

Flowcasting the Retail Supply Chain - Executive Summary

By André Martin, Mike Doherty and Jeff Harrop

FLOWCASTING THE RETAIL SUPPLY CHAIN



André Martin Mike Doherty Jeff Harrop

Foreword by Thomas H. Friedman

The Summary in Brief

The retail store has been disconnected from planning the supply chain, even though the majority of planning problems can only be addressed at store level. For example, retail out-of-stocks are a major problem for retailers and their trading partners, yet no substantial progress has been made on this front in the last 20 years.

Planning the retail supply chain must start at store level.

By starting at the store and producing forecasts of consumer demand, all other demands in the supply chain can be calculated. The result is **order-of-magnitude improvements in reducing out of stocks and improving inventory performance and profitability** for all members of the extended retail supply chain.

Retailers and their trading partners can **increase profitability by 1-6% of top line sales** by using Flowcasting to plan the retail supply chain!

What You'll Learn in this Executive Summary

- **A forecast of store-level consumer demand is the only forecast that any retail supply chain needs.** This forecast is easily translated into demand, supply and inventory projections for all other partners in the supply chain. There will be no need for suppliers to forecast their upstream customers' demands.
- **A number of supply chain planning problems are resolved, or significantly improved, using Flowcasting.** These include: virtually eliminating retail out-of-stocks (even during promotions), minimizing seasonal inventory carryover and flawlessly executing on assortment, operational and financial planning.
- **Flowcasting provides a single set of numbers, or a single version of the truth, to which all supply chain partners can plan.** Flowcasting translates consumer demand forecasts into demand projections, manpower and equipment requirements, capacity requirements and financial plans for all trading partners.
- **Flowcasting allows people to work by exception and "see" the future.** People can identify problems before they occur and take action to resolve them before they happen.
- **Flowcasting ensures that retailers and their trading partners are ultra-competitive.** Results to date have proven that using Flowcasting retailers and their trading partners can improve bottom line performance by 1-6%.
- **The success of Flowcasting is dependent on people and process.** People make the Flowcasting process work. The more sustained effort you invest in education, training, process design and integration, the better will be your results.

Flowcasting the Retail Supply Chain - Executive Summary

By André Martin, Mike Doherty and Jeff Harrop

Section 1: The Need for Flowcasting

Starting at Store Level

- The **retail store** is often considered the **weakest link in the retail supply chain** - a notion supported by numerous surveys conducted over the past 10 to 15 years regarding out-of-stocks.
- **Retail store out-of-stocks (usually in the 5 percent to 8 percent range)** are indeed much worse than the percentage of out-of-stocks that occur elsewhere across retail supply chains. Even worse, those numbers **balloon to almost 15% during promotions**.
- The **nodes in a retail supply chain** are **highly interdependent**. And when they're managed as such, the benefits that accrue to the trading partner are staggering in terms of reducing costs and improving customer service - two keys in winning today's retail race.

Forecasting Today - Every Node for Itself

- Today's forecasting happens everywhere, but where it really counts - at store level. Consider the following chart, which outlines the many functions and types of forecasts that retailers do today:

Who is Forecasting

| | Top Management | Sales and Marketing | Stores | Distribution | Finance |
|---------------------------------|----------------------|---------------------|--------------|------------------|-----------|
| What They're Forecasting | Revenues | Marketing plans | Sales | Transportation | Revenues |
| | Profits | Sales plans | Manpower | Warehousing | Profits |
| | Capital expenditures | Promotions | Inventories | Receiving | Cash flow |
| | Earnings per share | New products | Space plans | Shipping | |
| | New stores | | Receiving | Customer service | |
| | Store closings | | Shipping | Manpower | |
| | | | New products | Inventories | |
| | | | | New equipment | |

Figure 1: Retailer's functional forecasting activities.

- Clearly, retailers spend a significant amount of time and effort on forecasting activities. The same is true for manufacturers and wholesalers. Since the retail supply chain is not linked, it's every node for itself - everyone is forecasting.

Flowcasting the Retail Supply Chain - Executive Summary

By André Martin, Mike Doherty and Jeff Harrop

- The result of this “forecast-everywhere-but-where-it-counts” approach is that forecast performance has actually worsened over time:
 - Low forecast accuracy was one of the key findings in a recent Grocery Manufacturers of America study by Roland Berger Strategy Consultants. “Errors at the national, monthly item-level - measured as mean absolute percentage error (MAPE) - were 23 percent in 1996 and 31 percent in 1999. In 2002, the error rate had increased - to 34 percent on a national, monthly level and 44 percent on a shipping location level.”
 - How can this be? Major investments in new forecasting practices and technology over a sustained time period, and it’s getting worse.

