

› White Paper



Demand Signal Analytics: The Next Big Innovation in Demand Forecasting

Contents

Introduction.....	1
What Are Demand Signal Repositories?	1
Benefits of DSRs Complemented by DSA	2
What Are Users Hoping to Gain?	2
What Is the Core of Demand Sensing?	2
Demand Signal Analytics: The Next Big Innovation in Demand Forecasting	3
What Is Demand Signal Analytics?	3
Why Is DSA Important?	3
Key Benefits	4
Conclusion	5

Bio: As Chief Industry Consultant, Charles Chase is the principal solutions architect and thought leader for delivering demand planning and forecasting solutions to improve SAS customers' supply chain efficiencies. Chase has more than 20 years of experience in the consumer packaged goods industry, and is an expert in sales forecasting, market response modeling, econometrics and supply chain management.

Introduction

There has been a lot of focus on demand signal repositories (DSR) over the past several years, but little emphasis on leveraging that information using predictive analytics.

The majority of the output has been focused on descriptive analytics or reporting. If you want to be more proactive than simply basing replenishment on shipment data, you need access to downstream data, analysis and insights to make decisions to stay ahead of the demand curve. It is about more than just seasonality and forecasting trends. Using DSR information for demand sensing is about identifying and measuring market signals and using those signals to shape future demand. DSR is a basic foundation, but demand signal analytics (DSA) is where real differentiation and value can be gained.

Companies across a myriad of industries understand the importance of becoming demand-driven. The challenge is to gather, cleanse and access the vast amount of downstream demand data. Downstream data can be difficult to master and govern without a cohesive approach across the organization.

The DSR solution for consumer products companies is an integrated information hub that provides the foundation for breakaway analytics and optimization across the enterprise. Companies aren't using big data to its fullest potential. Information sources such as retailer point of sale (POS), syndicated scanner sources (Nielsen, IRI and others), loyalty programs, consumer panels and social media – as well as ERP software from SAP for finance and internal systems – are all available to drive powerful analytics. Downstream consumption data is now more widespread, with many retailers sharing POS data with consumer products companies on a daily basis and, as a result, expecting to benefit from enhanced supplier knowledge.

There are challenges to becoming a demand-driven organization. Many of the data sources are new for most companies, so ownership, expertise and governance are important. Many executives say that their organizations are still in the early stages of data integration and cleansing due to poor data quality and lack of internal skills for maximizing analytic benefits.

In today's business environment, there are significant financial implications to ineffective data management. The results can be higher costs and lower revenue due to non-optimized inventory, ineffective demand planning, strained product launches and higher out-of-stocks.

The successful implementation of a DSR, supercharged by DSA, is dependent upon managing POS and syndicated scanner data effectively and complementing it with specific internal data attributes, such as the company's product hierarchy. This exercise makes the POS and syndicated scanner data a more robust source of information to analyze with more dimensions to gain more usable insights. This type of attribute data comes from internal corporate systems, local repositories and spreadsheets. Furthermore, it is often manually maintained and not subject to good data governance practices.

What Are Demand Signal Repositories?

A demand signal repository (DSR) is a data warehouse designed to integrate and cleanse demand data for use by consumer goods manufacturers, automotive manufacturers, electronics manufacturers and others to efficiently serve retailers and consumers.

Gartner defines DSRs as centralized databases that store, organize and harmonize attributes for large volumes of demand data – POS data, wholesaler data (electronic data interchange, inventory movement, promotional data) and customer loyalty data for use by decision support technologies (category management, account team joint value creation, shopper insight analysis, demand planning forecast improvement, replenishment, etc.).

The primary focus has been on cleansing the data and synchronizing it with POS, syndicated scanner and internal (shipment and replenishment) data to enable companies to provide business users with a more complete view of retail performance.

The repository itself is a database that stores the information in a format that allows for easy retrieval so that users can quickly query the database to identify what's selling, where, when and in what quantities. Identifying marketing opportunities, demand performance, and out-of-stocks – along with control-tower tracking and monitoring – are all important requirements.

Using that data to perform predictive analytics is where the real benefit (*innovation*) lies. By considering POS within your data model, you can help identify both current and potential impacts from a sales, marketing and demand planning perspective.

With the right architecture, DSRs can grow along with your business needs. They can be applied across multiple business functions, including category management, supply chain

management, inventory management, promotion and event management, sales, marketing, and others.

