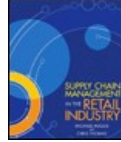


Chapters *To Go*



Supply Chain Management in the Retail Industry

by Michael Hugos and Chris Thomas
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yi.lin@cvscaremark.com

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Chapter 7: Measuring Performance—Supply Chain Metrics

Overview

Supply chains are fluid, as they continuously adjust to changes in supply and demand for the products they handle. This kind of flexibility is absolutely necessary, but it also requires that the performance of the companies in the chain be monitored and controlled for the good of the group, and to make course corrections along the way if necessary.

Nowadays, even with advances in technology, this type of control is difficult at best. Especially in supply chains that stretch across the globe, with suppliers on different continents than retailers, each new subcontractor adds a layer of complexity that, in effect, lengthens the chain. Some refer to it as a pipeline rather than a chain, which is an apt description—when the pipeline is too long, it is dark and hard to see what's going on in various parts of it, let alone measure progress.

This chapter introduces four performance categories that each participant in a supply chain should be measuring regularly, along with the performance metrics for each of these categories. We also discuss the collection and storage of data. After reading this chapter, you will understand

- The four basic market conditions in which companies operate
- Four categories that gauge a company or supply chain's performance, how and why to measure each of these categories
- The importance of data collection and retrieval/reporting of data
- How companies use performance data to spotlight problems and opportunities.
- How supply chain confidence is measured

Four Types Of Markets

A supply chain exists to support the market that it serves, so we cannot decide on the type of performance it must deliver unless we first understand the market being served. In support of this analysis, we'll use a simple model that allows us to categorize a market and identify various requirements and opportunities that it presents to its supply chain. Reality is, of course, a lot more subtle and complex than any model can represent—but this should at least provide the basics.

We'll start by defining a market using its two most basic components— supply and demand. Any market is characterized by its combination of supply and demand. This model defines four basic kinds of markets, or market quadrants, as seen in **Figure 7-1**:

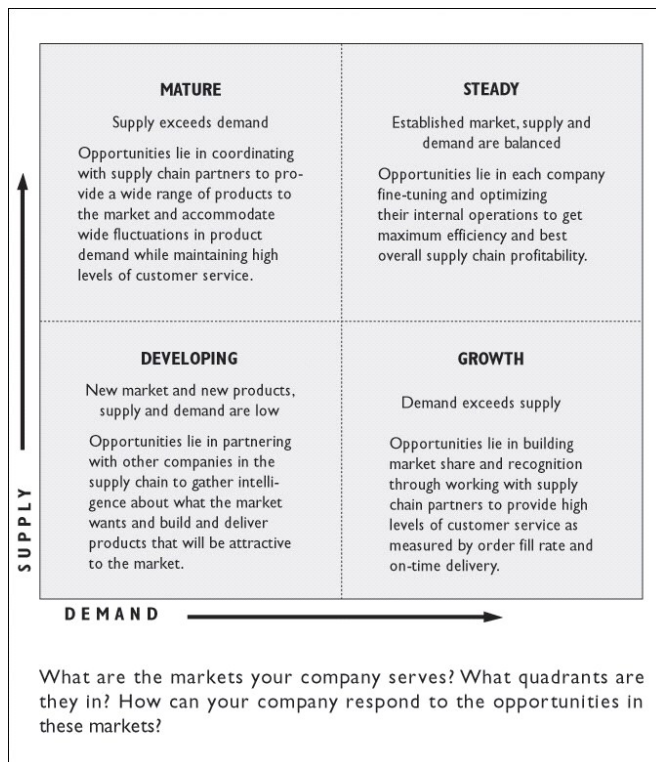


Figure 7-1. Each market quadrant presents different opportunities.

- The first quadrant is a market where both supply and demand for its products are low and unpredictable. Let's call this a *developing market*. These are usually new markets that are just emerging, created by new technology just hitting the market, or by social and economic trends that cause a group of customers to perceive some new set of needs—say, long-term care insurance for baby boomers, for example. Opportunities in a developing market are in the areas of partnering with other players in the supply chain to gather intelligence about what the market wants. Cost of sales is high in this market, and inventories are low because the product is still new and not all potential sellers have jumped on the bandwagon.
- The second quadrant is a market where supply is low and demand is high. This is a *growth market*. Since the demand is higher than supply, the supply is often uncertain. If a developing market solidifies and builds up momentum, it can suddenly take off, and for a time, there is a surge in demand that suppliers have difficulty keeping up with. Opportunities in a growth market involve providing a high level of customer service as measured by order fill rates and on-time deliveries. Customers in a market like this value a reliable source of supply and will generally pay premium prices for reliability. Cost of sales should be low, because the customers are easy to find, and inventories can be higher because they are increasing in value.
- The third quadrant is a market in which both supply and demand are high and, thus, relatively predictable. In this *steady market*, the market forces have been at work for a while and have pretty well balanced supply and demand. Opportunities here lie in fine-tuning or “optimizing” internal company operations. Companies should focus on minimizing their inventory and cost of sales while maintaining high levels of customer service.
- The fourth quadrant is a market in which supply has overtaken demand, so excess supply capacity exists. This is a *mature market*, in which demand is reasonably stable or slowly falling but—because of the fierce competition due to oversupply—demand seems uncertain from the point of view of any one supplier. Opportunities in mature markets hinge on the ability to be flexible and respond quickly to changes in product demand while maintaining high levels of customer service. Customers in a market like this value the convenience of “one-stop shopping,” where they can purchase a wide variety of related products at low prices. Inventories should be minimized, and the costs of sales are somewhat higher due to the expense of attracting customers in an already crowded market.