Dependent Demand

- Years ago in the auto industry, people realized that once you forecasted how many of a particular car model you would assemble and then sell, you could easily calculate the demand for tires, steering wheels, hubcaps and a variety of other parts. These component level forecasts were based on “dependent demand” - that is, they depended entirely on the demand for finished cars.
- The concept of dependent demand is important in retail planning as well. Consider the supply chain shown in Figure 2. At every node of this distribution channel, a customer/supplier relationship has been created. For example, the factory has one customer, MDC1. MDC1 plays a dual role—it is the customer of the factory and the supplier to RDC1 and RDC2. RDCs 1 and 2 also play dual roles; each is a customer of MDC1 and each is a supplier to a specific number of stores (two each in this example).

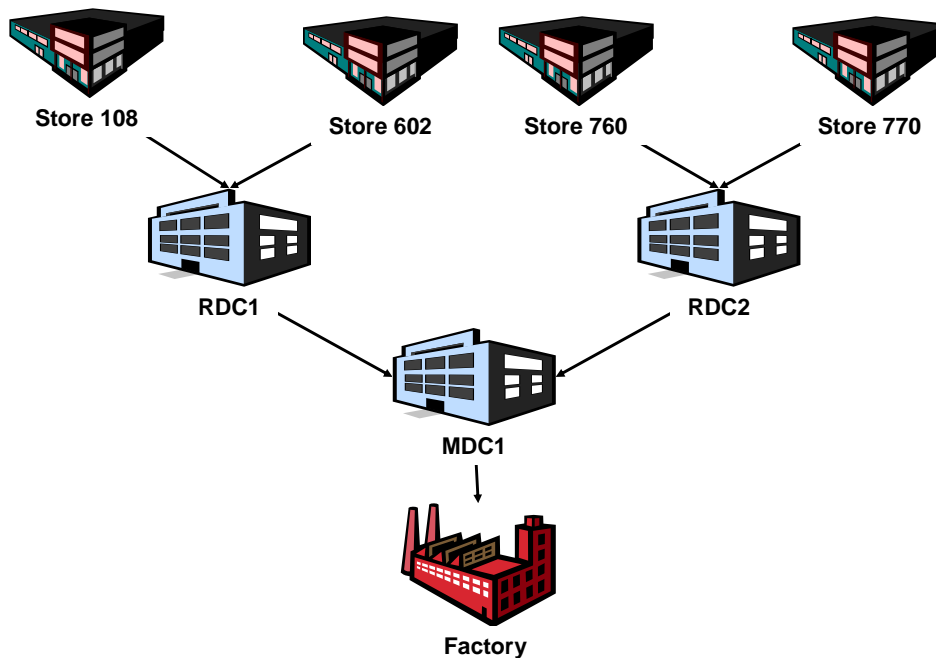


Figure 2: Dependent demand in a retail supply chain.

Flowcasting the Retail Supply Chain - Executive Summary

By André Martin, Mike Doherty and Jeff Harrop

- When store 108 needs products, it orders from RDC1. When RDC1 needs products it will order from MDC1. The product demand that RDC1 experiences will always be generated by stores 108 and 602. In other words *the demand on RDC1 is dependent on the needs of stores 108 and 602.*
- Another way to look at this distribution channel is to think of the way products will normally flow from factories to store shelves. Once you have forecasted what consumers will buy at the store level, you can calculate the demand flow through every node and trading partner within this distribution network. And this makes perfect sense. After all, we build distribution centers to serve the demands of other DCs and stores. So why not have forecasting and planning processes and systems follow in the same path that support the way we actually do business?

The Power of One (Forecast)

- Manufacturing Resource Planning (MRP II) has been used in manufacturing to manage inventories for decades. Distribution Resource Planning (DRP) applied the same principles to the management of distribution inventories, resulting in significant improvements in fill rate and inventory turns.
- Flowcasting extends this thinking to the retail store - the place where the information flow starts and product flow ends - thereby closing the supply chain loop with a common process for all nodes.
- The solution is simple and intuitive - first, create a model of total supply chain from the factory to the store shelf inside the same system (see the picture below), then make a forecast for what consumers are going to buy, item by item and store by store. With a clear picture of demand at the ultimate point of sale, schedule all upstream supply nodes to meet demand. The calculated supply schedules are just basic math using DRP logic at every location, including each store.
- As shown in Figure 3, forecasting only needs to happen at the final point of sale, the retail store. The calculated demand at each level, from retail stores through the supplier's factories, *is the one set of numbers that can be converted into meaningful units within each functional area of the supply chain.*

