Domain Knowledge

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Collaboration between the Demand Planner and the Statistical Forecast

How can you achieve the optimal mix of demand planner knowledge and the statistical forecast?

When justifying overrides of the forecast, do your planners often give common exceptions or drivers? If these exceptions keep repeating themselves, are they still exceptions?

The simplest Demand Planning Process reads the demand history into a statistical forecasting model and generates a forecast. This forecast is then reviewed by a demand planner. If necessary, the demand planner inserts domain knowledge by overriding the statistical forecast.

The aim of collaboration between the demand planner and the statistical forecast is to incorporate as much domain knowledge into the statistical forecast as possible, and minimize the need for Planner overrides.

The first step in this collaboration process is to identify the reasons for the overrides and categorize them into Explanative or Predictive domain knowledge (see inset).

> *"Contrary to what you have heard or believe, there is no art to forecasting, but rather statistics and domain knowledge"*
>
> *Charles W. Chase, Jr.*

Domain Knowledge

The traditional definition of domain knowledge is any fact(s) known by the organization that influences the forecast, but is **not** accounted for in the statistical forecast.

Domain knowledge can be grouped into two broad categories, Explanative and Predictive knowledge.

Explanative domain knowledge is a demand insight into a demand anomaly in the past

Predictive domain knowledge is a demand insight in the future; it may or may not have an historical precedence

Categorize your Domain Knowledge

Are your demand planners adjusting for an exception in the past (Explanative) that is adversely affecting the statistical forecast? Or are they adjusting for a future exceptional event (Predictive)?

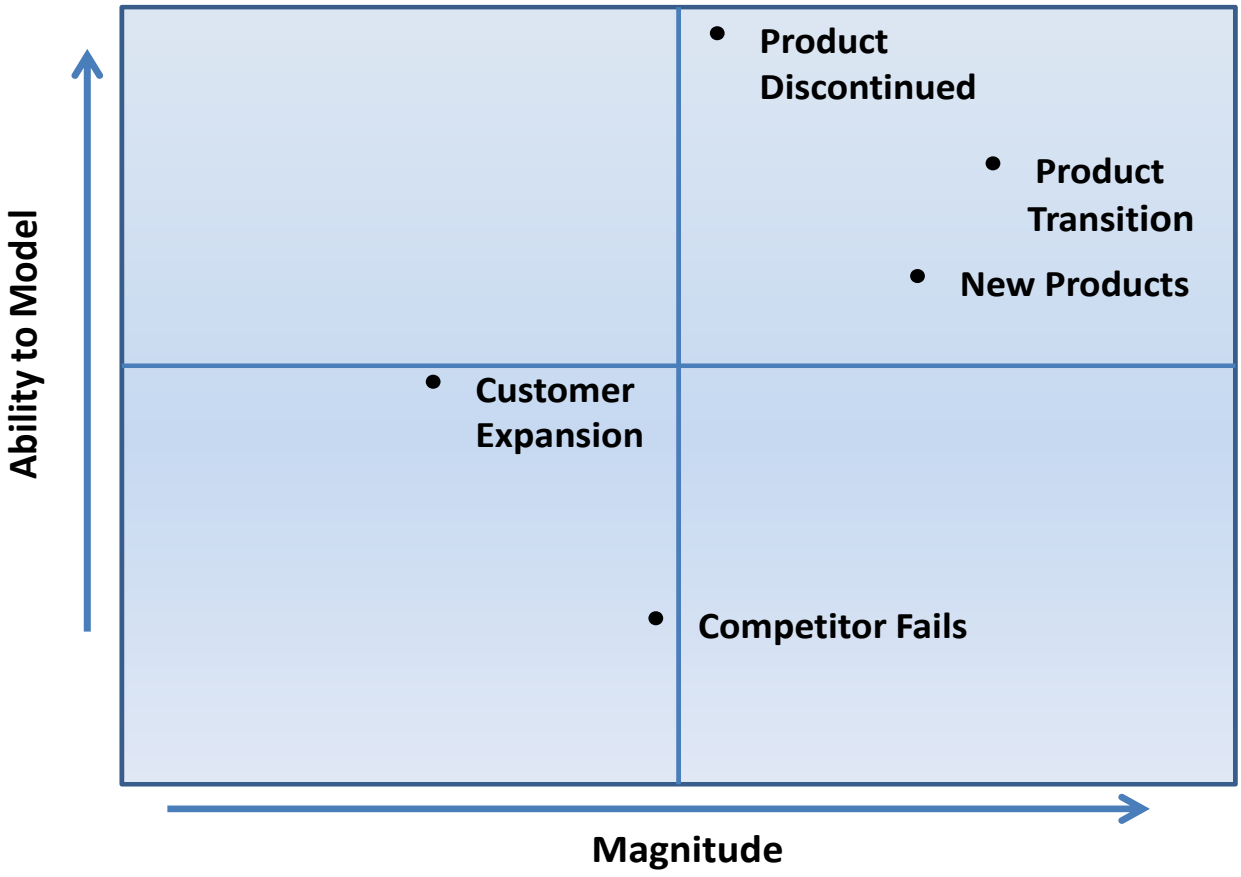
An example of an Explanative override would be a one-time flood of a delivery region. This would result in a significant impact to the demand pattern, which should not affect the statistical forecast in the future.

