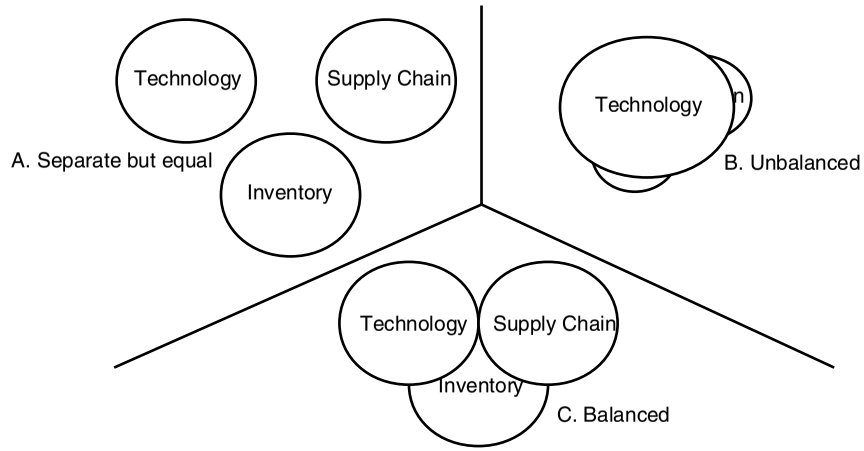
In situation B, one element dominates the others. This case is typical where resources or management attention is limited to "one problem at a time."

Situation C is more desirable. The efforts are balanced and overlap where appropriate. This is accomplished by formulating the components as parts of a single strategy. A sure way to evolve into a faulty business model is not to do this. To proceed, one needs to keep in mind the balance problem and fight to find ways to restore balance when it is missing.

THE COST REDUCTION PROMISE

The ongoing business will likely argue for technology and other initiatives in cost reduction terms. For example, the exchanges mentioned above claim that buyers will lower the prices they pay by using their Web sites as marketplaces. The Internet exchange, so the thinking goes, provides a wide world of suppliers from which to choose. No longer will a single supplier or a cartel hold the buyer hostage with exorbitant prices. A second payoff from the exchange is reduced transaction cost. Doing

EXHIBIT 1 — Balance in Improvement Projects



away with messy paperwork cuts the overhead associated with buying and selling.

A third often-cited technology benefit is inventory reduction. This saving occurs in the inbound (from suppliers to the company) and outbound (from the company to its customer) pipelines. The assumption is that the Internet and the latest application software will improve visibility along the chain. This, in turn, produces better decisions regarding what to produce, how much is needed, and when to produce it. It will also help buyers and sellers communicate progress in filling orders.

These claims are sometimes true — at least to some extent. Often, however, savings fall short. A principal reason is that the claims are based on traditional, arm's length, or even adversarial relationships between buyers and sellers. As the supply chain model of collaboration takes root, these relationships are changing. This in turn expands alternatives to solve problems, lower costs, and improve customer service.

MYTHS: COMMON OBSTACLES TO EFFECTIVE BUSINESS MODELS

To identify these alternatives, the technology manager should understand the reasons why things are the way they are and all the available alternatives for improving the status quo, not only technology but also basic structural change. One way to understand the multiple paths available is to explore common perceptions that stand in the way of building competitive business models. If the reader believes that his or her organization has embraced any of the myths listed here, consider the alternatives described.

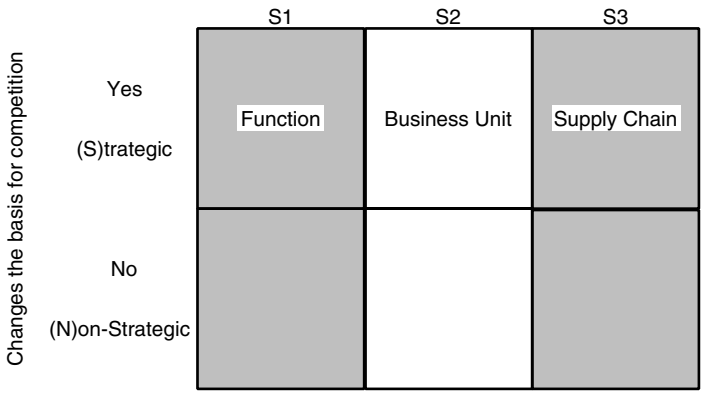
Myth: Improvement Projects Constitute a Strategy

A common mistake is confusion of activity with results. For example, an IT manager may have a full slate of small improvement projects, one that can pack his or her budget and staff capacity for years. However, virtually all of it falls into the category of continuous improvement or maintenance projects. Few are really the type of project that changes the business model and improves competitive position. The result might look like situation B in Exhibit 1.