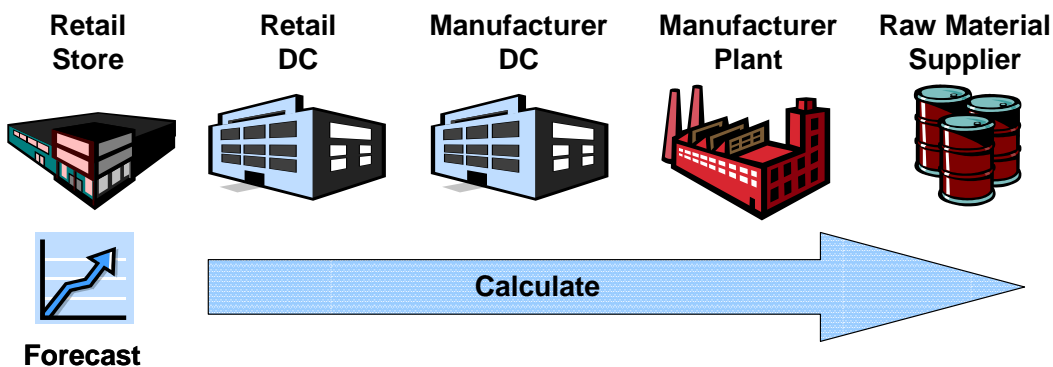


Figure 3: One sales forecast only at store level.

Flowcasting the Retail Supply Chain - Executive Summary

By André Martin, Mike Doherty and Jeff Harrop

Why is this Better?

- Forecasting at store level and calculating dependent demand throughout the extended retail supply chain is far superior to today's approaches since:
 - Everyone is focused on consumer demand and can collaborate on developing the best possible forecast of consumer demand
 - It can eliminate all forecasting happening today at the DC level, Wholesale level and at the Manufacturing level
 - Forecasting at the distribution center level actually introduces a significant source of error: store-level inventory levels.
 - If the stores have too much inventory, any RDC level statistical forecast based either on aggregate sales history or warehouse withdrawals will yield forecasts that are larger than what is actually needed. The result is even more excess inventory. If the stores don't have enough inventories, any RDC level statistical forecast based on the aggregate sales history or warehouse withdrawals will generate a forecast that is too low, resulting in out-of-stocks.
 - It factors in store-level inventories precisely where they count: at the store level plan. These include store on-hand balance, shelf resets, delivery schedules, minimum shipping quantities, supplier ordering rule changes, product phase in/phase out, and so on.
 - Consider Figure 4 which shows the sum of the POS forecast for a product at a number of stores supported by a retail DC, as well as the projected demand (dependant demand calculation) on the distribution center from the same stores. It clearly shows the effect of one of these factors: inventory imbalances at store-level.

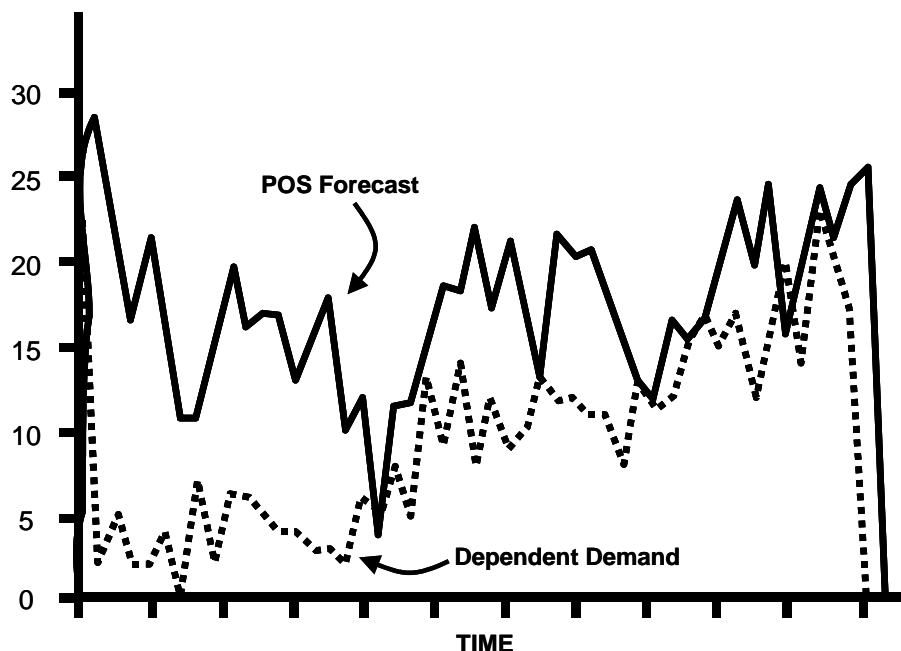


Figure 4: POS forecast compared to dependent demand forecast.