As you can see, markets in each quadrant have their own characteristics that supply chains can benefit from if they understand the opportunities and can work together to exploit them.

Market Performance Categories

In Chapter 1 we introduced two characteristics that describe the best supply chain performance—responsiveness and efficiency. We intuitively know what these two characteristics imply, but we need to define them in more precise terms in order to measure them objectively. This requires four measurement categories:

- *Customer service* measures the ability of the supply chain to meet the expectations of its customers—and, depending on the type of market being served, the customers have different expectations of service. Some customers both expect, and will pay for, high levels of product availability and quick delivery of small purchase quantities. Customers in other markets will accept longer waits for products and will purchase in large quantities. Whatever the market being served, the supply chain must meet the customer service expectations of the people in that market.
- *Internal efficiency* refers to the ability of a company (or an entire supply chain) to operate in ways that generate an appropriate level of profitability. As with customer service, market conditions vary and that “appropriate level” of profit varies. In a risky, developing market, the profit margins must be higher in order to justify the investment of time and money. In a mature market with little uncertainty or risk, profit margins can be somewhat lower and still satisfy the business partners, because high volume of sales can make up in gross profit what is given up in gross margin.
- *Demand flexibility* is the ability to respond to uncertainty in levels of product demand—notably, how much of an increase over current levels of demand could be handled if necessary by a company or its supply chain. It also includes the ability to respond to uncertainty in the range of products that may be demanded—that is, the ability (in a mature market, for example) to shift production to a better-selling new item suddenly if necessary.
- *Product development* encompasses a company and a supply chain’s ability to continue to evolve along with the markets it serves, developing and delivering new products in a timely manner. This ability is key when serving developing markets.

There are other demands that real-world markets place on their supply chains; however, by using these four performance categories, we can create a useful framework. This framework describes the mix of performance required from companies and supply chains that serve the four market quadrants.

When a company identifies the markets it serves, it can then define the performance mix required by those markets in order to best respond to the opportunities they provide. [Figure 7-2](#) lists the performance categories that have the most impact on each quadrant. The most profitable companies and supply chains are those that deliver the performance skills that “match” their markets.

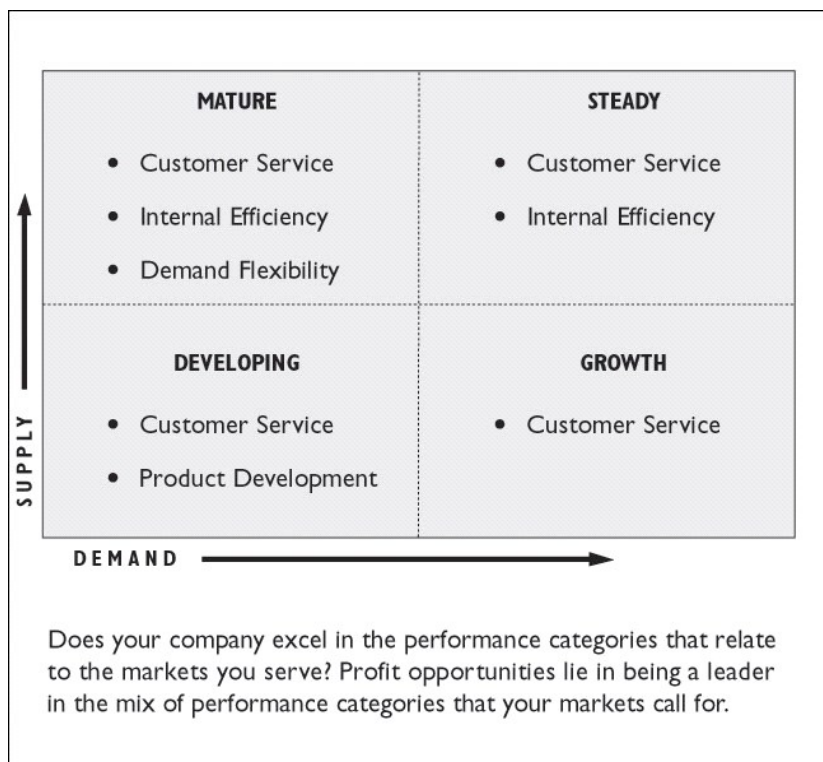


Figure 7-2. Market quadrants require a different mix of performance.

