USE SIMULATION TO EVALUATE THE EXPECTED REVENUE FROM A NEW PRODUCT

Problem

Lupin Pharmaceuticals, Inc. is the U.S. wholly owned subsidiary of Lupin Limited, is among the top five pharmaceutical companies in India. Through their sales and marketing headquarters in Baltimore, MD, Lupin Pharmaceuticals, Inc. is dedicated to delivering high-quality, branded and generic medications trusted by healthcare professionals and patients across geographies.

One of Lupin's strategies involves buying new products, so *they need to evaluate the expected revenue of a new product acquisition*. It is key for a decision making, to evaluate the impact of marketing actions on the expected revenue. Marketing actions are necessary to assure the market share, used to estimate the revenue.

Along the period of time chosen to estimate the terminal value of the investment, the consumers behavior will impact on the market share, and on the product success as well.

Their **Challenge** is to be able to Play with different scenarios or marketing efforts, and estimate the impact on the final results, to have a good view of what to expect.

Issues in mind:

Understand the market behavior and the expected market share, according to different actions they can undertake. These actions are related to different scenarios, so they will like to try different actions in a risk free environment, before taking decisions.
They also want to include the market behavior, according to the failure of other OTC drugs. Population has a different behavior according to sex and age.

Project Goals

- Simulate and analyze different Market scenarios, for the following five years. The Simulator will calculate de Gross profit and Net profit in each time step, according to the variations of market share.

- Run a Sensitivity analysis and build a Tornado graph, for the most relevant variables. Be able to vary the value of different variables, recalculate the impact and its variation, using 50 to 100 runs per variable, and order them according to the magnitude of their variance.

- Run a Montecarlo Analysis, to detect the magnitude of the risk of the investment. With the different most probable scenarios, the goal is to determine the magnitude of risk of each of them, using a Monte Carlo analysis, with a normal distribution probability frame.

- Estimate the NPV and the IRR of each chosen scenario.

SOLUTION

Based on Anylogic, with a discrete event simulation approach, we have designed and developed a solution.

A Pharmaceutical drug Company, willing to launch a new drug.This drug can be sold over the counter or with prescription.
To do so, although they have market information, and know the target population for the product, and although they have quantify how does market react to marketing efforts, they do not know for certain how does this impact on revenue.

Company has an estimated population that will use the drug.Within this population, some of them will use over the counter drugs, without prescription, and will have a certain behavior according to failure or success with the treatment.
Some of them will switch to prescript treatment after failure, and some will try with others non prescript treatment for more than once.

The behavior of females and males will be estimated, according to probabilities, using an action chart, and model will deliver the potential gain of consumers, to estimate the correct value of the product share (picture 1). We are considering sex, type of treatment, failure with treatment, behavior.
The output of this action chart, males and females share, will be the input for the running model, and will be recalculated each month according to the population variations, due to advertising incidence.

At the same time there is a prescript population, were the company's drug or potential drug has already a certain Physicians Share. This treatment also face a cycle of failure or success and there is a customer's attitude that will change the expected consumers. In this case the action of Reps on medical population, may change the consumer's share. (picture 2)

Finally, taking as input the previous estimations, that change as the model runs, we arrive to the correct estimation of the net revenue, according to the changes that marketing population suffer along the time.
Once calculated the potential gained pool of consumers of both population, model can estimate a projection, gross and net revenues expected for the estimated market share.
So, the first output of the model will be the expected revenue, for the defined time period (picture 3).

A second output will be the dispersion of all the variables that the company is using to change marketing behavior.
These variables have a cost, and the company can invest more of less money on them, according to the variability of its response, in other words, according to risk.
So, the company would like to understand, from the four marketing variables they are using to change market share, such as reps' cost, or advertising cost, etc., which have a bigger dispersion on revenue.

To achieve this, we can run the simulation, varying the the money expended in each of them, in a certain range, and order the results in a a tornado graph. With our tool we can do it automatically, with a sensitivity analysis. We will now know, which marketing variables may have a bigger influence, if we spend more money on them and which variables are more stable, that means that no matter how much money we spend on them, revenue will not change too much.

Step 1

Play with Scenarios & Play with your Variables. Imagine different answers to marketing actions from men or women, young or adults. Action chart will deliver the potential gain of consumers picking population agents individually. Running the model will recalculate each month according to the population variations, due to advertising incidence. Have loops feedbacks.

Step 2

Compare Runs, with Parameters Variation. In a methodic way, the experiment will show you the variation on the outputs and allow to compare costs and benefits of each action along time.

Step 3

Sensitivity Analysis. View in a Tornado graph, which of your variables have a larger or smaller probability of impact on your output. Measuring the probabilities allow you to make decisions based on risk.

Step 4

Optimize. Search for the best value of your variables for the goal you are looking for. Define your objective with an equation or number, apply constrains and just run the optimizer. It will deliver the best variables combination.

New Product Launch Simulation Model