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OLIVER WIGHTPAPER series

The Power of Insight

Statistical forecasting as part of integrated demand management



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Business
Excellence



David Holmes

Not the silver bullet

Success in today's consumer-driven business climate depends on meeting customer demand as efficiently and profitably as possible. Accurate demand planning is vital; not only does it provide the very foundation on which future plans can be made, it allows the business to anticipate changes in demand in plenty of time and respond accordingly. For most organizations, statistical forecasting has a role to play in this forward view of demand. But fully understanding the shortcomings of statistical forecasting, as well as the benefits, is critical to getting the best from it - and avoiding a potentially disastrous forward picture of demand. Statistical forecasting is an essential element in maturing the organization's demand process, but crucially it needs to be part of a wider integrated approach to demand management, led and managed by those closest to the consumer, and embedded cross-functionally into the organization. This means addressing people and processes first.



Andy Walker

The power of insight

In many organizations, there is a tendency for an over-dependency on computer-generated forecasts. Whether blind faith or optimism (perpetuated by software companies, perhaps?), to assume the computer knows best is a dangerous business. Like blaming the weather forecast for not taking an umbrella out, it's no good pointing the finger at the computer when there isn't enough stock to meet customer demand.

One of the most common problems is that organizations consider statistical forecasting to be a non-value-added administrative process for the IT department to manage. Of course, the IT department has little or no knowledge of the broader business in order to apply any interpretation of the data. And, without the intelligence, the forecast is just a number. The computer really doesn't know something you don't; applying intelligence is vital, and the detail must be scrutinized and challenged.



Rewriting history

It's time to stop blaming the tools and start taking ownership of the process. Demand planning must be led and managed by those who have the greatest understanding of what is happening at the point of consumption; that's the sales and marketing teams. Not only do they have the power to directly influence demand through the marketing mix of activities, they know what's happening in both the business and the outside world, so they are able to make sense of the data.

Based on algorithms, forecasting tools take elements of history to fit out a projection of the future. But history doesn't always repeat itself. Unless someone is managing the tool - correcting history to reflect real demand - the system will project incorrectly. For example, the figures may show a dip in the amount of product dispatched last month; but was this lack of shipment due to a fall in demand, or was there some other factor at play, such as a manufacturing fault or stock-out? Without applying the intelligence, you've just got a number in front of you.

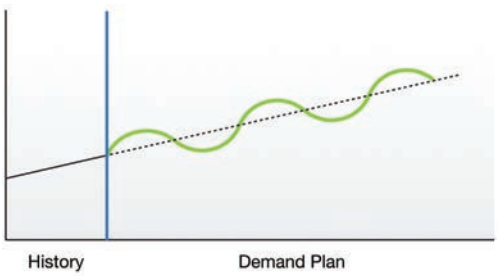
Accurate statistical forecasting relies on making this history truthful. What is the impact of new product introductions, seasonal variations, and promotions on demand? There are layers of complexity here too. For example, Christmas happens at the same time every year, but Easter doesn't. Take the computer's word for it, and you can find your spring forecast three or four weeks out of kilter.

Building an accurate statistical forecast

There are three basic strategies that can be applied for statistical forecasting: trends, seasonality and events-based forecasts. These each form a key starting point for the forward demand plan but need to be managed correctly.

Trends

A trend-based forecast (figure 1) is the tendency for data to increase fairly steadily over time. For organizations in a growth market, trend-based statistical forecasting can provide a good understanding of where demand is heading; up, down, or flat.



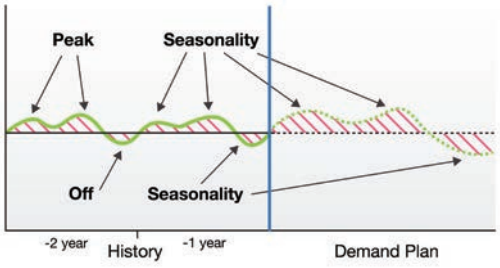
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Figure 1: Trend-based forecast

But beware of oscillations in demand caused by changes in the overall economic environment. While operating on the assumption that history is reflected in the future will work during times of stability, the recession highlighted the limitations and risks of this in dramatic fashion. The global financial crisis created an atypical situation where history was wiped out - the future no longer represents the past and vice versa. As the economy recovers, statistical tools will not project organizations out of a recession. Unless intelligence is applied, they will assume the business will continue in decline. As businesses finally get their heads above water, there's no time to wait for tools to play catch-up; assumptions need to be managed now. Only then will organizations be able to accurately forecast and capture a larger share of the market as demand returns.

Seasonality

Seasonal events create regular fluctuations, which are repeated from year to year at about the same time, with the same level of intensity. Based on cyclical patterns of demand (see figure 2), where some periods of the year are higher or lower than others, this model is best suited for repeat events, such as Christmas and Valentine's Day.