But even when they believe they're "delivering like crazy," how can they be sure? Some **metrics**, or ways to measure the performance, are necessary so that they can be tracked and compared over time to the goals and standards of the company and/or supply chain. And here's where things can get sticky. Companies are often reluctant to share data that may be used against them by their competitors, or that point out weaknesses to their customers or suppliers. There are issues of trust and confidence building to work out before these metrics can readily be collected for an entire supply chain, which will be discussed in greater detail later in this chapter. And yet, you can't hit a target that you can't see. Measurement is the only way to determine how close to the target the supply chain partners are coming, individually or collectively.

Customer Service Metrics

In the words of Stanford University professor Warren Hausman: "Service relates to the ability to anticipate, capture and fulfill customer demand with personalized products and on-time delivery." ^[1] The reason that any company exists is to be of service to its customers. The reason that any supply chain exists is to serve its market. Customer service metrics indicate how well a company serves its customers and how well a supply chain supports its market.

There are two sets of customer service metrics depending on whether the company or supply chain is in a **build-to-stock (BTS)** or **build-to-order (BTO)** situation. Retail buyers routinely encounter both BTS and BTO situations when placing orders.

Build-to-Stock

BTS is how common, commodity-type products are supplied to a large market or customer base—products such as office supplies, cleaning supplies, building supplies, and so on. These items are made in advance, with the idea that they may sit in inventory for a while before being purchased; however, customers fully expect to get them right away, anytime they need them. Supply chains for these products must make and stock them accordingly.

Because the customer wants their complete order to be filled immediately, there is added expense to some supply chain partners. It is costly for them to carry enough stock to fill orders that may contain a wide range and number of items. So they usually have backup plans—rush delivery of items not in stock or substitution of upgraded items.

Typical metrics for a build-to-stock situation are as follows:

- Complete order fill rate and order line-item fill rate
- On-time delivery rate
- Value of total back-orders and number of back orders
- Frequency and duration of back orders
- Line-item return rate

The order fill rate measures the percentage of total orders where all items on the order are filled immediately from stock. The line-item fill rate is the percentage of total line items on all orders that are filled immediately from stock. Used together, these two measures track customer service from two important perspectives. Can you figure out whose perspectives they are?

Build-to-Order

A BTO product is customized to meet a specific customer order, configured to meet the requirements defined by the customer. Examples of this are the way Boeing builds airplanes for specific customers, or the way Dell Computer assembles PCs to fit individual customer orders and specifications. Some BTO products are made up of premade components that are simply assembled to order; others are literally made from scratch.

Following are popular metrics for a build-to-order situation:

- Quoted customer response time and on-time completion rate
- On-time delivery rate
- Value of late orders and number of late orders

- Frequency and duration of late orders
- Number of warranty returns and repairs

In a BTO environment, it is important to track both the quoted customer response time and the on-time completion rate, because it is easier for a company to achieve a high on-time completion rate if it quotes longer customer response times. The question becomes whether the customer really wants a short response time or will accept a longer response time. The quoted response time needs to be aligned with the company's competitive strategy.

[1]Warren H. Hausman, "Supply Chain Performance Metrics," Management Science & Engineering Department, Stanford University, Palo Alto, California, 2000.

Internal Efficiency Metrics

Internal efficiency refers to the ability of a company or a supply chain to use its assets as profitably as possible. Assets include anything of tangible value: plant, equipment, inventory, and cash. Some popular measures of internal efficiency are as follows:

- *Inventory value* should be measured both at a point in time and also as an average over time. The major asset of any supply chain is the inventory contained throughout the length of the chain, because the individual assets to make the inventory are owned by the individual companies. Supply chain members are always looking for ways to reduce inventory while still delivering high levels of customer service. This means trying to match inventory availability (supply) with sales (demand) and not have excess inventory left over. The only time a company would want to let inventory exceed sales is in a growth market, where the value of the inventory will increase. However, markets can be fickle, and as a rule, it is best to avoid excess inventory.
- *Inventory turns* are a measurement of the profitability of inventory by tracking the speed with which it is sold or turned over during the course of a year. This measure is often referred to as **T&E**, short for "turn and earn." It is calculated by the equation:

$$\text{Turns} = \frac{\text{Annual Cost of Sales}}{\text{Annual Average Inventory Value}}$$

Generally, the higher the turn rate the better, although some lower-turning inventory must be available in order to meet customer service and demand flexibility.

