Profiting from Predictive Weather-Driven Demand Analytics



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Predicting customer behavior is complex, particularly because many external variables that are out of a retailer's control influence buying trends every day.

Of these outside factors, perhaps nothing is as volatile and as directly impactful as the weather. It changes constantly, shifting customer purchasing patterns. The result: mismatches between demand and a retailer's inventories and operating resources.

These imbalances are expensive. They produce poor customer experiences and they dent the bottom line with lost sales, higher inventory costs and margin-eroding markdowns.

Optimizing inventories is always a chief objective for retailers, but planning those levels, especially on a store-by-store basis, is tricky. Companies that factor the weather's impacts into demand forecasts are more effectively managing this challenge and better aligning inventory with shifting sales trends.

Sales variability due to changes in the weather can also make it difficult for retailers to effectively gauge business performance. Why were comps negative in some regions and positive in others? Why didn't a promotion or advertising campaign produce better results?

Planalytics translates weather into demand analytics that retailers leverage in existing processes and systems to account for the weather's impacts. Incorporating weather-driven demand metrics represents a huge, untapped opportunity for retailers to better understand their customers, capture additional sales and enhance profits.

PREDICTIVE WEATHER-DRIVEN DEMAND ANALYTICS

Many companies are prioritizing analytics and data science projects to learn more about their customers, become more efficient and grow profit margins. Planalytics helps companies address this priority with predictive demand analytics that precisely quantify the consumer's relationship with the weather—the most volatile, immediate and significant day-to-day, external variable impacting sales.

While data science teams developing Machine Learning (ML) forecasts and prepackaged software claim to "handle the weather" by adding temperatures, precipitation, humidity, wind speed and sunshine hours, retailers should not be surprised when the results fail to meet expectations.

Unlike other common time series data sets, weather is geo-diverse and meteorological data has unique characteristics that make developing reliable, granular and scalable demand analytics challenging. ML solutions often improve forecasts; however, it takes time to test and train solutions to deal with weather data and its relationships to demand. With more than 40,000 categories analyzed based on trillions of consumer purchases, Planalytics' Weather-Driven Demand (WDD) analytics offer highly tuned, feature-engineered metrics that are ready to use as inputs into ML models or as easy-to-integrate demand adjustments in existing ERPs and software.

Planning-accuracy improvements of 5-10% are common. Tests comparing ML solutions that incorporate weather data with Planalytics' weather-driven demand metrics have shown that Planalytics generates double the accuracy improvements on average.

"Great scalable insights integrated directly into our demand planning application."

– CORPORATE VICE PRESIDENT OF INVENTORY CONTROL AT ACE HARDWARE



"Planalytics has been great in transforming weather-driven demand data into meaningful, informed actions."

– CHIEF MERCHANDISING OFFICER AT LESLIE'S

BENEFITING FROM A CLEARER PICTURE OF CONSUMER DEMAND

With WDD analytics, retailers know the weather's effects on sales and other financial aspects of their business.

Planalytics WDDs are developed from multiple years of product-level sales data for specific locations and time periods. Controlled for factors such as trend, seasonality, pricing and promotions, they reveal weather-to-purchasing relationships. By quantifying the weather's impact on sales and incorporating it into core processes like reporting/analysis, planning, replenishment and digital marketing, retailers capture measurable benefits.



Improving Plan Accuracy

"In order to make an accurate sales forecast, retailers need to remove the historical effect the weather had on their sales so that they're starting from a weather-neutral baseline going forward," says Adam Moyer, Planalytics' EVP of Account Strategy and Operations.

Removing the weather bias from plan baselines in order to calculate year-over-year plan adjustments keeps retailers from inadvertently "chasing" weather-driven sales impacts that are very unlikely to repeat. It also reduces error. Planalytics' granular, bottom-up approach is effective because it corrects for weather volatility at a product and local (store or postal code) level.



Reducing Lost Sales

When demand is up, retailers need to have enough product to satisfy customers. Nothing ruins the customer experience more than empty shelves and racks. Besides risking customer loyalty, stockouts have significant negative revenue and profit ramifications.

A Retail Dive article highlighted the magnitude of the financial impact in an article referencing a study by IHL Group that estimated that "retailers are missing out on nearly $1 trillion in sales because they don't have on hand what customers want to buy in their stores."

Reducing forecasting error better aligns inventories with consumer demand, improving availability and reducing lost sales. By applying predictive weather impact analytics across the business, retailers can forecast more accurately and add up to 2% to total topline sales—with much larger gains for specific products and locations.