An example is a company in which executives charged a newly hired manager and a task team to make supply chain "breakthroughs." This company is a contract manufacturer with a leading market share and depends on supply chain dominance to remain competitive.

However, the team found that the company had to clean up supply chain data in the wake of a recent ERP implementation. As long as the new system spewed out inaccurate information, little in the way of real benefit would be enjoyed. And top management was anxious for a payback from their ERP investment. The team's efforts became, in reality, completion of the ERP project, a task that diverts them from their original mission.

EXHIBIT 2 — Model for Competing through Supply Chain Management



The purpose of this story is not to belittle the real needs that are filled by projects such as this one. In fact, most companies need at least two types of projects: ones that pursue continuous improvements and ones that change competitive position. Companies that want to move ahead must find the resources for both continuous improvement and strategic projects.

In the *Handbook of Supply Chain Management*,[1] the author of this article presents a method for categorizing a supply chain project. That framework is shown as Exhibit 2. The exhibit shows six project categories. On the vertical axis, projects are either strategic or non-strategic. A strategic project changes the basis for competition. Along the horizontal axis, there are three categories that measure the breadth in the project. The categories are department level (function), business unit level, and supply chain level. Department-level projects are confined to just one department. A business unit project involves more than one department but remains within the walls of the company. A supply chain project extends its reach to multiple enterprises beyond the immediate business unit.

A company should classify its projects using this framework. An honest assessment will likely place the majority of projects in the lower left-hand box — department-level, non-strategic projects that do not change the basis for competition. Situation A from Exhibit 1 likely reflects this condition.

Myth: One Can Control Costs

You might get arguments on this one from the company controller. Financial statements keep score, reporting costs against budgets; hence, they are under control from an accountant's viewpoint. Marching orders for improving the score often boil down to reducing costs, cutting

items on the balance sheet inventory, and otherwise improving the bottom line.

This mindset reflects the view that cost is an independent variable, or one that is controllable. When managers treat costs as independent variables, they overlook the fact that the costs of operations mirror many factors. They fail to understand the root causes, which lie in the way the supply chain works. In fact, inventory levels and costs are a consequence of many supply chain features. This means they are dependent — not independent — variables. As dependent variables, one cannot achieve cost reductions without changing the way one conducts business.

Myth: Time Is Not Important

Those deeply in involved in supply chain issues often forget the role of time as a determinant of competitive position. This issue arose in a team working under the auspices of the Supply-Chain Council (or SCC). The team was deciding whether and how to explain the difference between the terms "lead-time" and "cycle time." The effort was part of an update of the SCOR model, maintained by the SCC (SCOR stands for supply-chain reference model). The model contains a standard set of supply chain activities and practices and includes a glossary. SCOR has widespread application in benchmarking, defining activities, measuring performance, and cataloging best practices.

Some participants in the effort felt that lead-time and cycle time are identical terms and that only one definition is required. Others felt the terms should have different definitions. The ensuing discussions led to a distinction between the two terms, including the author's contribution shown in Exhibit 3.

The distinction between the terms is important. The root cause for inventory and its related costs lies in the mismatch between lead-time and cycle time. When the lead-time demanded by the market is less than the corresponding cycle time, inventories are required. Additionally, the greater the mismatch, the greater the inventory requirement. For this reason, leading competitors strive for synchronous operations and lean manufacturing to reduce the difference.

For example, the grocery shopper who wants a gallon of milk does not expect to wait until the cow is milked, and the product is pasteurized and packaged in a processing plant, and then delivered to the supermarket. The shopper anticipates finding the milk on the shelf at any hour of the day, creating the need for inventory on the grocer's shelf. The inventory, in turn, creates needs for management and technological baggage to store it, finance it, account for it, and track it.