- *Return on sales* is a broad measure of how well an operation is being run. It measures how well fixed and variable costs are being managed, and also takes into account the gross profit generated on sales:

$$\text{Return on Sales} = \frac{\text{Earnings before Interest and Tax}}{\text{Sales}}$$

Again, as a rule, the higher the return on sales, the better. However, there are times when a company may deliberately reduce this number in order to gain or defend market share, or to incur expenses that are necessary to achieve some other business objective.

- *Cash-to-cash cycle time* is the time it takes from when a company pays its suppliers for materials to when it gets paid by its customers. This time can be estimated with the following formula:

$$\text{Cash-to-Cash Cycle Time} = \text{Inventory Days of Supply} + \text{Days Sales Outstanding} - \text{Average Payment Period on Purchases}$$

The shorter this cycle time, the better. A company can often make more improvements in its accounts payable and receivable areas than can be made in its inventory levels. Accounts receivable may be large as a result of late payments caused by billing errors or selling to customers who are bad credit risks. These are things a company should be able to manage just as well as inventory.

Demand Flexibility Metrics

Demand flexibility describes a company's ability to be responsive to new demands in the quantity and range of products and to act quickly—which is absolutely necessary in today's marketplace in order to cope with fast-changing trends and the related uncertainty. There are three chief measurements of flexibility:

- *Activity cycle time* is a very simple concept—the amount of time it takes to perform a supply chain activity such as order fulfillment, product design, product assembly, and so on. This cycle time can be measured within an individual company or across the whole supply chain. In retail, order fulfillment is a critical measure of efficiency. But within a supply chain, what's important is the cycle time for the *total* order fulfillment—from the time the first item was made to its sale to the ultimate end user, the customer.
- *Upside flexibility* is the ability of a company or supply chain to respond quickly to additional order volume for the products they carry. Normal order volume may be 100 units per week for a product—but can an order be filled that is 25 percent greater one week, or will the extra product demand wind up as a back order? Upside flexibility can be measured as the percentage of increase *over the expected demand* that the supply chain can accommodate.
- *Outside flexibility* is the ability to quickly provide the customer with additional products outside the bundle of products normally provided. As markets mature and technologies blend, products that were once considered outside the range of a company's offerings can become a logical extension of them. There is danger in trying to provide customers with a new and unrelated set of products that has little in common with the existing product bundle. However, there is opportunity to acquire new customers, and sell more to existing customers, when outside flexibility is managed skillfully.

Product Development Metrics

Product development metrics are measurements of a company or supply chain's ability to design, build, and deliver new products to serve its markets as those markets evolve over time. Technical innovations, social change, and economic developments all cause or contribute to market changes, and as important as they are, this is the category that is most often overlooked in terms of trying to measure performance.

A supply chain simply must keep pace with the market it serves, or sooner or later, it will be replaced. The ability to keep pace with an evolving market can be measured by metrics such as:

- Percentage of total products sold that were introduced in the last year
- Percentage of total sales from products introduced in the last year
- Cycle time to develop and deliver a new product

Metrics by Operation

Sometimes what to measure can be determined by just taking a closer look at the operation itself. The Supply-Chain Council's SCOR Model, introduced in Chapter 3, divides any supply chain into five functions. Here are a few metrics that would be useful in each function. Can you think of others?

1. **Plan.** Costs of planning activities; inventory financing costs; inventory days of supply on hand; forecast accuracy
2. **Source.** Material acquisition costs; cycle times for receiving and using goods; raw materials' days of supply on hand
3. **Make.** Production cycle times; numbers of product defects; other quality issues
4. **Deliver.** Fill rates; order management costs; order lead times; transportation costs
5. **Return.** Numbers of complaints; speed of customer service calls; customer follow-up measures

And those are just a few examples. The efficiency with which these activities are carried out will ultimately determine how well a company performs.

Collecting and Using Performance Data

Historically, companies based their management decisions on periodic, standard reports that showed what happened during some period in the past. In stable and slow-moving business environments, this worked well enough—but there are not many companies that work in stable and slow-moving environments anymore! Working from traditional, periodic, accounting-oriented reports in a fast-paced retail business is somewhat like trying to drive a car by looking only in the rearview mirror.

Today's shorter product life cycles, mass markets dissolving into smaller niche markets, and new technology and distribution channels are constantly opening up new opportunities. To keep pace, a company requires a reporting system that presents data at three levels of detail:

- **Strategic.** To help the senior management team decide what to do
- **Tactical.** To help middle management decide how to do it
- **Operational.** To help employees in general actually do it

In a supply chain management context, *strategic data* consists of current or “actual,” as well as plan and historical numbers, that show the company's standing in the four performance categories: customer service, internal efficiency, demand flexibility, and product development. In the Supply-Chain Council SCOR model, data of this type is referred to as “Level 1” data. This data is the overview or top-level data, summarized by major business unit and for the company as a whole. Strategic data also consists of data from outside the company—things like market sizes and growth rates, demographics, and economic indicators such as inflation rates and interest rates. There should also be benchmark data from industry trade associations and studies that show the operating standards and financial performance levels of the best companies in the markets being served.