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Figure 2: Seasonality-based forecast

However, it is important to remember to 'de-seasonalize' the data after an event to avoid incorrectly inferring the seasonal pattern will continue indefinitely. One beverage company Oliver Wight worked with launched a hot chocolate business in Canada highly successfully but wondered why, six months later, it had a lot of excess inventory. The statistical tool had picked up the high demand and forecast it forward. Furthermore, while a lot of hot chocolate was being consumed in Canadian winter when it was minus 20 degrees outside, come the summer, hot chocolate wasn't everyone's beverage of choice. Not 'de-seasonalizing' the data and letting the statistical tool go unattended, as this company did, will inevitably result in a lot of wasted product. Obvious it may seem, but it's surprising how many companies believe the number put in front of them without applying common sense.

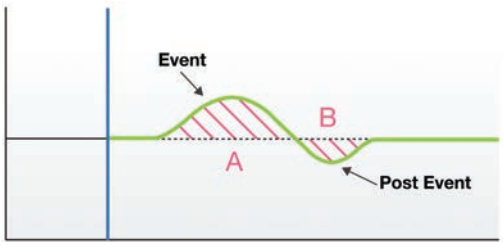
Watch out for one-off promotions, which impact seasonality too. A swimming pool company may have its seasonal peaks around summer, but changing the terms of trade and offering a discount for those who pre-order before the season starts will, of course, alter demand. Sales and Marketing's input here is key, for they have the knowledge of one-off events, which can affect seasonality.

Events

A statistical model based on events (figure 3) refers to known circumstances, which result in high or low data points, outside of the typical 'expected' demand pattern. More often than not, the events will be specific to the particular business and industry - from promotional activities, closeout sales and special orders, to stock-outs, natural disasters, and special occasions.

One-time events need to be addressed and edited out of the history to prevent the forecast going askew. Take the London 2012 Olympics as an extreme example; while the UK economy saw a £9.9 billion boost in trade and investment during the games, this would need managing in the forecast. Businesses cannot look forward to the demand heights provided by Olympic fever the following year or indeed, probably ever again.

Event-based statistical modeling works particularly well in highly volatile industries, such as food manufacturers, who are



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Figure 3: Event-based forecast



at the whims of retail promotions, or for organizations where the product portfolio changes dramatically – technology companies for example. For these organizations, it's not possible to just run an annual statistical forecast based on last year's performance, and tune it up and down based on the individual events. It is important to start with forecasting around the events themselves; create profiles for the shape and size of demand associated with them, and use these as the building blocks. These building blocks can then be scheduled in for when they're going to occur and, of course, for simultaneous events, they can be stacked one on top of the other. So, instead of projecting a straight line forward, the business builds an overall forward view.

It is vital to factor in the drop in sales that always follows an event. After a Buy-One-Get-One-Free promotion, for example, retailers will see a dip in sales, since consumers stock up for a couple of weeks and won't buy that product again until needed. Sales and Marketing may be quick to take the glory for the sales peak surrounding the promotion, but the dip that follows can't be ignored. A statistical tool can help to analyze a two-week promotion over a six- to eight-week period, so the business can see exactly how well it has performed and exactly how to forecast similar events going forwards. However, it would be naive to assume that the event itself is the only factor at play. While there is real power in linking demand variation to events, it's important to take the time to truly understand the demand drivers. Just because demand doubled during a Buy-One-Get-One-Free event, don't make assumptions. Some of the demand could have been driven by a competitor stock-out, for example, rather than the success of the promotion itself. There is huge value in the sales and marketing team undertaking post-event analysis to drive long-term demand improvement.

Knowing its value

The value of a statistical forecasting tool is not the same for every business. For some organizations, where the market is stable, with little seasonal variety, statistical forecasting can be highly valuable. Indeed, for some large multinationals whose product portfolios are so large, a statistical tool is sometimes the only starting point. For example, one Oliver Wight client manufactures fan belts for the automotive sector and has over 45,000 products in its portfolio. While it may only sell half a dozen fan belts for a 1964 Ford Mustang a year, it sells half a dozen every year. Without a tool to account for each product, forecasting demand would be nigh on impossible.

Conversely, for organizations where volatility is high, there is little or no value in a statistical forecast. For one large food manufacturer Oliver Wight works with, which supplies major retailers, just 20 percent of its demand is base business, while 80 percent is driven by promotions. Unless it ran the same promotions for the same categories in the same weeks every year, and its competitors did too, statistical modeling is not a valuable starting point. In order to establish how, and to what extent, statistical forecasting should be used, the organization needs to consider its own drivers in demand. It is critical to design models that are right for the individual company.

A stepping stone

Statistical forecasting provides an invaluable baseline from which to build an integrated demand plan, but it must always be regarded as an input to the demand plan, rather than an output of it.

At Oliver Wight we use a maturity model to help organizations understand their level of capability and that of their supply chain partners. The model describes four phases of maturity for demand management and within phase one (where most organizations find themselves), there are three transitions organizations have to make on their way to the 'advanced' level (phase two); these transitions are 'basic', 'foundation' and 'capable'.