Flowcasting the Retail Supply Chain - Executive Summary

By André Martin, Mike Doherty and Jeff Harrop

- The solid line is the sum of the POS forecasts for the more than 100 stores supported by this distribution center. The dotted line is dependent demand that the distribution center will experience once store level inventories are taken into account. Notice that in the first week, the dotted line is significant as the stores that are below the minimum display quantities are brought up to the minimum.
- The differences between the solid and dotted lines indicate the degree of error that can exist between the POS forecasts and an accurate orders forecast (what a retailer will buy from suppliers). The typical orders forecast resembles the solid line, while the orders forecasts we are proposing would resemble the dotted line.

Section 2: How it Works

The Flowcasting Concept

- Flowcasting starts at the head of the retail supply chain (the store) by forecasting what consumers will buy each day over the forecast period - typically one full year to capture the entire business cycle. It calculates dependent demand to predict how much inventory RDCs must ship in the stores, and when specified quantities of product must arrive in order to meet consumer demand over the entire forecast horizon - not just the next order. Flowcasting repeats this process for every supply chain node that a product will flow through on its way from the factory floor to the retail store shelf.
- Figure 5 shows the power of this approach within the first two nodes of a retail supply chain (for simplicity, only the first 8 days of the 52-week planning horizon are shown).

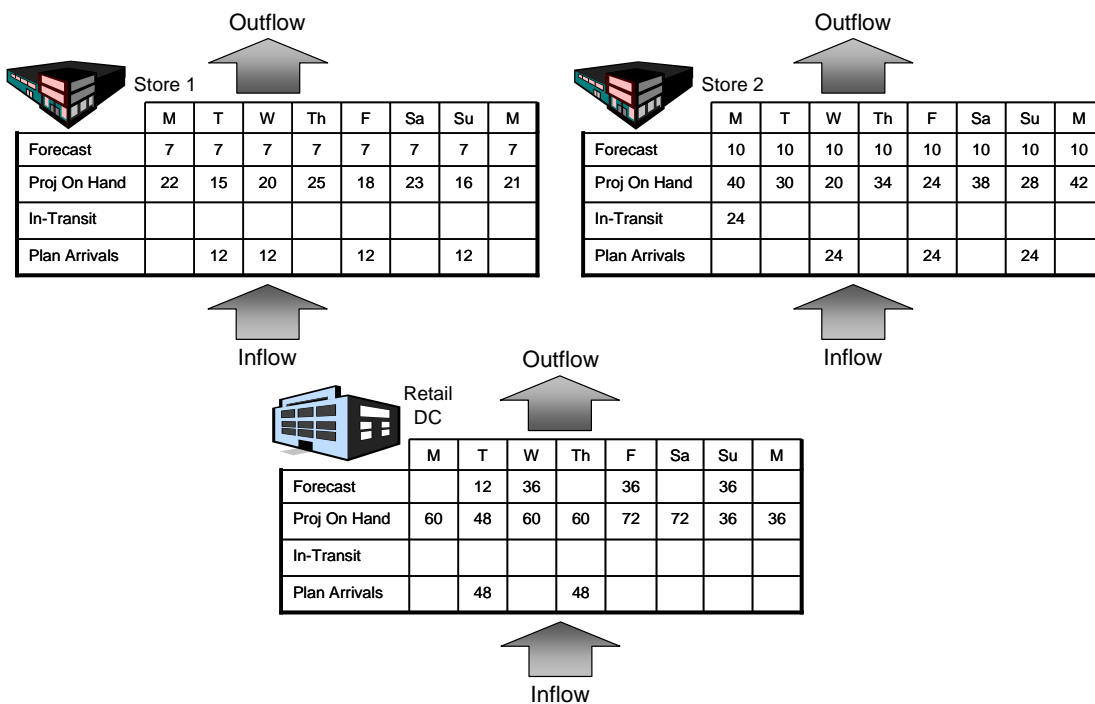


Figure 5: Flow of products in and out of retail stores and DCs.