In the planning operation, for example, measures of complexity would be the number and percentage of order changes, number of stock-keeping units (SKUs) carried, production volumes, and inventory carrying costs. Configuration measures track things such as product volume by channel, number of channels, and number of supply chain locations. Measures of management practices in the plan operation are such things as planning cycle time, forecast accuracy, and obsolete inventory on hand.

Tactical data consists of actual, plan, and historical numbers in the four performance categories displayed at the “branch office” level of detail—in retail, the individual store level. This data also includes the performance metrics labeled “Level 2” in the SCOR model. SCOR breaks them into 30 core process categories that make up any supply chain. Companies use Level 2 measurements to uncover process inefficiencies and try out possibilities—what if we did things this way? What if we changed just this part of the process?

Operational data consists of the measures labeled “Level 3” in the SCOR model. These measurements help people who are charged with getting a job done to understand what is happening, fine-tune, and find ways to make improvements to meet the performance targets that have been set. The SCOR model refers to these measurements as diagnostic metrics. Companies use Level 3 metrics to analyze information flow and workflow, among other things.

There are also “Level 4” metrics in the SCOR model, but these are company-specific and therefore highly customized. The higher the level of metrics, the more detailed they are, but all are used to analyze some aspect of the complexity and configuration of the supply chain, and to study the effectiveness of specific management practices.

The important thing to note here is that most of us are awash in data, so if it is not presented in ways that are useful and meaningful, we are more likely than ever to discard it. By organizing data into distinct levels, people can quickly access only what they need to do their jobs:

- Upper management uses strategic level data to assess market conditions and set business performance objectives. They can drill down to the tactical level or even the operational levels when necessary.
- Store managers use tactical data to do planning and resource allocation to achieve the performance objectives set by upper management.
- Department managers and their staffs use operational data to solve problems and get things done.

The Data Warehouse

A central repository or **data warehouse** is necessary so that data may be drawn from a variety of operating systems and accounting systems within a company and sent to a single source—secure, but easily accessible to those who need it. Technology makes data collection easy to accomplish directly from its sources, as part of daily operations.

The data warehouse includes a database software package and the automated connections to other systems needed to collect the relevant data on a regular and timely schedule. Working in conjunction with the database software is other software that allows for the creation of standard, predefined reports and graphic displays that people can use to monitor

operations. In addition to predefined reports and displays, the software must also allow people to make queries in the data warehouse when they need to find things or do more detailed investigations.

A company's IT (information technology) department and/or an outside contractor handles the design and updating of the data warehouse, but it is smart for anyone who uses it to have a basic idea of how it operates. Smaller retailers can get by with a simple, smaller-scale software package, but large or multistore retailers require larger and more complex data warehouses.

Remember, the most important component in any data warehouse system is not the technology, or even the data, but the people who use the system and their ability to use it effectively. Chapter 8 goes into further detail about the design and building of these kinds of systems.

In addition to helping the people inside a company to become more efficient in their own jobs, a data warehouse is the foundation for collaboration with other companies in the supply chain. Information is shared electronically, either automatically (reports sent at certain intervals to certain people in other firms) or retrieval-on-demand capability (certain external people are given proprietary "password" access to the data warehouse over the Internet and can download what they need). Figure 7-3 gives an overview of the information flow.

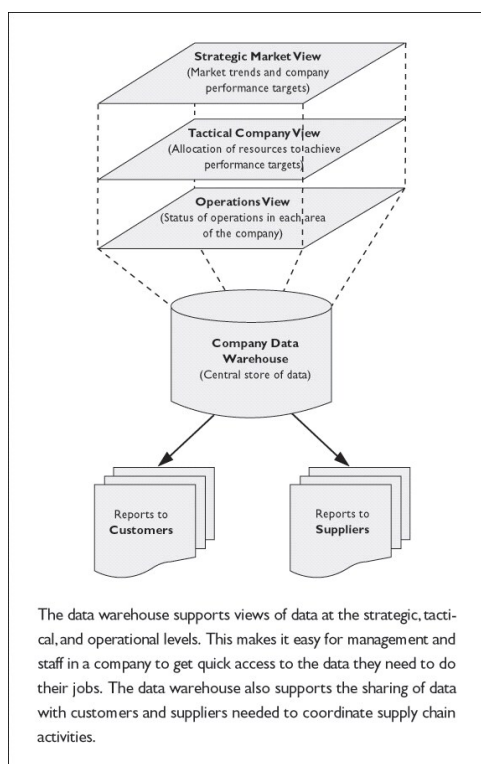


Figure 7-3. The data warehouse displays different views of data to different audiences.