Benefits of DSRs Complemented by DSA

The augmentation of DSR data improves visibility and control. POS and syndicated scanner data can be a tremendous asset when used properly. By integrating POS data with company-specific attributes, manufacturers can use that data to collaborate more effectively across the organization and with their retailer (customer) networks. POS data can then drive commercial and operational improvements, such as:

- Improving demand forecast accuracy by enhancing demand sensing and shaping activities.
- Reducing out-of-stocks.
- Detecting product category changes more effectively.
- Improving evaluation of new product information.
- Intergradation of sentiment analysis.
- Increasing trade promotion effectiveness.
- Lowering inventory and safety stock levels.

What Are Users Hoping to Gain?

Users want easy-to-use visualization tools that have predictive analytics capabilities to uncover market opportunities by more efficiently synchronizing demand and supply to take advantage of the information stored in their DSRs. If a solution can't accomplish this, then it's probably a solution that is proprietary and not a true DSR.

The open architecture you are looking for should have an intuitive point-and-click user interface with strong visualization capabilities that lets users easily get reports to help them understand their sales, manage categories and brand information, and more. Users should easily be able to drag, drop and drill into information. They should be able to pull data from multiple data sources, share reports securely and create alerts.

In addition, users who have specific requirements (for example, price elasticity or analyzing promotional ROI) that aren't handled in their DSRs need an exploratory capability that uses predictive analytics on POS/syndicated scanner and shipment and replenishment data.

Alerts combined with predictive exploratory capabilities using visualization will allow users to pinpoint areas of the business that require immediate attention. The goal of a DSR is to provide faster access to more information, improve retailer relationships, maximize ROI, streamline internal efficiencies, improve

performance at all stages of the supply chain and support multiple departments and teams. However, most DSRs fall short of their promise by providing control towers (including dashboards) and descriptive reporting to monitor and track their business year over year – but with virtually no predictive analytics to uncover useful insights into the data.

What Is the Core of Demand Sensing?

Demand sensing and shaping are terms that have been loosely used over the past several years, with changing definitions depending on the industry and purpose. The most common definitions are associated with consumer product goods. Demand sensing, especially in recent years, has come to denote using detailed downstream sales data (sales orders – preferably POS data) to refine short-term demand forecasts and inventory positioning in support of a one-to-six week supply plan. It is slowly being expanded to cover medium-term operational and inventory replenishment plans that require a one-to-eight month demand forecast. Now it also includes long-term strategic forecasting and planning (two years or more). The term *demand shaping* describes measuring the relationships of customer (or consumer) demand with sales promotions and marketing events or price discounts, and then using those influence factors to shape future demand. These new, much broader definitions, and the need for demand sensing and demand shaping, have been at the forefront of many conversations with senior executives across all industries globally.

Demand sensing is the translation of downstream data, with minimal latency, to understand what is being sold, who is buying the product and how the product is affecting demand. Overall, three key elements define demand sensing:

- **Use of downstream data (for demand pattern recognition).** This requires the ability to collect and analyze POS data across market channels, geography and so on to understand who is buying what product and in what quantities. Those demand signals measured are not just traditional demand signals, such as trend and seasonality. Demand signals also include price, advertising, sales promotions, in-store merchandising (e.g., features, displays, temporary price reductions and weighted distribution), economic factors and others.
- **Measuring the impact of demand-shaping programs.** This refers to the ability to analytically measure and determine the impact of demand-shaping activities (price promotions, sales tactics and marketing events) as well as changes in product mix, new product introductions and other demand-lift related factors. It also includes measuring and assessing the financial impact of demand-shaping activities related to profit margins and overall revenue growth.

- **Reduced and minimal latency.** This refers to the ability of modeling and forecasting demand changes on a more frequent basis (e.g., weekly versus monthly).

Traditionally, demand forecasting is done on a monthly, or longer, basis. Demand sensing requires that demand be modeled on a shorter-term basis – weekly or even daily, depending on the frequency of new information – and the changes in demand be reflected on a daily (if that is the frequency of new information) basis.

As stated previously, demand sensing uses downstream data to communicate what products and services have been sold, who is buying the products and services, and the impact of sales and marketing activities on consumer demand. These three demand elements are used to shape future demand, which is translated into creating a profitable demand response.

Although many companies have developed demand processes to capture volume information and replenishment (shipments) within their supply chain, it is the responsibility of sales and marketing to capture demand insights in regard to which sales promotions and marketing activities have influenced consumers to purchase their products.

The information translated into a demand response by sales and marketing is used to adjust prior predictions by shaping future unconstrained demand using what-if analysis. Traditional sources have been structured data, but unstructured sources, such as weather patterns and chatter on social media, are increasingly important sources of insight.¹

Demand Signal Analytics: The Next Big Innovation in Demand Forecasting

What Is Demand Signal Analytics?