Flowcasting the Retail Supply Chain - Executive Summary

By André Martin, Mike Doherty and Jeff Harrop

- The ability to flowcast the inflow and outflow of products across each node enables the translation of information into the various languages of the key functional areas within a retail company.
- For example, planned receipts (into a store or RDC) can be converted to receiving hours, in order to plan receiving capacity. The capacity plan for receiving can also be expressed in terms of the number of trucks that need to be received in a given retail store or RDC, thereby transforming the typical appointment system into a *forward looking* system in which valid delivery dates can be stated on planned purchases *before* orders and schedules are sent to suppliers. By using this approach, suppliers would no longer have to call in for appointments before making a delivery - Flowcasting creates a receiving capacity plan for the future inbound flow of traffic and can be used to match daily receiving capacity before sending out purchase orders.
- The output from Flowcasting can also be used to make financial projections of planned product receipts from suppliers in dollars, by week, by month, or one year into the future. These projections become excellent input for cash flow planning purposes. Companies can even take the projected product receipts from suppliers and offset them by their payment terms, so as to predict the amount of accounts payable that product purchases will represent.
- Projected inventory levels can be converted to projected inventory investment in the currency of choice. The projected inventories can also be converted into cases and pallets in order to calculate how much warehousing space will be needed.
- Since information is generated from item/store level consumer sales forecasts and is time-phased a year out, it drives every key function in a retail company. In other words, the consumer sales forecast becomes a “universal” set of numbers that can be easily trained to speak the various functional languages of the company.
- To flowcast any retail supply chain, the process would start with daily requirements at the retail store. Once those requirements are known, the entire retail supply chain can be synchronized to meet those needs. As a result, ordering and delivery requirements to retail stores will be completely visible to supply chain participants that manufacturer and distribute those products. Trading partners will know the specific retail store needs today, tomorrow, next week and well into the future. The same visibility will apply to all other nodes in the supply chain. As a result, when conditions change (selling over or under forecasts), product flow requirements can be recalculated daily and communicated to supply chain participants.

What are the Benefits?

For Retailers

- Retail distribution centers would become, over time, cross-docking and repackaging facilities. Products would arrive from supply sources and would then be repackaged when necessary in units of weekly store sales. Initially, most products would be cross-docked and inventory turn rates in RDCs would rise to 50 or more annually. Repackaging operation costs would be shared among supply chain trading partners. Over time, fewer retail DCs would be required.
- Retail stores would receive deliveries so that trucks would be unloaded in shelf placement sequence. Since repackaging would be done in RDCs (or in 3PL provider facilities), retail

Flowcasting the Retail Supply Chain - Executive Summary

By André Martin, Mike Doherty and Jeff Harrop

stores would be able to free up significant shelf space that management could use to fulfill other consumer needs. Backroom inventories would become a thing of the past. Retail store sales would increase 2 to 8 percent, while store inventory turns, over time, could rise to 50 or more annually depending on products' selling velocities.

- Retailers would no longer need separate forecasting and replenishment systems for their stores and RDCs. One common system would manage inventory in both stores and RDCs and interface with suppliers on a daily basis.
- The internal theft portion of product shrink would be reduced by at least 50 percent due to the hourly and up to the minute visibility of what is on the shelf, what is sold, and what is coming into the store.
- One common system would span cross-organizational boundaries. Store operations, merchandising, buying, category management, distribution, finance and management would all be working from one set of numbers.

For Wholesalers

- Flowcasting would enable wholesalers to become value-added partners for their manufacturing suppliers and retailing customers. Their businesses would transform as they become professional cross-dockers and repackagers for those retailers or manufacturers that cannot or do not want to take on those activities themselves.
- Wholesalers would only need to hold a few days of inventory, compared to the volumes they carry today.
- Wholesalers would require far less warehousing space. Many of their current activities in purchasing, distributing, marketing and selling would be significantly reduced and, in some cases, eliminated.

For Manufacturers

- A manufacturer's way of doing business would change completely. The timeframe for the change would depend on the size of their retail and wholesale customers, and how rapidly those customers adopt Flowcasting. Over time, as more retailers adopt Flowcasting, the manufacturer would gradually convert from a manufacture-to-stock (MTS) strategy to a manufacture-to-order (MTO) strategy for most of their business, and reap all the economic and productivity benefits that derive from the MTO approach. Gone would be the uncertainty of demand, associated safety stocks, and associated warehousing and operating costs as well as last minute and very costly production schedule changes.

For All Trading Partners

- Supply chain-wide inventory investment would drop significantly for those retail supply chain partners that adopt the Flowcasting way of doing business. We predict that once critical mass is achieved, finished goods inventories in the global consumer goods industry would drop by two thirds. These inventories, which now range from 80 to 120 days on-hand in the consumer goods industry, would drop to 30 to 45 days on-hand, which would represent a substantial opportunity to reduce costs, product obsolescence, and returns.

