Forecasting Pharmaceutical Sales without Big Data

“Big Data” seems to have become the panacea to answer all kinds of questions, ranging from sports and entertainment (i.e., predict the winner of a tennis match by analyzing first serve percentage, forehand winners, and unforced errors against a particular opponent) to business (i.e., what product offer is most likely to generate the next sale to a particular customer). In healthcare, Big Data has gained use across a number of applications as well, including predicting medical outcomes, managing risk, and of course forecasting drug sales.

Unfortunately, we don’t always have “big data” to work with – in many therapeutic areas patient volumes, prescriptions, and underlying data that might explain prescription patterns is not readily available, if at all. Despite significant advances in data collection – including EMR data, claims data, prescription data – information for niche markets and many geographic regions remains spotty, expensive, or is simply not accessible to pharmaceutical companies.

The solution is to develop a much simpler, yet still powerful model to help us understand market dynamics and model potential outcomes – using logic to mirror the steps taken by Ph.D. level mathematicians with large computing power and even larger data sets.

- Determine market potential for a new therapeutic category
- Project sales forecasts – for existing in-market or pre-launch products
- Evaluate different marketing strategies on their probability of success
- Model ROI on marketing investments (or calculate a net present value, NPV)
- Allocate resources across different markets, products, geographies
Based on years of experience with building and using various forecasting and decision support models, Cogent has identified a few simple, but critical steps to develop the right tool to make critical investment decisions, project revenues, or evaluate alternative marketing strategies. The key is to leverage all available information and your own experience (plus that of other team members) to mimic what a computer program with tons of data can do mathematically:

6-Step Process to build a powerful Decision Support Model without Big Data:

1. Decide what you want to model (i.e., forecast revenue, project ROI, etc.) – this is your dependent variable
2. Think through the factors that MOST influence your model output (i.e., dependent variable)
   a. Use your experience and judgment to focus on the most important factors (after all, we do not have unlimited data, or computing power)
   b. Assimilate all available data and decide whether to conduct some focused research to fill any critical gaps – last, use benchmarks from analogous situations as a guide
3. Develop a logical model that captures the relationships you expect to see between your independent variables and the modeled outcome
   a. Most of the time, one does not have to resort to complex relationships and regression factors (i.e., how much does Y change when you change X) – it is often enough to stick with simple relationships that can be observed or tested empirically down the road to validate or fine-tune the model
   b. As a rule of thumb, try to capture those variables that you believe you can influence (i.e., those “leverage points” that become objectives in your marketing strategy)
4. Test the model by entering known data where we have both the inputs and outputs
   a. For new launch products with no historic data, model the sales of a competitor
   b. Calibrate the model by ensuring known inputs generate actually observed results – a critical step when data is incomplete, biased, dated, or from multiple data sources.
   c. Continue to tweak the model until you are comfortable that it generates a reasonably accurate output for a set of given inputs
5. Use the model to learn: Models often reveal surprises – do not ignore these surprises or jump to conclusions that the model is wrong. Check your assumptions, pressure test the logic, double check the data, and if everything still appears sound, then have an open mind to consider that there may be some dynamics that “conventional wisdom” does not see. Some of these surprises may be things like:
   a. Certain market segments offer more / less potential than we expected
   b. Long-held beliefs about diagnosis rates, compliance, and similar may be mathematically impossible
   c. Gaining share with new patients may not drive growth as quickly as switching existing patients to a new treatment
   d. Raising / lowering prices does not change revenue as much / as little as expected due to price elasticity of demand
   e. Specific business opportunities are larger / smaller than assumed
   f. Timelines to achieve a positive ROI or NPV are longer / shorter than anticipated – some investments will never pay off
6. Once the basic model is in place, use it often & use it continuously – learn over time and improve the model
   a. Do a Sensitivity Analysis to determine how different variables affect your “forecast”
b. **Track** inputs and outputs over time & **Evaluate** whether the relationships you created hold true or can be fine-tuned

c. **Scenario Plan** for major changes in the market and see how they would impact your business results – solicit SME (subject matter expert) perspectives to help you understand how selected model inputs may trend or change as a result of external events

d. Use the model to build **Organizational Alignment** around business goals and ways to achieve those - it builds a shared understanding, generates valuable discussion, and ultimately achieves ownership and commitment to move forward in unison

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**What is the best structure for a forecasting or market potential model?**

We have to make some basic choices concerning the model structure – inputs must be selected based on data availability and quality. Equally important is the context of the current business situation.

<table>
<thead>
<tr>
<th>Modeling Approach</th>
<th>Useful when …</th>
<th>Less useful when …</th>
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</thead>
<tbody>
<tr>
<td>Patient-based model</td>
<td>- Disease is under-diagnosed or under-treated.</td>
<td>- Modeling a ‘me-too’ product or generic</td>
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<tr>
<td></td>
<td>- Competitor products are used across many indications / treatment types</td>
<td>- No “leverage points” other than market share gains will drive product uptake</td>
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<tr>
<td>Competitor cannibalization model</td>
<td>- Product is an almost exact replacement for a competitor product</td>
<td>- Product’s target patient profile differs from those of competitor products</td>
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<tr>
<td></td>
<td></td>
<td>- New, different patients are expected to be treated with the product</td>
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<tr>
<td>Trend analysis model</td>
<td>- A long history of previous sales exists</td>
<td>- New products enter the market</td>
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<tr>
<td></td>
<td>- No significant changes in the market are expected</td>
<td>- Changes in reimbursement, treatment guidelines, etc. are expected</td>
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The modeling approach has to take into account the market environment and business strategy to serve its purpose best. The table above provides an initial guideline – however, in some situations, the best choice may be a combination of the above approaches. For example, use a patient-based model as the core, but add trend analyses to project selected inputs (e.g., market share). In addition, building in “Key Events” or “Milestones” may permit modeling discontinuities in the forecast. “Monte Carlo” probability modeling may be useful to model the likelihood of certain events taking place. The possibilities are plenty – the key is to **keep it as simple as possible, but not more simple than necessary.**

Following these guidelines can generate a useful tool and process to make forecasting and business planning more objective, efficient, transparent, flexible, and ultimately more accurate as the models are updated with actual results from actions taken. Using the right models to create a fact-based, transparent forecast will avoid the significant costs associated with decisions not fully accepted, over- or under-investments as a result of a wrong forecast, and most importantly missed opportunities.

**In order to reap the full benefit of forecasting models and other decision support tools, Cogent Consulting has developed a new generation of online models to improve reliability, manage access, foster collaboration, and keep information secure and up to date for all approved users. Please don’t hesitate to reach out to us for a personal demo or discussion at info@cogentconsult.com.**