An Example of a Predictive override would be if a planner has knowledge of a future geographic or customer expansion in demand. By their nature many predictive override become historical anomalies as they roll into the past.

Once overrides are categorized they then need to be studied to determine if they are candidates for statistical modeling, or are true one-off occurrences that are best handled by manual overrides.

> *"It is certainly faster and cheaper to rely on the statistical forecast, rather than have to manually update every single forecast"*
>
> *Michael Gilliland CFPIM*

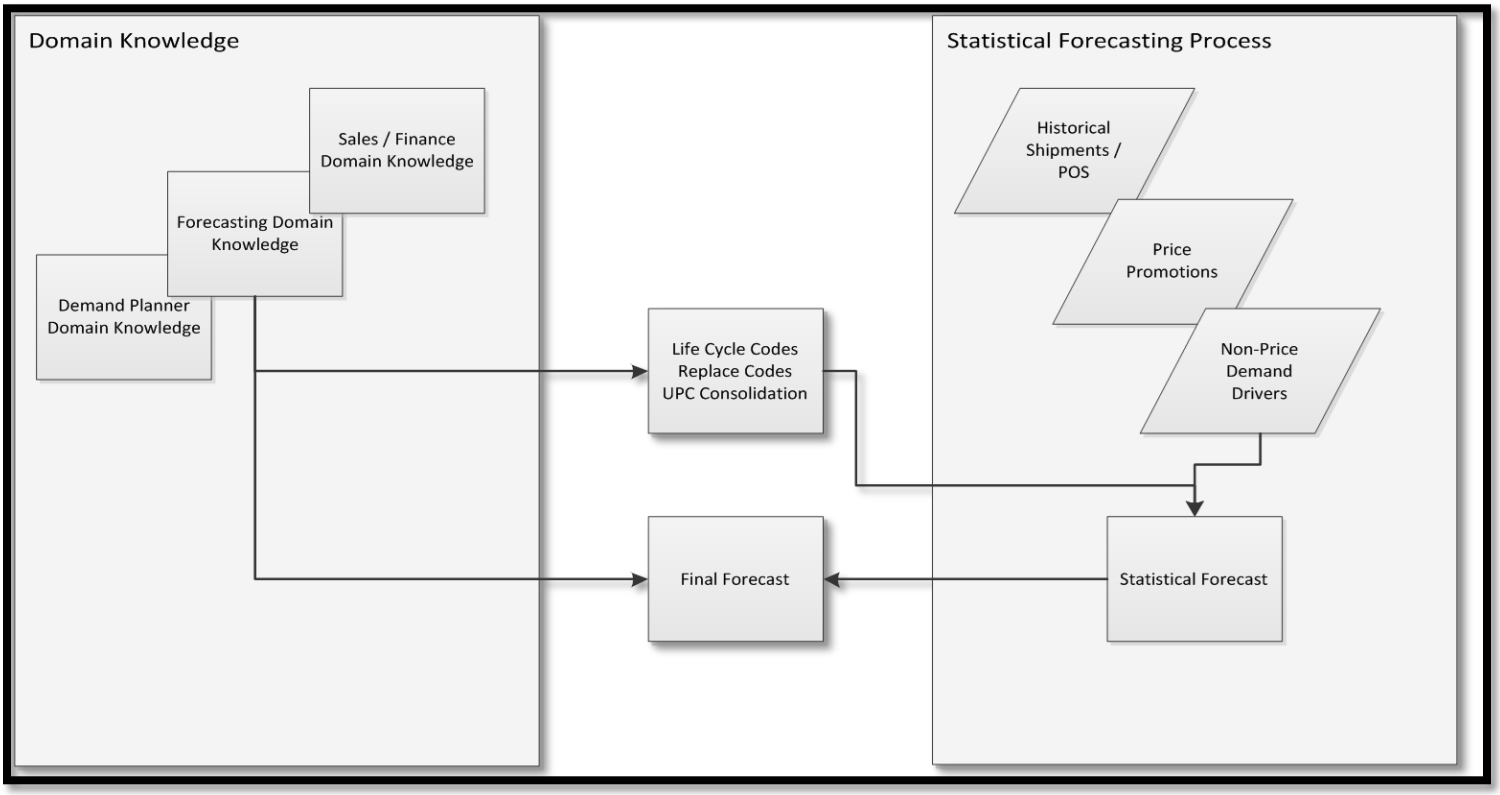
There are a number of factors to consider when determining what domain knowledge should be modeled; frequency, accuracy, ability to model, and magnitude. E.g. frequent events that have a large effect on the forecast with a strong statistical model are the strongest candidates. Price promotions are the most obvious example of this. In many instances promotions are the first attempt at domain knowledge modeling.