Flowcasting the Retail Supply Chain - Executive Summary

By André Martin, Mike Doherty and Jeff Harrop

Section 3: Solving Supply Chain Problems, Realizing Opportunities

Flowcasting provides unprecedented opportunities to solve problems or take advantage of supply chain opportunities as summarized below:

Promotional Planning

- Numerous studies have concluded that most retail out-of-stocks are the result of poor store ordering and an unresponsive supply chain, especially during promotions. Since the Flowcasting process plans at store level and resynchronizes the entire retail supply chain daily based on what's happening at store level, these root causes are eliminated.
- In most promotions, some stores sell more than expected while others sell less. With Flowcasting, only a portion of the inventory is positioned at the store level prior to the promotion. This provides opportunities for re-supplying stores that need more inventory during the promotion.
- At the manufacturer's end of the supply chain, Flowcasting provides production schedulers with unprecedented visibility into the needs of their customers. They can see changes in demand at the plant only a day or two into the promotion and can adjust their production to provide the right amount of product to the DC's that need it.
- Flowcasting naturally links all nodes in the supply chain. This takes the guesswork out of determining how much to produce and where to deploy product during promotions. In the following diagram the 2 stores provide demand projections for the RDC, the RDC provides demand projections for the MDC, and so on until the supply chain is linked.

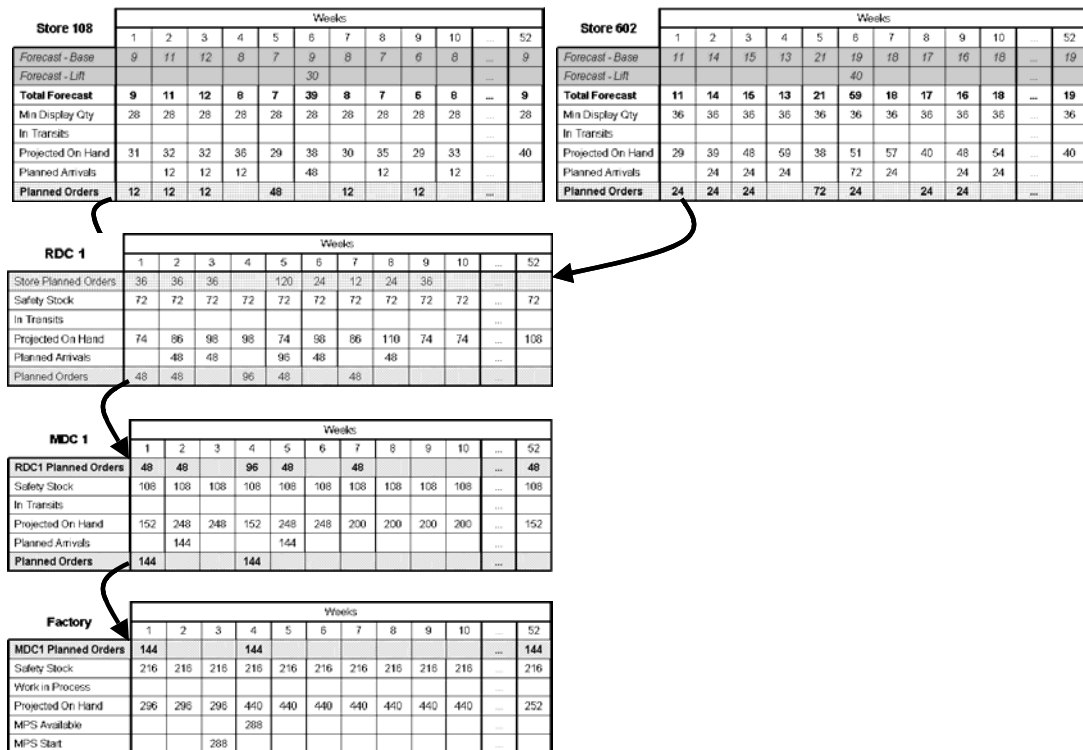


Figure 6: Natural cascade of dependent demand for a planned promotion.

Flowcasting the Retail Supply Chain - Executive Summary

By André Martin, Mike Doherty and Jeff Harrop

Assortment Planning

- All products have a lifecycle. Flowcasting provides the ability to translate the lifecycle into actionable information for all trading partners.
- The Flowcasting process provides the visibility required to effectively introduce new products to the marketplace. Store-level forecasts and inventory projections give planners the ability to see the impact of their decisions long before they will occur. This provides all trading partners, through their Flowcasting teams, with the opportunity to create, agree to, and execute a plan.
- Product-level visibility can be converted into capacity requirements to ensure that initial store distributions of new products will not create a bottleneck anywhere within the extended retail supply chain. In the event they do, decisions can be taken in advance to avoid constraints.
- Store level visibility and the ability to continuously recalculate store-by-store run-out dates of an existing product make it far easier to introduce a new product while replacing an old one
- Since the entire supply chain is linked by a series of cascading planned orders (dependent demand), all trading partners have advance notice of product introductions and discontinuations and the impact that these events will have on their operations.