Likewise, there is more milk inventory back up the chain all the way to the cow. In the case of perishable goods such as milk, inventories are likely to be low, as measured by the number of days of inventory. The

EXHIBIT 3 — Definitions of Lead-Time and Cycle Time

Lead-Time	Cycle Time
Lead-time is associated with a product or service delivered by the supply chain. It is "imposed" on the supply chain by the competitive environment. It is driven by customer expectations, supply chain innovations, and competitive pressure.	Cycle time is a property of processes along the supply chain. The minimum theoretical cycle time for a product's supply chain is the sum of individual process cycle times.
All these factors are in constant motion, moving toward "faster, cheaper, better." Competitors that cannot deliver products and services within the established lead-time will likely perish. Competitors that achieve the shortest lead-times have an advantage.	Cycle time reduction is achieved through process reengineering, including the introduction of technology along the chain. An example is sharing information about final demand, introducing postponement[a] through product design, and automation in production processes. A competitor that works to reduce the cycle time can end up with the shortest lead-time.

[a] Postponement refers to product and supply chain design that allow for last-minute customizing of a product for delivery. It is often achieved by creating projects built on standard modules.

"sell it or smell it" reality is a reason. However, for more durable goods, inventory in the supply chain can be weeks, months, or even years of requirements.

Some products operate quite differently. In these cases, the lead-time is longer than the cycle time. For example, airlines and aircraft leasing companies place orders for aircraft far in advance of their need, essentially reserving space on the assembly line. In contrast to the milk example, the customer is willing to put in its order and then wait while the airplane is built.

Dell has a short lead-time for customized computers and a positive cash-to-cash cycle. Dell receives payment from the customer before it pays its suppliers and has short lead-times for delivering customized products. When an order is placed, Dell customizes its products for the order. Dell, however, has only eliminated its own inventory; inventory is still required to support its business model. Its suppliers must carry now carry it.

Returning to the milk example, Exhibit 4 shows at least four alternatives for designing the supply chain and their impact on the business model.

Before embarking on any technology investment — moving from Model A to Model B in Exhibit 4, for example — the company needs to understand whether there is a better way, as represented by Models C and D.

Myth: The Lower the Inventory the Better

There are essentially two types of products to consider in supply chain design: the *functional* product and the *innovative* product. The supply

EXHIBIT 4 — Alternative Ways of Designing a Supply Chain

	Alternatives	Description
A	"Low-tech" information sharing (status quo business model)	Signal the need for restocking with manual or other less technical solutions. Includes kanbans, shelf restocking, faxes, etc. This is the common practice today with the dairy distributor making frequent stops at the supermarket and replacing what has been sold. Empty space on the shelves is the replacement signal. This signal ripples sequentially back through the chain.
B	"High-tech" information sharing (Internet model)	Use information technology at the store level to let the distribution company, milk processing company, and the dairy farmer know a transaction has occurred. The replacement signal is electronically transmitted to interested parties. Their responses are pre-planned.
C	Cycle time shortening ("lean" business model)	Move the cow and processing plant into the store to cut overall cycle time. This tight supply chain also uses the empty shelf as a replenishment signal. While not practical for milk, it is a technique that is finding wider use in automotive supply chains.
D	Structural business model change	Provide delayed delivery directly to the customer's home. This saves a customer a trip to the store. Use the Internet or a call center to gather orders. (The reader should note that recent start-ups like Webvan have not made money with this model.)

chain for the functional product, according to Fisher, will be designed for low cost. The supply chain for the innovative product will be designed for responsiveness.

This concept also extends to the product life cycle. Early in life, the product is, by definition, new. The market is likely to be growing fast. There is ample demand and plenty of business for all competitors. This defines the innovative product. However, no good thing lasts forever. As the product ages, demand flattens and competition stiffens. The product is now functional.

How many companies make the distinction between innovative and functional products? Often, where a company sells both types of product, there is just one supply chain. That supply chain is usually designed for low cost. This includes minimizing inventory, using low-cost shipping companies, and cutting back on stocking points in the chain. Suppliers are also likely to be chosen on the basis of cost.

Such a policy overlooks the costs of being out of stock. These costs take the form of lost sales and the associated profit; these are costs not included in most financial statements.

Myth: Visibility Is the Solution

There are two types of errors one can commit in opening the supply chain to increased visibility through the Internet or other means. The first is an error of doing something just because technology makes it possible.