The mapping of these activities to the quadrants will be different by industry, but in this example Product Disco's weight-outs and new products domain knowledge should be modeled in the Statistical forecast before others.

Imbedding Domain Knowledge in the Statistical forecast

Often times, collaboration between the forecasting analysts and demand planners consists of the demand planners overriding the statistical forecast produced by the forecasting analysts. In a true collaboration environment, the demand planners have an intuitive interface in which to apply their domain knowledge to improve the quality of the statistical forecast.



Product Lifecycle Domain Knowledge

Domain knowledge is instrumental in the creation of a forecast at multiple stages of the product lifecycle.

At product launch, it is necessary to understand the time to stabilization of the product sales. Effects such as pipeline fill and other factors will lead to poor forecasts especially on the anniversary of the product launch. Many times a default stabilization timeframe can be used to filter the new data. However, often a default timeframe is not sufficient. The planner's intimate knowledge of the product and customer set is invaluable in this process. This is an example of explanative domain knowledge. This knowledge could be converted in to predictive demand knowledge by analyzing the stabilization timeframe demand history to produce new product launch profiles.

Finally, at the end of a product lifecycle the planner has visibility to the discontinuation of product. Properly modeling the discontinuation of a product helps the forecast accuracy and bias at higher levels of the product hierarchy.

Exception Event Domain Knowledge

The planner also has visibility to short-term dramatic events that can adversely influence the forecast. For example, a flood in

a distribution center can lead to zero shipment data from that DC for a number of weeks. The unmodified time series can lead to significant forecast error and bias.

Product Transition Domain Knowledge

In this age of innovation and economic challenges, products are constantly being updated. Examples of these would be packaging and net weight changes. Almost always, these products are focused on the same customer, sold through the same channel and have a very similar selling pattern. In these situations it is imperative to map our knowledge of the old product to the new. The planner should have prior knowledge of these product changes, and that knowledge should make its way to the statistical forecast before the transition (Predictive).

Summary

The aim of collaboration between the demand planner and the statistical forecast is to incorporate as much domain Knowledge into the statistical forecast as possible, and minimize the need for Planner overrides. In a true collaboration environment, the demand planners have an intuitive interface in which to apply their domain knowledge to improve the quality of the statistical forecast. By reducing the time the planners spend manipulating data, greater emphasis can be placed on analyzing and planning profitability, significantly increasing organizational productivity.

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Prognos is a SAS Silver Alliance partner specializing in solving complex analytical business problems specifically for CPG and Retail Organizations.

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