Seasonal Planning

- Dependent demand communicated to trading partners will reflect when a season starts and ends.
- Because the Flowcasting planning horizon is a full year into the future, next year's sales, inventory and merchandising plans can be completely set up and ready to execute immediately after the previous season's post mortem review.
- Future visibility regarding inventory projections provides people with the information they need to make good decisions regarding end of season inventory levels. For example, Figure 7 highlights to a planner that 2 items in store 108 will have significant end of season carryover inventory (expressed in future days of supply) unless action is taken:

| Store 108 | Days of Supply by Week | | | | | | | | | | | |
|-----------|------------------------|----|----|----|----|----|-----|-----|-----|-----|-----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | ... | 52 |
| Shovel 1 | 21 | 14 | 7 | 21 | 14 | 7 | 180 | 171 | 165 | 158 | ... | 21 |
| Shovel 2 | 21 | 14 | 21 | 14 | 21 | 14 | 7 | 0 | 0 | 0 | ... | 0 |
| Shovel 3 | 21 | 14 | 7 | 21 | 14 | 7 | 190 | 183 | 180 | 180 | ... | 0 |

Figure 7: Projected inventory coverage in days of supply for three shovels at store 108.

Flowcasting the Retail Supply Chain - Executive Summary

By André Martin, Mike Doherty and Jeff Harrop

Operational Planning

- The Flowcasting process provides projections of demand, inventory, and supply at the most granular level (by store by product). This information can be multiplied by product factors (such as cube and weight) to provide projections that are useful to operations planners.
- The Flowcasting process provides both the short- and long-term information required to improve operational planning. Since the process is a simulation of what is going to happen in the future, this information can be used for capacity and transportation planning. Consider the diagram in Figure 8.

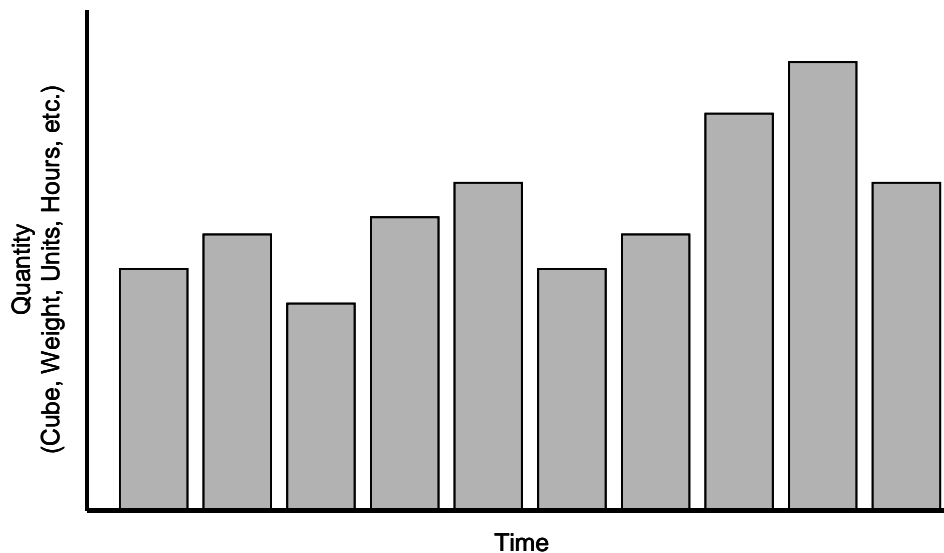


Figure 8: Visibility of required capacity provided by Flowcasting.

- In the example above, the chart could represent a number of different views of capacity including:
 - Cube to be received
 - Hours needed to unload
 - Hours needed to put away product
 - Weight to be shipped between a particular source and destination
 - Inventory space required at any location
 - Numbers of trucks to be received
- Operational planners cannot work in isolation from other departments and other companies (e.g., suppliers). Rather, everyone must work together and arrive at solutions that provide top-notch service and reduce costs. Since people have long term projections of product flows and associated capacities, exceptions can be highlighted and actions taken to resolve them before they occur.
- Since the Flowcasting process provides accurate projections, it can be used to develop transportation freight budgets, negotiate freight rates, and justify the purchase of equipment.
- Flowcasting will enable the deployment of new distribution methods. The new methods will be used to avoid potential problems and reduce costs.