Exhibit 4 reveals a choice between a low-tech (A) and a high-tech solution (B). In the absence of loud protestations by customers or suppliers, there may not be a "visibility problem." Low tech is good enough — particularly if supply chain activities are well executed.

The second type of error is one of implementation. Unless the data made visible is timely and accurate, it may be better to keep it hidden. It is also necessary to define the expected responses in situations likely to be revealed by the flow of new data.

A case example illustrates the point. A company with a widespread, global supplier base instructed its suppliers to maintain a two-week inventory at its production facility in the United States. The original purpose was to move this inventory off the company's balance sheet and onto the suppliers'. Each supplier received a weekly forecast from the ERP system defining the number of units they were expected to have on hand.

The procedure had several flaws. The ERP forecasts were not frozen and shifted significantly from week to week. For example, the week of July 15, forecasted in mid-June, might require 1000 units; a couple of weeks later, the requirement may have changed to 2000 units.

It was also difficult for suppliers to make the adjustments in time. The ERP reports covered only the current quarter. Near the end of the quarter, there were no forecasts to define the needs within the time it took the suppliers to respond. Thus, suppliers were "flying blind" at this time.

The lesson is that sometimes no information is better than bad information. Also, one must critically examine what information is available, and when and what has to be done with it.

Myth: Technology Is Efficient

A tendency of many is to underestimate the complexity and decision-making content in seemingly routine transactions. The *Wall Street Journal* headlined a story that defies the notion technology is the solution for "routine" transactions.[2] It tells the story of the Grant J. Hunt Co., a distributor of potatoes and other produce, and the experience of its president, Grant Hunt.

The Hunt company buys from farmers and sells their products to supermarket chains, wholesalers, and restaurant-supply companies. The article describes Hunt's experience in trying to move its low-tech, non-Internet business to a Web exchange. Exhibit 5 summarizes the claimed advantages for the exchanges and the lessons learned from tests of the technology.

Companies contemplating the provision of increased visibility into their supply chains should understand the Hunt experience. Any proposals should be reviewed with the lessons learned in mind.

EXHIBIT 5 — Transactions on Exchanges: Promises and Reality

The Promise	The Reality
Joining an exchange would bring new customers.	• The exchanges were seen to attract customers with marginal credit ratings. • An exchange-posted offer to sell cherries produced no bidders in four days.
The exchange would streamline transactions bringing "incalculable efficiencies."	• The exchange could only handle routine transactions. • The existing infrastructure (faxes, phones, etc.) is not that inefficient. • The exchange systems would not link to home-grown systems. The result was duplication.
The exchange would increase business.	• The best way to get business is to hit the phones and call suppliers and customers. The exchange did not attract incremental business. • The service provided by Hunt buyers includes advising suppliers and customers on market conditions. It is difficult to automate this function.
Big customers would require exchange-based transactions.	• The large customers wanted to shift business to the exchanges but were not able — as of the date of the article — to follow through. In fact, some transactions were done both the old and new ways, bringing about duplication.
The exchange would improve visibility along the supply chain.	• This was true. However, it was important to keep some prices and transactions confidential; the exchange opened the terms of these transactions to too many parties.
The exchange fee was competitive.	• The fee of 1 to 2 percent was a steep price in a narrow margin business like distribution.
The software would work.	• The software was not ready for use. Hunt became a beta test site for some of the exchanges. • Several of the early exchange providers left the business.
The software was flexible.	• The exchanges would not allow Hunt to change prices quickly in response to market conditions. • The software had difficulty processing abnormal transactions such as returns. It failed four of the nine common transactions selected for a test. • The software had difficulty classifying different types of potatoes. Different distributors used different codes for the same potato.
The Hunt systems were outmoded.	• They worked, and the supply chain had grown accustomed to using them.

CONCLUSION

The basis of competition has shifted from the individual company to the supply chain. Companies must continuously review and adjust their business models to stay in the game. The penalties for making mistakes similar to the ones described herein can be severe. The intent of this article has been to aid the reader in avoiding the pitfalls. Unfortunately, many will repeat the errors of the past under pressure for quick solutions or out of fear of being left behind.

Notes

1. Ayers, James B., *Handbook of Supply Chain Management*, Boca Raton, FL, St. Lucie Press & APICS, 2001.
2. Gomes, Lee, How lower tech gear beat web "exchange" at their own game, *The Wall Street Journal*, March 16, 2001, A1.

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