DSA combines visual analytics and predictive analytics to access the data in DSRs to uncover insights with minimal latency. You can think of DSA as having three layers.

The foundational layer is a repository (DSR), an integrated database of essential (big) data you need to provide insight into sales, marketing, inventory, price, demand performance and operations. It cleanses, normalizes and integrates this raw

demand data from any source (POS, wholesalers, social media, weather, EDI, inventory, syndicated scanner data, promotional/marketing, customer loyalty and more). It works with any data type or source format – from multiple retailers, distributors and their respective disparate systems – to make that data available for retrieval, query, reporting, alerts and analysis.

The next layer uses visual analytics to transform the DSR data into demand signal visualization (DSV) to allow for exploration, analysis and insight that suggests areas of focus, improvement and action. While typical marketing research only provides answers to predefined questions, DSV provides insight into questions you didn't know to ask.

The addition of predictive analytics within DSA (forecasting and optimization) complements the descriptive analytics and quantifies the direction, size, scope and variability of supply chain replenishment.

Using DSA, companies can produce forecasts automatically, with the ability to modify models interactively without programming. This makes large forecasting projects manageable by requiring less manual input so analysts focus on the most important forecasts.

These forecasts will better reflect the intricacies of your business and the drivers of the behavior being forecast. DSA automatically builds the most appropriate model for your data, delivering forecasts that are as accurate as possible for the behavior being forecast. Figure 1 illustrates a typical interactive visualization combined with predictive analytics, allowing the demand planner to review both demand and replenishment from combined POS and replenishment data.

Why Is DSA Important?

If you want to be more proactive than simply basing replenishment on shipment data, you need access to downstream data, analysis and insights to make decisions that put you ahead of the demand curve. DSA is more than just forecasting trends and seasonality and demand sensing; it is about identifying and measuring market signals, and then using those signals to shape future demand.

¹ Charles W. Chase Jr. (2013). Demand-Driven Forecasting: A Structured Approach to Forecasting, Second Edition. New York, NY: Wiley.

"Consumer products companies continue to face an uncertain global economy, with an expectation that demand volatility will continue to increase and revenue growth will continue to be challenging," said Steve Steutermann, research vice president at Gartner. "In this scenario, increasing revenue growth means finding new markets, increasing market share and improving on-shelf availability (OSA) of products sold. Supply chain leaders that can measure OSA and collaborate with retailers to improve shelf availability and manage inventories have an advantage versus those CP manufacturers that cannot use customer data to improve OSA." [Gartner Press Release, "Gartner Says Supply Chain Leaders Must Find Innovative Ways to Drive Consumer Products Revenue Growth", March 11, 2014.

<http://www.gartner.com/newsroom/id/2679915>

Effectively using customer data requires making an investment in a DSR to harmonize and cleanse POS data so that it is usable for analytics. DSA using consumption and inventory data is an example of using structured data. While downstream data can include consumption and inventory data, unstructured data (for example, loyalty data, social sentiment and consumer perception attitudinal data) is starting to be used for targeting consumers, shaping demand and improving new product launch effectiveness.

Key Benefits

Optimize data management no matter the source
Always have access to the data you need, including legacy systems, ERP applications, and data stored in Hadoop from virtually any hardware platform or operating system. New sources are easily added, and security is centrally managed at the user, department or enterprise level. You'll get improved productivity using a standard interface for building and documenting work. The result is consistent, timely data that leads to improved accuracy and confidence.

Unlock insights with visual data exploration

Give yourself a competitive advantage and make better, more effective decisions using all of your strategic data investments. The visual analytics component empowers business users to quickly and thoroughly explore all available data without requiring them to know subsetting or sampling techniques. By using all available data, users are able to see all options to make more accurate decisions faster.