Spotlighting Problems And Opportunities

Now we know that, depending on the type of markets a company serves, senior management must define a handful of key performance targets in the areas of customer service, internal efficiency, demand flexibility, and product development. The task then becomes one of figuring out how to manage operations to achieve the target numbers. The point of collecting performance data is to help monitor and control daily, weekly, and monthly operations.

For the most part, people can run their business or do their job by keeping track of a handful of key indicators that tell them where to direct their attention and help them steer through a complex and changing world. No matter how much data is collected, the system should be set up to provide succinct, one-page displays of these key indicators for each department, or even each person within a department. These snapshots are known as **dashboards** because—like the odometer, speedometer, and gauges on a vehicle—they are “right up front,” showing a person at a glance the top-level, most important data available *for them*. As shown in Figure 7-4, the data displayed on a senior management dashboard will be different from an operating manager's dashboard. The dashboard of a salesperson in one department is different from a salesperson in another department. Dashboards generally show current performance as well as projected performance. This allows the person to see if what is happening now is on target with or falling short of goals.

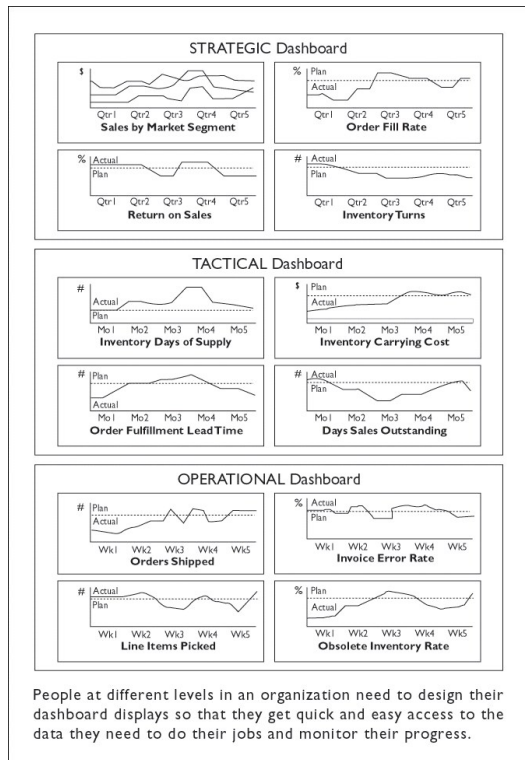


Figure 7-4. Dashboard designs are different at each level.

When a data warehouse and software reporting tools are in place in a company, people can experiment with the design of their dashboard displays or reports. As they get better at using their dashboards to guide their actions, the company as a whole can become more efficient and more responsive to its markets.

Tracking Market Changes

Nothing stays the same, and the retail industry is living proof of that! Products and markets have life cycles, migrating from one quadrant to another. Over time, market forces are always pushing a market toward an equilibrium where supply meets demand. At the same time, other forces pull and push the market, causing it to fluctuate back and forth around the equilibrium point. Call it supply and demand, or just call it crazy! But put it on a chart and a life cycle usually resembles **Figure 7-5** more closely than it would a flat, stable line.

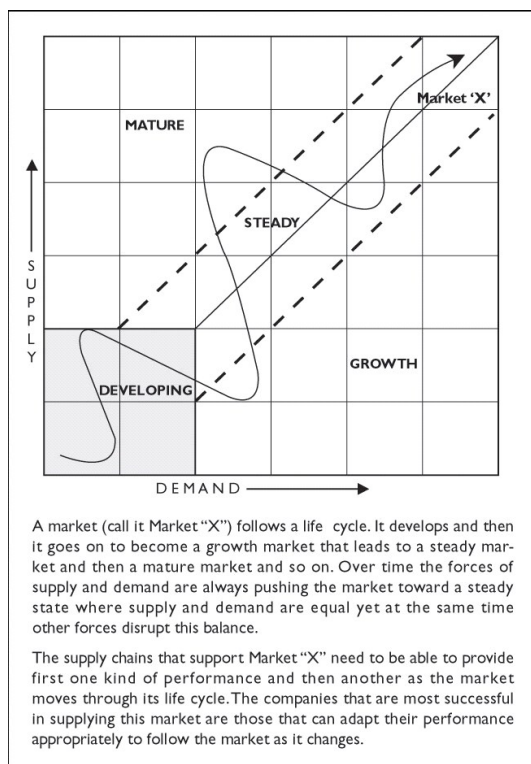


Figure 7-5. Market conditions shift over time.

