Forecasting in Pharmaceutical Domain

Sales forecasting in Pharmaceutical domain is a complex task. Each company has its own specific set of issues, some of which are discussed below.

**Large number of SKUs (Stock Keeping Units)**

Generally, the number of SKUs is large anywhere ranging from 80 to 300. Each product has its own unique characteristics. For a manager, it becomes complex to focus on the sales behavior of each SKU and define some set of general rules for forecasting.

**Geographic Diversity**

Most of the pharmaceutical companies are catering to the needs of geographically spread customers. The therapy used by doctors, distribution of specialist doctors’, proportion of dispensing doctors, patients profile etc. vary from region to region. This contributes to variations in regional/ locational demands.

**Diverse therapeutic segments**

The sales effort is organized around therapeutic segments. The sale of each brand depends upon the overall size of the therapeutic segment, competitive pressures within the therapeutic group among other things. The growth and trend that exist in one therapeutic segment may widely differ from that of other therapeutic segment.

**Campaign Period**

The sales activity is generally carried out in well worked out campaigns. The briefing to doctors, samples distribution, doctors’ conference and other marketing activities are generally carried out around the campaign products during campaign period. These stimuli also change the demand pattern.

**Differential Brand promotion**

Pharmaceutical companies also launch schemes and offer gifts for brand promotion. The sale in scheme period may sometime go up by 3-4 times (at times much more) than the usual monthly sale. It precedes and succeeds by a much lower sale due to drying up and over filling of the stock pipeline.

**New Products**
The sale of new products is generally very unpredictable. ‘Right communication’, availability, medical rep’s training goes a long way in making or breaking a brand. The initial sale is used for filling up the pipeline and is not a true representative of consumer off take.

**Re-launched products**

A brand that is repositioned in the market may see a quantum change in sales. The sales may dip because of change of focus or may grow significantly due to more effective communication or other initiatives.

**Seasonal products**

The disease pattern and the requirement of certain drugs show seasonal variations. The effect of seasonality is very high on certain products and very low on certain other products.

**New Stockist or Credit Limit**

Opening of new stockist or enhancement of credit limits gives an artificial flip to primary sales. It is important to identify such instances while forecasting. At times this is also done to achieve current budgets through push sales.

**Larger Batch Size**

At times the batch size in relation to sale of the product cause large inventories. A larger batch size can thus take care of large sales fluctuation without disturbing the supply of the product. In such cases even higher sales forecast accuracy does not yield real value to the organization, other than avoiding inter CFA transfers.

**Manufacturing arrangement**

Improvement in sales forecast is generally viewed as a tool to reduce the overall cost of making the product available in time at the right place with lower inventories. On supply side, manufacturing arrangement (Own, Loan License, third party) plays a major role in determining sales forecast horizon. In case of own manufacturing, next month forecast accuracy may be relevant and in case of Loan License it may be important to improve the sales forecast accuracy of next+1 month.

**Formulation type**

Sometimes, there are dedicated facilities for certain products or formulation types like soft gel, ointments etc. And if the capacity utilization is less, higher sales forecast inaccuracy can be handled though at a cost. However, if the facilities are common the challenge of having a more accurate forecast gains much more significance.
In addition to above, there are number of other challenges in forecasting product sales of a pharmaceutical company. All these factors needs to be taken into account while building a sales forecasting model.

Methodology for Forecasting

DecisionCraft Analytics uses a well-defined methodology for forecasting in a pharmaceutical company. This involves study of all the SKUs and product segmentation on the basis of different dimensions

- Sales variability
- Sales Value
- Sales Volume
- Formulation Type
- Manufacturing Arrangement
- New/ Re-launched and existing products
- Seasonality
- Therapeutic Segments
- Promotions

Sets of matrix relationships like ‘low value, low volume, low variability product’ and manufacturing arrangement as ‘own’ may require a simplistic forecasting model (Regression, ARIMA etc.). Whereas, for complex segments some more sophisticated forecasting algorithms may be used (like Box-Jenkins, ANN). For certain products (like new products), certain forecasting policies may be adequate.

Thus, Decisioncraft’s forecasting methodology has following steps:

1. Data Collection, Analysis and product segmentation
   The data is collected and analyzed for building matrices of segmentation. At the end of this phase there will be some clear well defined product segments.

2. Managerial participation for segment validation
   Managers from the client organization participates in building and reorienting the segments based upon more company specific insights

3. Generation of time horizons and set of forecasting policies
   Defining the time buckets in which the forecasting is required for each segment of products. At this stage all segments will be segregated into two blocks - One, where stocking or other policies may serve the purpose and second, where sophisticated mathematical model needs to be developed.

4. Identification of set of suitable sales forecasting algorithms
   There are 2 main factors that help determine the type of forecasting method that will be used. They are:
   - Time Frame
5. Development of User interface for algorithms
   Users need to use the forecasting method rather than understanding the complex
   mathematical model. This needs development of front end, back end, database design and
   other upload download procedures and utilities.

6. Solution Testing and roll out plan
   The developed solution is tested with historical data and improvement in forecasts is
   measured before starting the roll out. The roll out plan is prepared in consultation with
   the client and their preparedness for handling change.

7. Implementation
   This includes documentation and user training for introducing the forecasting models to
   them.

Major Challenges

Forecasting in a pharmaceutical company is a very involved consulting process. It is not a off the
shelf software implementation assignment. It poses its own challenges for which the project team
should be prepared

- Forecast what is possible. Forecasting every product may end up in misdirected effort.
- Forecasting models mature with time and give better results as the experience of working
  with the model grows and models are modified for better performance.
- A model that gives 10-15% better forecast over a period of time is considered to be a
  good forecasting model.
- Focus on those product segments where maximum gain lies for the organization.
- Every forecast comes with a forecasting error. The endeavor is to reduce the forecasting
  error but in no way it can be eliminated altogether.
- Development of forecasting model has greater chances of success when the business
  users are involved from the beginning of the project.
- The domain knowledge and identification of key drivers of demand are the most crucial
  factors where client plays a very important role.

Benefits

- Improved forecast accuracy: Since the forecast will be based on scientific proven
  methods the accuracy level will improve
- Lower safety stocks: A more accurate forecast means lower forecast error (the gap
  between forecast and actual demand). The low forecast error would result in lower safety
  stock that would in turn lead to:
  - Lower inventory costs
  - Improved response time
  - Shorter cash-to-cash cycle
  - Lower costs of rush shipments
- A virtuous cycle of benefits accrues by following a scientific forecast consistently. Continuous improvement in forecast accuracy leads to a continuous improvement in the bottom-line.

- The qualitative benefits of improved forecasts are:
  - More focus on working with realistic sales forecast rather than building inventories to serve unrealistic targets
  - The smoothening of demand profile would lead to better operating efficiencies and lower operating cost

- Introduction of Intelligence Models and upsizing the employees. As the state of the art algorithms are used, employees move from Level I / Level II to Level IV of information hierarchy. The Level IV systems are based on the concept of intelligent systems. Critical elements that distinguish intelligent systems from transaction systems (stand alone or ERP system) are
  - Recognition
  - Feedback
  - Correction
  - Learning
  - Warning
  - Adaptation

These systems help business managers in doing “what-if” analysis and scenario building.

**Improve bottom line by improving sales forecast**