Flowcasting the Retail Supply Chain - Executive Summary

By André Martin, Mike Doherty and Jeff Harrop

Financial Planning and Budgeting

- The Flowcasting process provides the capability to do store-level business planning and calculates all other demand and supply projections throughout the extended retail supply chain. This makes it possible to conduct business planning at all levels by simply converting planned product flows into financial flows. The result benefits the entire supply by providing a single set of numbers for planning.
- Flowcasting makes it possible to use supplier scheduling in retail environments since accurate projections of future purchases, inventory levels, and sales are provided, a year into the future.
- Flowcasting facilitates and improves category management processes. With Flowcasting, projections of sales and inventory can be aggregated by category, division, or whatever aggregate display is needed.
- Retail Sales & Operations Planning (RS&OP) will emerge as an improved way to gain control of the business. Like its manufacturing counterpart, Sales & Operations Planning, Retail S&OP will help ensure that everyone in retail is “on the same page.” Figure 9 depicts a potential template for Retail Sales & Operations Planning:

| Sales & Operations Planning | | | | | | | | |
|--|-----|-----|-----|-----|------|-----|-----|-----|
| All numbers in 000's | | | | | | | | |
| Time periods = months | | | | | | | | |
| Sales | | -3 | -2 | -1 | | | | |
| Plan | | 240 | 250 | 260 | Curr | +1 | +2 | +3 |
| Actual | | 235 | 252 | 261 | 270 | 250 | 240 | 240 |
| Difference | | (5) | +2 | +1 | 268 | | | |
| Cumulative Difference | 0 | (5) | (3) | (2) | | | | |
| | | | | | | | | |
| Purchases | | -3 | -2 | -1 | | | | |
| Plan | | 260 | 260 | 260 | Curr | +1 | +2 | +3 |
| Actual | | 258 | 266 | 260 | 260 | 260 | 260 | 260 |
| Difference | | (2) | +6 | 0 | 260 | | | |
| Cumulative Difference | 0 | (2) | +4 | +4 | | | | |
| | | | | | | | | |
| Inventory | | -3 | -2 | -1 | | | | |
| Plan | | 740 | 750 | 760 | Curr | +1 | +2 | +3 |
| Actual | 740 | 735 | 747 | 758 | 750 | 740 | 730 | 730 |
| Difference | | (5) | (3) | (2) | 753 | | | |

Today

Figure 9: Potential template for Retail Sales & Operations Planning.

Flowcasting the Retail Supply Chain - Executive Summary

By André Martin, Mike Doherty and Jeff Harrop

Making it Happen: Implementing Flowcasting

- In a Flowcasting world people, not computers, are responsible - and rightly held accountable - for sales, in-stocks on the shelf, inventory investment, and operating costs. Therefore, people must be in total control. When a store or retail DC goes out of stock, no one can blame the computer; it's knowledgeable people who know the products, the consumers, suppliers that make the decisions.
- In a Flowcasting world, hardware and software are to Flowcasting teams what drills, hammers and saws are to the carpenter, a set of tools to get the job done. And it's people who will ultimately solve business problems. Show people how to get accurate foundational data, and give them the necessary education and training they need, and they will generate valid models that will enable others to do their job in a superior way.
- Flowcasting is thus a mix of human judgment and sophisticated technology. And given that it represents a sea change in the way a company does business with its trading partners, a formal implementation process is necessary to ensure a success. Figure 10 outlines fourteen basic steps for implementing Flowcasting.

A Basic Flowcasting Implementation Plan

| | | | | |
|--------------------|--------------------------------|---------------------------|------------------------------------|--------------------------|
| Audit Assessment I | Initial Education | Flowcasting Teams | | |
| | Project Initiator Organization | Education/Consulting | | |
| | Performance Goals | Business Process Redesign | Demand Management | |
| | | | Data Integrity | |
| | | | Software | Performance Measurements |
| | | | Conference Room Pilot & Live Pilot | Roll-out |

Figure 10: The 14 basic steps of a Flowcasting implementation plan

- This approach is based on a proven approach that has successfully stood the test of time in retail, wholesale, and manufacturing companies. If you follow it, you'll maximize your chances of gaining unprecedented visibility into your supply chain from store shelf to the factory floor. To be sure, implementing Flowcasting is a major undertaking. But the benefits far outweigh costs of transforming your retail supply chain from a series of disconnected islands to a seamlessly integrated entity driven by a single forecast.