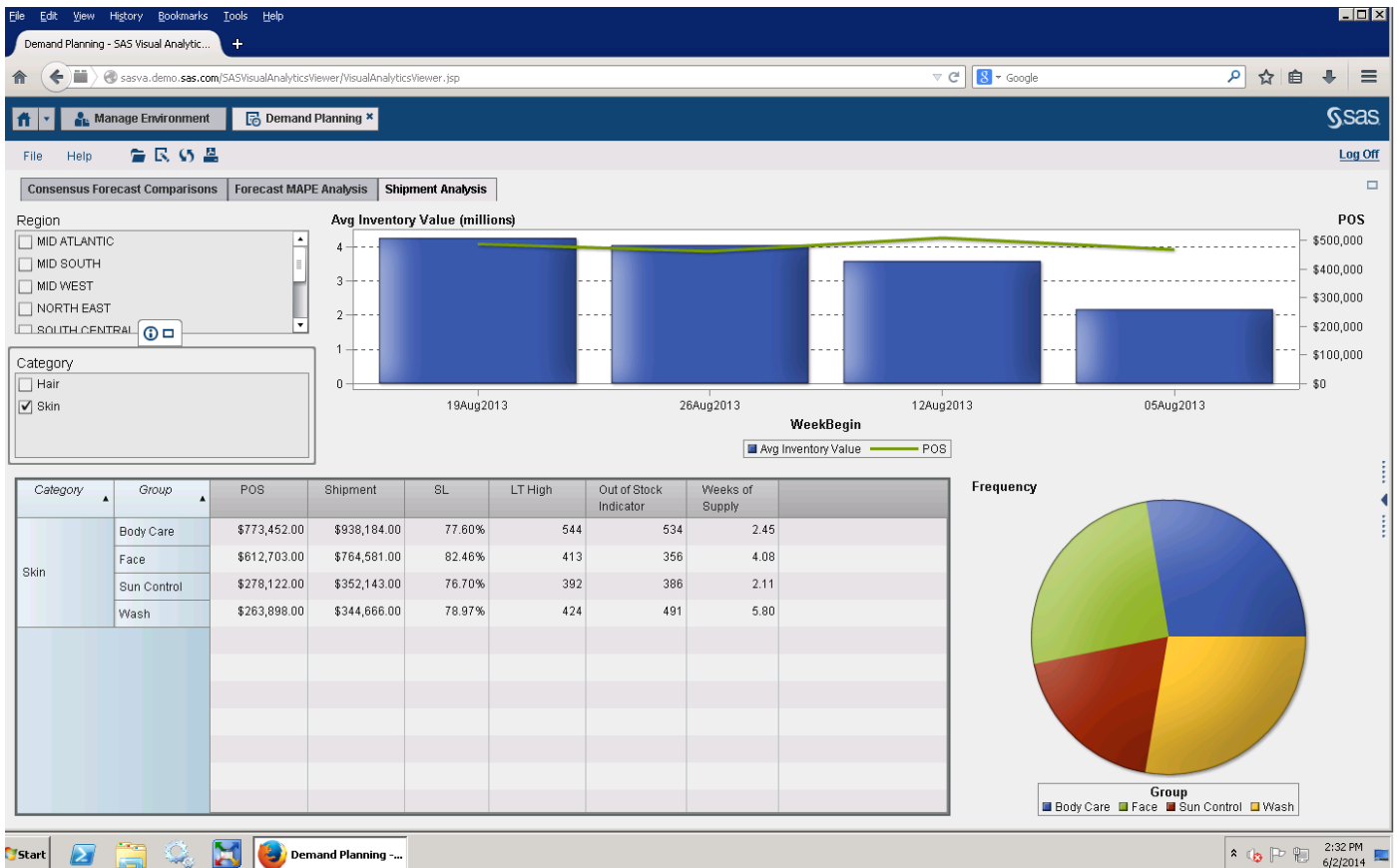


Figure 1: Using DSV/DSA to analyze the demand and supply performance of a company's products and/or product categories.

Conclusion

The race is on among companies to deploy the capabilities required to convert increasingly large, complex and disparate sets of downstream data into retail customer, shopper and consumer insights that can enable improved decision making and execution across the organization. The transformation from DSR to DSA will require leadership, a strategic vision, a road map of priorities and the ability to execute the organization's strategy.

Sometimes, achieving best-in-class status across every measure means adding unnecessary cost and complexity. What's important is to invest in people, process, analytics and technology that are valued by your customers. Leaders must make conscious trade-offs, with an understanding that it may be desirable to have benchmarks based on industry averages while, at the same time, having other measures that reflect best-in-class outcomes.

Now that many companies have created DSRs, moving to the next level will require implementing DSA. Until companies implement DSA they will not have the ability to take full advantage of all the data collected, cleansed and loaded into their DSRs.

With DSA, companies can get a near-real time picture of retail store-level sales and inventory replenishment trends while identifying potential challenges as well as market opportunities. The entire organization can take advantage of the predictive intelligence of DSA by easily visualizing big data libraries of facts and measures in detail across account, category and item, and geographical hierarchies. In addition, DSA can deliver targeted alerts to enable exception-based processes and workflow.

Finally, most DSA should come with a set of prepackaged reports, dashboards and easy-to-use exploration capabilities designed to support demand management, brand management, category management and product performance, along with scorecarding capabilities that accelerate time to value.

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