Supply chain participants adjust their operations accordingly to remain competitive. Adaptability is now as important to survival and success as the four performance categories. Market evolution can often be measured in years—and sometimes, in months. Companies no longer have the luxury of being able to focus on optimizing any single mix of performance capabilities over the long term.

A company may become very skilled at internal efficiency and customer service as called for in a steady market; but as the market matures, the same company will have to add skills in the area of demand flexibility. The company may even need to deemphasize some of its internal efficiency policies in order to ramp up its performance in product development so that it can participate in a promising developing market. The key here is that a company needs to know *when to shift its emphasis* from one mix of performance categories to another, just as a ship at sea adapts to the wind and waves and responds appropriately—and when it comes to necessary course corrections, the quicker, the better.

In the meantime, great demands are placed on the supply chains that support each retailer. In fact, sometimes the supply chain itself can push a market from one quadrant to another, as was illustrated by the “Beer Game” simulation described in Chapter 6. It showed how slight changes in demand by the end customer (or the market as a whole) can cause wildly escalating product demand forecasts to be sent to companies further down the supply chain. This bullwhip effect results in changes in production that outstrip the market’s true demand for the product—pushing the market out of “steady” and into “mature.” As excess inventory is finally used, the market swings back into the “steady” quadrant once again.

One cure for this wild ride known as the bullwhip effect is better sharing of data among all the companies in a supply chain, sometimes known as better **visibility**. Companies need to work through their concerns about sharing data that would otherwise be confidential. There are serious issues to be negotiated: Exactly what data is reasonable to share? How can privacy of critical data be maintained? What are the benefits of sharing data and how can they be quantified?

Hau Lee, director of the Stanford University Global Supply Chain Management Forum, envisions the supply chain as “an intricate network of suppliers, distributors and customers who share carefully managed information about demand, decisions and performance, and who recognize that success for one part of the supply chain means success for all.” [2]

With this in mind, companies need to see demand information from their immediate customers, and also from the end customers of the supply chain—and not just the basics (like demand data), but information about any decisions they make with supply chain implications. In any chain, someone is bound to be “the last to know,” and this lack of information—whether or not it is intentional—can impact product demand and sour supply chain relationships.

Companies are accustomed to sharing demand information with each other, but far less likely to share their decisions or

performance metrics because they are afraid this information could wind up in the hands of competitors and be used against them. However, this has not reduced the need for sharing it, as customers continue to demand more and more from their supply chains. In an interview with *CIO* magazine, Professor Lee put it this way: “If you are late because your distributor is late, your customers will go to a competitor whose distributor isn’t late. That is more than a company-to-company competition. We’re going to see more supply-chain-to-supply-chain competition.” [3]

Measuring Supply Chain Confidence

So how does a supply chain promote trust and confidence among its wary, business-savvy partner companies? And further, can trust and confidence actually be measured, since they are based on people’s perceptions? Professor Lee and colleague Martin Christopher of Cranfield University in Bedfordshire, United Kingdom, collaborated on a 2001 study of this topic for Vastera, a global import/export consulting company (that has since been acquired by JPMorgan Chase). They write

If we consider the supply chain to be, in effect, a chain of customers, then we should be seeking to measure the degree of confidence that each “customer” in the chain has with their upstream “suppliers.” Because confidence is all about perceptions, it is perceptions that should be measured. As well as measuring this qualitative aspect of confidence, it should also be possible to find tangible measures of confidence. For example, how many days of inventory are carried at each step in the chain? Supply chain mapping is a helpful tool for highlighting those points where inventory is highest and therefore, presumably, where confidence is lowest.[4]

Table 7-1 summarizes their findings about how lack of confidence shows itself throughout the chain. Each of these symptoms signals a point that might be measured to determine confidence levels. As Christopher and Lee put it, a well-synchronized supply chain, in effect, “substitutes information for inventory”—that is, when the partners trust each other and communicate accurate and complete information openly, no one has to overproduce, overstock, or overpromise. There is no need to hedge their bets.

Table 7-1: Lack of Confidence in Practice

Business Area	Lack of Confidence Outcomes
Sales	<ul style="list-style-type: none"> Over-order to hold buffer stocks for key customers Over-quote on delivery times to customers—may lose the order Misuse of samples to compensate for lack of stock
Customer service	<ul style="list-style-type: none"> Cannot give accurate information on resolving supply issues May order buffer stock to assist customers
Operations	<ul style="list-style-type: none"> Can derive no patterns on sales due to lack of confidence in other areas; forecasting becomes inaccurate, and the trend continues Likely to overproduce to compensate for other areas’ lack of confidence
Marketing	<ul style="list-style-type: none"> Delays in essential product launches due to uncertainty of supply
Raw material supplier	<ul style="list-style-type: none"> Does not have accurate forecasting and has suffered from previous “emergency” requirements; starts to hold more stock and passes the cost on to their customer
Source: Martin Christopher and Hau L. Lee, “Supply Chain Confidence: The Key to Effective Supply Chains Through Improved Visibility and Reliability,” for Vastera, Inc. (now JPMorgan Chase Vastera), Dulles, Virginia, November 6, 2001.	