"In a very difficult sales environment, we were able to maintain margins, and that was a huge win."

– SENIOR VICE PRESIDENT OF PLANNING AT ROSS STORES

Lowering Inventory Costs

Although availability is critical, relying on heavier stock levels to fend off lost sales can result in huge costs. A survey conducted by Coresight Research and Celect estimated that non-grocery retailers in the U.S. alone absorb markdown costs of about $300 billion annually, or about 12% of overall sales.

The report found that "misjudged inventory decisions—including overbuying, buying the wrong type of products and misallocating inventory—account for an estimated 53% of unplanned markdown costs for retailers." The largest factors behind unplanned markdowns were "reduced demand due to external factors such as unseasonable weather, sudden changes in consumer behavior and competitors' unplanned promotional activities."

Even before taking on excessive markdown costs, retailers must consider how much overplanning ties up cash and increases inventory carrying costs. An analysis by EY suggested that "retailers may be sitting on billions of dollars in trapped cash." Improving demand planning with "functionality to integrate a greater array of demand signals, local consumer behaviors and external data sources ... could typically result in a 13% to 16% reduction in-store inventory," researchers reported.

By measuring the weather's impact on demand, Planalytics offers an opportunity to improve accuracy and capture cost savings by reducing excess inventory and its associated costs. These savings enhance margins, with many retailers seeing 20 to 70 basis points in incremental profit as a result.

And while markdown costs are not a huge issue for food retailers, they face the added challenge of balancing availability with shrink/waste costs for perishable items. It is estimated that grocers lose about 5% of total sales in fresh categories due to poor quality and expiration dates. Using store-level, WDD-adjusted replenishment, grocers typically decrease waste by 10 to 35% in fresh categories.



Improving Digital Marketing Returns

"If a business is not controlling for the fact that the weather is often a factor in the performance of marketing campaigns," says Planalytics' Moyer, "it is easy to draw the wrong conclusions about whether that campaign was particularly effective or not." Retailers may also be wasting spend promoting products in regions or time periods where demand is soft or nonexistent due to unfavorable weather.

A growing share of the retail marketing budget continues to shift into digital alternatives to attract customers and capture sales. In the end, knowing when to spend and when not to, what product to feature, and which markets and shoppers will be most receptive to messaging are critical to increasing clicks, conversions and metrics like return on advertising spend (ROAS).

When Planalytics' WDD analytics are used to inform digital marketing, retailers drive sales and improve key performance metrics by putting relevant content in front of consumers who are most likely to buy. For example, a retail client running social media ads saw ROAS increases that were 3 to 4 times the gains captured with traditional cookie-based behavioral targeting.



Evaluating Performance from a Weather-Adjusted Perspective

Assessing performance without the ability to accurately quantify how weather changes have skewed results will often lead retailers to incomplete or erroneous conclusions—such as overestimating a marketing campaign's effect on sales or wrongly concluding that operational or merchandise changes need to be made in underperforming markets.

Planalytics' WDD metrics put a number on this key variable, making it easier to evaluate performance from a weather-neutral perspective. Retailers can evaluate regional or departmental sales, promotional effectiveness and other key metrics more sensibly and fairly across the business.

"We use Planalytics every day to help understand what's happening with our business."

– VICE PRESIDENT OF BRAND STRATEGY & MENU AT INSPIRE BRANDS



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"We've used Planalytics for several years. Great information and even better business partners!"

– VICE PRESIDENT OF ANALYTICS, BUSINESS INTELLIGENCE, AND DATA SCIENCE AT DICK'S SPORTING GOODS

CONCLUSION

Retailers are increasingly embracing analytics. The insights they gain from data are helping them address demand forecasting challenges.

What sets Planalytics apart is that it can integrate directly into existing forecasting systems, even the complex machine learning algorithms that retailers are developing themselves. "Planalytics can be a huge value-add for these investments in analytics and data science," Moyer says. "Retailers are developing ML models that include WDDs and are custom-built to their businesses, and they are seeing double or triple returns."

Operationalizing weather analytics at scale has never been more attainable. And it is profitable—the financial gains can be captured in 3-6 months rather than a year or more down the road.

Retailers can start with a comprehensive weather impact analysis across the company to identify exactly when, where and how much a shopper's climate influences their purchases and the company's performance. They'll gain a clear outline of expected financial benefits (such as revenue increases from reduced stockouts and annual profit gains) once weather-driven demand metrics are integrated into existing forecasting systems. In Planalytics' experience with retailers, this process can wrap up in under 10 weeks.



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