# CASE STUDY: Pharmaceutical

**Optima Systems, a Dyalog Ltd Application Development Partner, was approached by a major pharmaceutical manufacturing company who wanted to model how their new products would sell around the world, the revenues that they might earn and the sensitivity to marketing spend.**

To make this work we had to write a data driven model of how patients present to their doctors and the manner in which drugs are prescribed (or not) in response to their symptoms. This was termed the "Doctor Visit" model.

A PC-based system was written which contained such a model and allowed total flexibility over which parts of the model were to be included or excluded. The model was represented graphically and could be changed at any time for any specific scenario.

The modelling process could be set to run for 5 years (high detail) or 20 years (low detail). The system dynamically changed the calculations to suit whichever mode of operation was chosen and the complexity of the doctor visits.

Once the baseline parameters were set the researcher had to input information regarding dosage, duration, launch, cost per dose, pack size, market penetration, drop out rates and so on. Finally, we had the United Nations world population survey broken down by sex, age and country for the next 40 years. This data was kept updated on a regular basis as any forecasts changed.

Since the population numbers to be dealt with were large and the incidence of the ailments known to a reliable degree of accuracy, presenting patient numbers could be generated by the system and passed forward into the model.

The system allowed for an unlimited number of ailments to be specified and/or grouped then combined with the doctor visits to model drug prescribing patterns around the world.

The calculations had to run on a day-by-day basis, that is, values were generated for each day so that an allowance could be made for treatment duration and drop-out rates. At the end of the process an interface allowed the researcher to view all of the calculated data in a variety of ways then report up.

The system became very useful to the customer in question and is still being heavily used in its marketing departments.

One particular point of interest is that it allows for the modelling of own and competitor products. In one world wide scenario that was run, several competitor products were trialed side-by-side to see how they might do in the same marketplace. Clearly the output results will depend heavily on the

quality of the data going in but as trends changed and the product mixes varied this model was quickly modified to reflect such.

The created system was very easy to operate, allowed huge amounts of flexibility in how it operated internally and produced presentation-quality output on demand.

The challenge for us was to make the internals (even aspects of the screen display) totally data driven. No two models will work in exactly the same way. It proved to be a useful exercise in modular design before the luxuries of object orientation were available to us.

Very large models could be run in under an hour or more usually 5-10 minutes so the marketing departments could normally produce a discussion document on a proposal very quickly.

The system is being used to explore potential revenue streams around the world and to target marketing spend where maximum benefit can be made.