[2] Sarah D. Scalet, “The Cost of Secrecy,” *CIO* magazine, © CXO Media, Inc., Framingham, Massachusetts, July 15, 2001.

[3] *Ibid.*

[4] Martin Christopher (Cranfield University, Bedfordshire, United Kingdom) and Hau L. Lee (Stanford University,

Palo Alto, California), “Supply Chain Confidence: The Key to Effective Supply Chains Through Improved Visibility and Reliability,” for Vastera, Inc. (now JPMorgan Chase Vastera), Dulles, Virginia, November 6, 2001.

Chapter Summary

Supply and demand can be used to create a simple model that consists of four market quadrants, into which every product fits at some point during its life cycle:

1. **Developing.** New markets and new products where both supply and demand are low and uncertain
2. **Growth.** Markets where demand is higher than supply and supply is uncertain
3. **Steady.** Established markets where supply is high and demand is high and both are stable and predictable
4. **Mature.** Markets where supply exceeds demand and where demand can be unpredictable

Each type of market has a unique set of performance requirements that are placed automatically on their supply chains: customer service, internal efficiency, demand flexibility, and product development.

Briefly, developing markets require performance in the areas of customer service and product development. Growth markets demand customer service above all else. Steady markets call for customer service and internal efficiency, and mature markets require customer service, internal efficiency, and demand flexibility. In order to succeed, companies and supply chains must excel in the performance areas that are required by the markets they serve.

Neither company nor supply chain can gauge its progress in these performance areas without taking measurements, and the chapter mentioned typical tasks or outcomes that may be measured for each. A data warehouse must be designed as the repository for this information. Most companies err on the side of collecting too much data, and a system was suggested for organizing it into tiers for use by different groups, including dashboards of concise, relevant information for individuals and departments. The most important thing about information is not the quantity of it, but whether it can be accessed and successfully used by the people who need it to do their jobs.

How much and what types of data to share among supply chain partners is an issue of continuing concern in the competitive retail industry, but companies that can learn to trust and share data effectively will be the ones to create the most efficient supply chains.

Discussion Questions

1. What is the difference between gross profit and gross margin? To a retailer, why does this matter?
2. Of all the performance metrics described in this chapter, select one from each of the four “major categories” and explain how it might apply—not in a supply chain, but to your own life as a student.
3. What is the difference between upside flexibility, outside flexibility, and adaptability in a retail supply chain?
4. What items should be on the dashboard of a retail buyer? What items should be on the dashboard of a store manager in a multistore chain?
5. List the types of measurements that would be required to quantify each “lack-of-confidence outcome” in [Table 7-1](#). Which of these would best be measured and studied by individual companies? Which would best be measured by the entire supply chain? Briefly explain your thoughts.

The Incredible Journey Continues

SEPTEMBER 29—WHAT’S IN STORE

CVS store managers like Mike McGee, who manages a CVS in Framingham, Massachusetts, represent the next piece of the supply chain. As he does twice a week, McGee walks up and down the aisles of his store with a handheld computer from Telxon Corp. Underneath every product is a bar code label that tells McGee the minimum quantity of the item that should be kept on the shelf. He eyeballs the Cool Mint Listerine shelf and notices that several of the 500-milliliter bottles appear to be missing. Years of experience enable him to estimate that three bottles are gone instead of having to manually count them. He punches an order for three more into his handheld device. At the end of the day, he connects the machine to an IBM Corp. computer and downloads his full order via modem to (CVS headquarters in) Woonsocket.

CVS is in the process of installing a wireless network and new handheld computers from Symbol Technologies Inc. to automate ordering, says (Leo) Hartnett, the efficient consumer response vice president. Store managers will no longer have to manually figure out how much of an item to restock because the handheld will do all the calculations. Managers scan the shelf label with the handheld, which sends a query for information to CVS's Symbol Spectrum wireless network via the store computer. Within seconds, detailed item information and history, as well as the recommended quantity to order, travels back to the store computer and manager's handheld device. Hartnett would not reveal how much time and money the new system will save, but International Data Corp.'s Jill House, associate research analyst for smart handheld devices, says the savings will be significant.

"The use of handhelds has in past retail pilot trials seen as much as a 10 percent to 15 percent increase in worker productivity, and shipping and inventory accuracy nearing 95 percent to 100 percent," she says. "CVS should see comparable returns on investment."