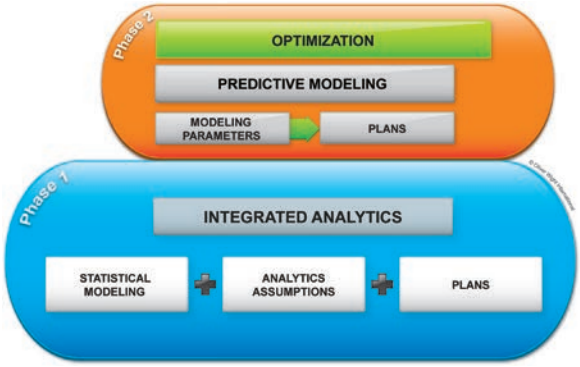


Figure 4: Evolution of Marketing & Sales Planning

For those companies in phase one, the focus is gaining control; getting to grips with understanding the impact of the past, and anticipating future events. This is where statistical forecasting comes in, providing a vital building block to move the organization forwards. As demonstrated in figure 4, organizations at this foundation level, need to not only have the statistical models in place, but a good understanding of analytical assumptions and a firm grip on sales and marketing plans; it is this 'equation' that delivers a structured demand plan. However a demand process that operates at this level will be relatively manual and heavily dependent on people's interpretation of the data. It is only as a business moves to the top of phase one, maturing its processes and improving competencies to the 'capable' level, that analytics start to become more integrated; demand analysts and insight teams, equipped with a true understanding of the cause and effect, can start using key analytics to make sound projections for the future, thus improving the accuracy of the demand plan. Once in phase two an organization can then start to use systems tools for modeling parameters and predictive modeling. However, these models have to be tested and validated before they can be trusted; only then can the business begin optimizing the demand plan to reveal the optimal marketing mix.

Integrating the process

Having established its use and its role in the demand planning process, the key to making statistical forecasting a useful input lies in ensuring the process is embedded across the organization. Far too often, failure to plan for demand variation is blamed on forecasting error, and the error itself used as a stick with which to beat Sales and Marketing. While knowledge from Sales and Marketing is essential, integrating forecasting with financial planning is equally important; but this is often overlooked and in many cases, forecasts are merely volume-only statistical processes.



Integrated Business Planning (Advanced S&OP) has become the process of choice for smarter organizations. Its five monthly review processes provide an effective forum to measure performance, highlight gaps, and drive continuous improvement. One of its key differentiators from traditional S&OP is the financial integration it provides, allowing the business to operate with a single set of numbers.

This is fundamental. All stakeholders in the forecast must take an active role in reviewing and agreeing on the key inputs of the demand management process, including the accuracy of the statistical forecast. Of course, there will always be some errors in the forecast, but how this is managed is dependent upon the culture of the organization. Getting to this single set of numbers, so the business operates with one agreed agenda for success, relies on establishing the principles of 'truth as we know it.'

This often involves a cultural change; breaking down functional silos and creating an environment where people trust each other, and take accountability for their actions as well as ownership of the processes. To achieve this, it's essential to get the right balance of people and behaviors, processes and tools (figure 5). All too often, processes and tools are addressed with vigor but people and behavior not so.



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Figure 5: The principle objective of integration

Hitting the 'sweet spot' where these overlap is fundamental to effective change management. They must be addressed in the right order, too. 35 percent of organizations get this wrong, starting with processes, and tools, and then trying to align its people behind them. It is in this scenario that the tools get blamed when things go badly. Businesses must instead, work in an anti-clockwise fashion around figure 5; knowledge and processes must be in place before the right tools can be specified and a reliable statistical forecast established.

Looking ahead

While tools have become increasingly sophisticated, they can never provide the overriding output for effective demand planning. Without applying intelligence, data is but a number, and a potentially dangerous one at that. Forecasts must be based on real demand history, rather than just shipments, and any non-repeating historical events have to be edited out. When led by Sales and Marketing, and integrated across the organization - with the correct models applied to suit the business, its products, and markets - statistical forecasting can provide a powerful baseline on which to create future plans. When used as part of an integrated demand management process, it can help anticipate changes in demand well in advance, so the business can respond accordingly, before it's too late.



About Oliver Wight

At Oliver Wight, we believe sustainable business improvement can only be delivered by your own people; so, unlike other consultancy firms, we transfer our knowledge to you.

Pioneers of Sales and Operations Planning and MRP II, Oliver Wight professionals are the acknowledged industry thought leaders for Integrated Business Planning (IBP) and Supply Chain Planning. Integrated Business Planning allows your senior executives to plan and manage the entire organization over a 24-month horizon, while Oliver Wight's extended Supply Chain Planning and Optimization ensures your supply chain is designed and structured to deliver best-in-class customer service with minimal costs.

Using the Oliver Wight Maturity Model to pursue our globally recognized Class A standard for best practice will determine a tailored improvement journey for you to develop your organization's processes, and reach and sustain excellent business performance. With a track record of more than 40 years helping some of the world's best-known organizations, Oliver Wight will help you define your company's vision for the future and deliver performance and financial results that last.

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